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DISKUSSIONSBEITRÄGE

Anreiz- und Verteilungswirkungen der Steuerreform 2000

von

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Incentive and Redistribution Effects of the German Tax Reform 2000

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This paper analyzes the impact on work incentives and income distribution of the German tax reform 2000 and alternative tax regimes which might be viewed as examples for tax reforms on the agenda in Europe. The approach is based on a comprehensive microsimulation model for taxes, social security contributions and transfers in the Federal Republic of Germany, which is combined with a micro- econometric behavioral model. The main findings of the paper are: the tax reform 2000 generates positive labor supply incentives; almost all persons in dependent employment profit from the tax reform. However, a significant decline in unemployment cannot be expected as a result of the tax reform alone. (JEL: H 31, J 22)

1. Introduction

The tax reform 2000 is one of the most important economic reforms in Germany in the last few decades. Other countries such as France and Italy are planning tax reforms along similar lines (see e.g. Financial Times Deutschland, July 17th, 2000, p. 1). This paper analyzes the impact on incentives and income distribution of the German tax reform 2000. The analysis is based on a comprehensive microsimulation model[1], which uses a representative data set, and which is combined with a microeconometric behavioral model for the labor supply of married women in the Federal Republic of Germany.

During the last few decades, in the Federal Republic of Germany the parameters of tax, social security and transfer rules have changed considerably and often not systematically. Examples include substantial increases of the basic personal allowances by order of the German Federal Constitutional Court on September 25th, 1992, a tenfold increase of the allowance for in-

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1 This microsimulation model GMOD has been used in several previous studies. See Wagenhals (1998, 1999) and the references quoted there.

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come from capital investment in 1993, which was then halved in 2000, the introduction of an additional solidarity charge because of the German unification, frequent changes of the basic and top rates, as well as many modifications of social security contributions and transfer rules. Therefore, marginal effective tax rates, defined as sum of the marginal tax rates calculated according to § 32 a of the income tax law (EStG), the marginal social security contributions and the marginal withdrawal rates of transfers, changed considerably according to population and time. Individual labor supply responses may be traced back to such exogenous changes of individual marginal effective tax rates, with the German tax reforms during the second half of the 1980s and during the 1990s serving as natural experiments.

Together with changes in wage dispersion and cohort effects, variations of the marginal effective tax rates imply variations of marginal effective wage rates and of net incomes from all sources of income. These changes offer an opportunity to estimate labor supply effects. This paper adapts to the German case an approach developed by Blundell, Duncan and Meghir (1998). They used a sequence of tax reforms to identify and estimate the labor supply of married women in the United Kingdom. This approach is compatible with the assumption of life cycle optimization. It allows for search unemployment and for fixed costs of work (such as child care or transportation costs). The importance of fixed costs of work, as well as the significant number of individuals actively looking for a new job, exclude the use of a Tobit model or of one of the usual reservation wage models (see e.g. Mroz (1987)).

The main idea of the estimation procedure used is to group the data according to age cohorts and education levels. The different growth rates of the real wages in these groups reflect exogenous changes in the demand for labor of different levels of qualification, and these have to be excluded from the labor supply equation. Female labor force participation, wages, other income and labor supply are treated as endogenous variables.

In principle, macroeconomic repercussions of the tax reform, especially the impact of the financing, e.g. by restricting tax depreciation arrangements, by reducing public expenditures, by increasing taxes elsewhere or by new net borrowing, could be integrated in the model. However, the corresponding policy measures must be precisely formulated so that they can be converted into computer code. At the time being, this is not the case. Here, the integration of the model in a numerically implemented intertemporal computable equilibrium model[2] might make sense, because the approach used in this study is compatible with the assumption of life cycle utility maximization contrary to most other labor supply models[3].

2 See e.g. Fehr and Wiegard (1998).

3 See Blundell and MaCurdy (1999) for a review of labor supply models.

In this paper I do not attempt such a comprehensive macroeconomic analysis of the tax reform proposals. I "only" try to assess the impact of the tax reform on labor supply incentives and income distribution, where I focus on a precise mapping and analysis of the reforms.

The paper is organized as follows. The next section describes the data on which the paper is based. Section 3 introduces the microeconometric behavioral model. I present the estimated labor supply function as well as labor supply elasticities which are the most important determinant when studying the inefficiency of a tax system. Based on these results I analyze the impact of recent tax reform proposals on incentives and income distribution. I compare the impact of the proposals of the German government[4], of the CDU/CSU opposition[5] and of a compromise finally adopted based on a recommendation of the upper house of the German Parliament (Bundesrat)[6]. A final section summarizes the main results.

2. Data and Sample Selection

The analysis is based on the German Socio-Economic Panel (GSOEP), waves A to O, 1984–1998. Some of the variables are sampled retrospectively, therefore the estimates are based on the period 1984–1997. After elimination of evidently wrong or contradictory observations, I obtain a cleaned data set of 42,331 married couples and of 23,054 single persons. These data are the input of my microsimulation model GMOD. For all private households and/or persons in the sample this model generates a large number of variables, e.g. income distinguished from all seven types of income in the German income tax law, taxable income, income taxes, social security contributions (for health, old age, unemployment and care insurances) as well as transfers (social assistance, housing benefits and child allowance). Total and marginal tax and social security burdens as well as total and marginal relief due to transfers may be calculated for any individual or household and may be extrapolated to the residential population of the Federal Republic of Germany.

Research on the labor supply of married men and single women almost always shows very small responses to changes of taxes, social security contri-

4 Tax Reduction Act (Draft Bill), Parliamentary Papers (Drucksachen) No. 14/2683 and 14/3074 of the lower house of the German Parliament (Deutscher Bundestag).

5 Law for a Tax Reform to Foster Growth and Employment (Draft Bill), Parliamentary Paper (Drucksache) 14/2903, Deutscher Bundestag.

6 Tax Reform Resolution of the federal states Berlin, Brandenburg, Bremen, Hamburg, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatine, Saxony-Anhalt and Schleswig-Holstein on July 14th, 2000.

Table 1

Descriptive Statistics: Means (Standard Errors in Italics), Former Federal Republic

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Sample of Workers														
Weekly Hours	31.8	30.8	31.5	31.2	30.3	31.1	30.6	30.3	30.4	30.0	30.3	30.1	30.3	30.5
	13.0	*12.6*	*12.0*	*12.0*	*12.9*	*12.1*	*12.6*	*12.4*	*12.0*	*12.6*	*12.5*	*12.4*	*12.5*	*12.6*
Wage (DM)	20.8	19.9	21.1	19.0	23.0	21.3	22.7	21.6	22.7	23.2	22.2	24.8	23.1	23.1
	29.1	*27.7*	*29.4*	*11.3*	*33.2*	*28.3*	*22.9*	*15.8*	*19.0*	*17.9*	*11.6*	*22.4*	*13.5*	*13.8*
Other Income	58.2	59.6	59.2	61.5	63.4	63.5	65.2	67.8	70.5	68.6	69.3	69.3	67.9	68.2
(1,000 DM)	*37.0*	*39.0*	*33.5*	*30.1*	*35.8*	*30.6*	*30.9*	*36.1*	*45.9*	*42.0*	*47.4*	*45.6*	*36.4*	*42.6*
Age	39.6	40.0	39.8	39.8	40.1	40.5	40.3	40.9	41.0	41.2	40.9	40.9	41.1	41.1
	8.2	*8.4*	*8.4*	*8.4*	*8.4*	*8.4*	*8.6*	*8.4*	*8.2*	*8.4*	*8.4*	*8.4*	*8.2*	*8.1*
Years of Education	11.3	11.3	11.3	11.3	11.5	11.3	11.4	11.5	11.6	11.7	11.9	12.1	12.0	12.1
	2.1	*2.1*	*2.2*	*2.1*	*2.2*	*2.1*	*2.1*	*2.1*	*2.1*	*2.2*	*2.3*	*2.4*	*2.4*	*2.4*
Children <16	0.74	0.69	0.66	0.69	0.72	0.72	0.70	0.71	0.70	0.69	0.64	0.65	0.69	0.69
Sample of Non Workers														
Other Income	64.7	64.1	66.0	69.1	69.9	71.8	76.0	76.1	75.8	73.6	77.4	76.8	74.0	72.7
(1,000 DM)	*48.5*	*41.1*	*36.4*	*39.2*	*36.0*	*43.2*	*44.1*	*42.4*	*42.2*	*40.6*	*69.3*	*42.3*	*42.5*	*39.5*
Age	40.5	40.7	40.7	41.1	41.1	41.4	41.9	41.0	41.5	41.8	42.2	41.4	40.9	41.1
	9.1	*9.0*	*8.8*	*8.7*	*8.8*	*8.7*	*8.9*	*9.2*	*9.1*	*9.2*	*9.2*	*8.8*	*9.1*	*9.1*
Years of Education	10.9	11.1	11.0	11.0	11.1	11.1	11.2	11.2	11.3	11.4	11.4	11.6	11.6	11.6
	1.8	*1.9*	*1.8*	*1.7*	*1.7*	*1.8*	*1.8*	*1.8*	*2.0*	*2.1*	*2.1*	*2.3*	*2.2*	*2.2*
Children <16	1.16	1.17	1.17	1.13	1.10	1.13	1.06	1.06	1.06	1.11	1.12	1.24	1.23	1.20
Participation rate (per cent)	44.7	45.3	47.2	50.4	51.9	54.5	56.4	58.8	60.1	60.4	58.7	60.1	59.0	61.9

Note: Wages and Other Income in 1995 prices. Deflator: Cost-of-Living Index.

butions and transfers. Therefore, I assume the labor supply of these groups as given and concentrate on the labor supply of married women[7]. To estimate the parameters of the behavioral model I select from the complete data set of 42,331 married couples a subsample of married women aged between 23 and 55, who do not receive profit income (i.e. income from farming or forestry, income from trade or business or income from independent activities), and who are not eligible for social assistance or housing benefits, if the female does not work. Finally, civil servants are excluded. The age restriction tries to avoid a mixing of labor supply, education and retirement decisions. I exclude married women with profit incomes because I want to concentrate on persons in dependent employment. To simplify, I concentrate on females who are not eligible for social assistance or housing benefits when they are out of work. Housing benefits and social assistance are means-tested benefits which are taxed away at a rate up to 100 per cent. The budget sets of such households are highly non convex, which complicates the estimation of labor supply functions considerably[8].

After the application of these three selection criteria I obtain a sample of 23,873 married women, 13,840 of whom are in the labor force. The labor force participation rate amounts to some 58 per cent. This is somewhat high compared to the overall participation rate of married women in Germany and results mainly from the non-eligibility criterion used in selecting the sample. Tables 1 and 2 show descriptive statistics for the most important variables of the model.

3. Microeconometric Model

3.1. Participation, Wages and Other Income

The microeconometric behavioral model presented in this section closely follows Blundell, Duncan and Meghir (1998) and Wagenhals (2000). The data is treated as a sequence of cross sections. Three linear reduced form equations explain the labor force participation of married women, their wages and the other income of the households. Explanatory variables are the effective marginal tax rate when the female does not work, a complete set of group variables, time variables, group-time-interaction variables and demographic variables. I assume a linear relationship between the age of the youngest child and labor supply.

7 Donni (1999) presents alternatives in the context of a collective model, where the spouse's labor supply is assumed to be constrained, but a sharing rule is taken into account.

8 See e.g. Laisney et al. (1999) or Friedberg (2000).

Table 2
Descriptive Statistics: Means (Standard Errors in Italics), New Federal States

Year	1991	1992	1993	1994	1995	1996	1997
Sample of Workers							
Weekly Hours	39.7	41.5	41.4	41.5	42.0	40.7	41.8
	9.7	*8.3*	*8.6*	*9.1*	*10.0*	*9.5*	*10.1*
Wage (DM)	14.5	15.5	16.2	16.9	17.3	18.7	18.2
	13.4	*9.9*	*7.8*	*7.0*	*8.6*	*8.9*	*8.2*
Other Income	32.2	41.2	46.0	46.6	49.0	50.2	47.9
(1,000 DM)	*12.9*	*24.1*	*21.1*	*20.1*	*21.6*	*49.4*	*25.9*
Age	40.5	41.2	40.7	41.6	42.0	42.3	42.5
	8.6	*8.2*	*8.2*	*8.1*	*8.1*	*8.0*	*7.8*
Years of Education	12.9	13.0	13.1	13.1	13.1	13.1	13.1
	2.5	*2.5*	*2.5*	*2.5*	*2.4*	*2.4*	*2.4*
Children <16	0.97	0.88	0.94	0.82	0.80	0.75	0.67
Sample of Non Workers							
Other Income	37.3	42.1	43.7	48.8	49.9	50.9	50.4
(1,000 DM)	*12.7*	*13.9*	*13.5*	*15.6*	*16.6*	*21.5*	*17.5*
Age	40.5	41.4	41.9	42.0	42.1	43.1	42.9
	10.4	*9.5*	*9.4*	*9.6*	*9.9*	*9.6*	*9.2*
Years of Education	11.8	12.0	11.8	11.7	11.9	11.7	12.1
	2.2	*2.3*	*1.7*	*1.8*	*2.1*	*2.2*	*2.1*
Children <16	0.94	0.96	0.93	1.02	1.12	0.95	0.86
Participation Rate (per cent)	86.6	80.1	77.6	79.3	82.7	80.2	81.8

Note: Wages and Other Income in 1995 prices. Deflator: Cost-of-Living Index.

The participation equation is modeled using a probit approach. The hazard rate generated serves as an additional regressor in the wage equation to allow for a potential selection bias. The estimation results show, however, that the coefficient of Heckman's selection term is not significantly different from zero. (The *P*-value amounts to 0.149.)

Time-group interaction variables and the marginal effective tax rate when the woman does not work, i.e. the excluded variables in the hours equation, are significantly different from zero in all reduced forms. The *P*-value of the corresponding Wald-test is less than 0.001.

3.2. Labor Supply

The parameters of the labor supply function are estimated consistently using the least squares method. If h_{it} denotes the average number of hours

worked per week by the i-th female in the financial year t, then the labor supply equation is

$$h_{it} = a_g + m_t + \theta' d_{it} + \beta \ln w_{it} + \gamma \mu_{it} + \delta^p \hat{v}_{it}^p + \delta^w \hat{v}_{it}^w + \delta^\mu \hat{v}_{it}^\mu + e_{it}$$

where the a_g are coefficients of group-dummies, the m_t are coefficients of dummies for financial years, d_{it} is a vector of demographic variables, w_{it} is the individual marginal net wage, and μ_{it} is other income, defined as difference between the household's net disposable income and the female labor income. $\hat{v}_{it}^p$ is the hazard rate from the reduced form participation equation, $\hat{v}_{it}^w$ and $\hat{v}_{it}^\mu$ are the residuals from the reduced forms for wages and other income.

Table 3 shows the results for the weekly hours of work equation[9]. The asymptotic standard errors, t- and P-values account for potential heteroskedasticity of unknown form, within group dependencies and the use of generated regressors, because the covariance matrix of the estimated parameters is estimated by

$$\hat{V} = (Q'Q)^{-1} \left(\sum_{g=1}^{G} \sum_{t=1}^{T} \left(Q_{gt}' \hat{v}_{gt} \hat{v}_{gt}' Q_{gt} + \sum_{k=1}^{K} \hat{\delta}_k^2 Q_{gt}' \Gamma_{gt}^k V(\hat{\gamma}_k) \Gamma_{gt}^{k'} Q_{gt} \right) \right) (Q'Q)^{-1}$$

where Q denotes the matrix of observations (including the time effects, the group effects and the generated regressors) over the whole sample. Q_{gt} is the corresponding matrix for a group g in year t. $\hat{v}_{gt}$ denotes the vector of estimated residuals within a group g in year t. $\hat{\delta}_k$ is the estimated coefficient of the kth vector of reduced form residuals ($k = 1, 2, 3$), Γ_{gt}^k is the matrix of explanatory variables of the kth reduced form equation, and $V(\hat{\gamma}_k)$ is the covariance matrix of the vector of coefficients $\hat{\gamma}_k$ of the kth reduced form equation. Under weak assumptions Blundell, Duncan and Meghir (1998, Appendix B) show that $\hat{V}$ is consistent, if the number of groups G and the number of time periods T is fixed, but the number of individuals in each group goes to infinity.

The exogeneity of the participation decision, the wage rate and the other income may be directly tested using the t-statistics of the δ parameters (Smith and Blundell, 1986).

Table 4 shows the financial year dummies. By and large, time effects have been declining over time and have been insignificant since the early 1990s.

9 Individual effects are not presented because I treat the data as a sequence of cross sections. Utilizing the information on the panel structure of the data, I also estimated a fixed-effects model using the within estimator. The results were in line with the results presented in table 3. Of course, the time invariant regressors of the labor supply equation were spanned by the individual effects. I also estimated a random-effects model using a feasible generalized least squares estimator, but a Hausman test rejected the appropriateness of this approach.

Table 3
Labor Supply Function

Variable	Coef.	Std. error	*t*-value	*P*-value
Constant	32.8	3.97	8.27	0.00
Youngest Child Aged				
0–2	–7.68	2.55	–3.01	0.03
3–6	–7.78	1.55	–5.01	0.00
7–10	–5.50	1.18	–4.67	0.00
11–15	–3.77	0.95	–3.96	0.00
Log Wage	2.92	1.27	2.30	0.02
Other Income	–0.12	0.07	–1.64	0.10
East-West-Dummy	10.6	1.75	6.07	0.00
Birth Cohort				
Before 1940	–6.99	1.72	–4.06	0.00
1940–1949	–4.72	1.22	–3.87	0.00
1950–1959	–2.20	0.75	–2.92	0.00
Low Education Level	–1.23	0.83	–1.48	0.14
Residuals				
Participation	1.34	2.69	0.50	0.62
Wages	–7.69	1.18	–6.53	0.00
Other Income	–0.07	0.07	–0.93	0.35

$R^2 = 0.313$; $\bar{R}^2 = 0.312$; Root MSE = 10.5

Source: Own calculations. Note: The East-West-Dummy equals 0 for the "old" federal states, 1 otherwise. "Low Education Level" is a dummy variable which equals 1 if the number of years of schooling and apprenticeship is less than 12, and 0 otherwise. See table 4 for time effects on labor supply.

Table 4
Time Effects on Labor Supply, 1984–1995

Financial Year	1984	1985	1986	1987	1988	1989
Coefficient	4.45	3.24	3.44	3.43	2.13	2.85
Standard Error	1.01	0.88	0.77	0.76	0.68	0.77
Financial Year	1990	1991	1992	1993	1994	1995
Coefficient	1.77	0.95	1.53	0.83	0.64	0.27
Standard Error	0.81	0.69	0.70	0.73	0.62	0.44

Source: Own calculations. Base Financial Years 1996 and 1997.

Table 5
Labor Supply Elasticities, Married Women, Federal Republic of Germany, 1984–1997

Statistic	Income Elasticity	Uncompensated Wage Elasticity	Compensated Wage Elasticity
Mean	–0.19	0.12	0.25
Standard Deviation	0.38	0.14	0.23
Minimum	–14.4	0.03	0.04
First Quartile	–0.20	0.07	0.18
Median	–0.09	0.08	0.22
Third Quartile	–0.05	0.13	0.27
Maximum	1.51	2.96	8.66

Source: Own calculations based on individual elasticities.

Blundell, Duncan and Meghir (1998) showed the same development of time effects for female labor supply in the United Kingdom.

3.3. Elasticities

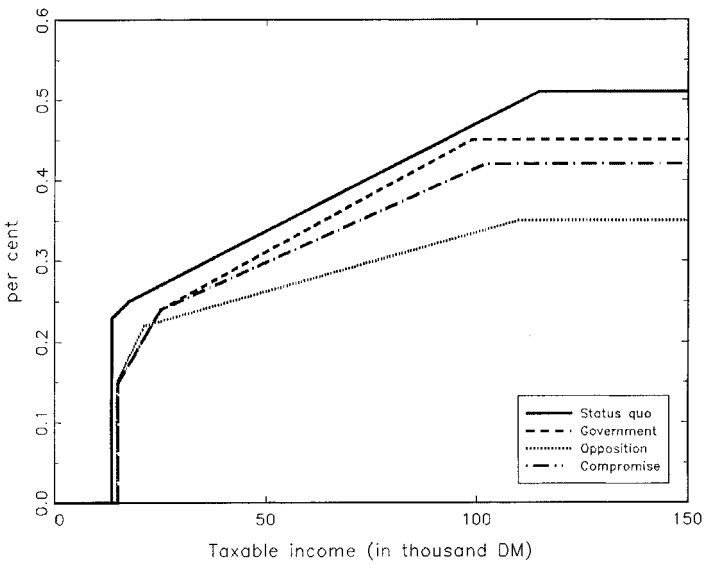
Labor supply elasticities determine the inefficiency costs of tax reforms. Therefore, I estimate these elasticities for all households in the sample. Table 5 shows that all elasticities are moderately sized. Almost all income elasticities are negative, all compensated and uncompensated wage elasticities are positive. Thus, the restrictions implied by economic theory are fulfilled for every household in the sample.

4. Policy Simulations

4.1. Introduction

The labor supply elasticities allow an analysis of the impact on incentives and income distribution of the tax reform 2000. Previous studies of this reform were restricted to summarizing conjectured tax revenues and an assessment of the impact on "typical" (whatever this may mean) and *fictitious* households without allowing for behavioral responses of households. The results presented here are based on a comprehensive microsimulation model which is combined with the microeconometric behavioral model sketched above. This combined model allows to assess the impact on tax revenues, on labor

Figure 1
Marginal Tax Rate Functions



Source: Own calculations according to the sources mentioned in footnotes 4, 5 and 6.

supply incentives and on the income distribution of reforms of the German tax, social security and benefit system. I avoid any interpretation-bias which may be caused by an arbitrary selection of examples.

4.2. Reform Proposals

The tax reform 2000 is the most ambitious tax program in the history of the Federal Republic. The government's draft of the tax reduction law 2000 scheduled three steps, in the financial years 2001/02, 2003/04 and 2005 (final stage). The CDU/CSU opposition proposed a faster reform in two steps, in the financial years 2001/02 and 2003 (final stage). On July 14th, 2000, the government agreed on a compromise with the upper house (Bundesrat), which represents the German federal states (Länder). Figure 1 shows marginal tax rates of the status quo (i.e. financial year 2000) as well as of the final reform stages. Table 6 summarizes the central elements of the tax reform 2000: successive increases of the basic personal allowance and successive rate cuts, including reductions of the basic tax rates and of the top tax rates. Measures to finance the reform are mainly concentrated on restrictions of existing tax depreciation arrangements.

Table 6
Tax Reform 2000. Proposals of Government, Opposition and Compromise in Comparison

	Status Quo	Government			Opposition		Compromise
Financial Year	2000	2001	2003	2005	2001	2003	2005
Basic Tax Rate [%]	22.9	19.9	17.0	15.0	18.0	15.0	15.0
Top Tax Rate [%]	51.0	48.5	47.0	45.0	42.0	35.0	42.0
Basic Personal Allowance [DM]	13,500	14,000	14,500	15,000	14,000	14,500	15,000
Lower Bound for Application of Top Tax Rate [DM]	115,000	107,500	102,000	98,500	108,000	110,000	102,000

Sources: See footnotes 4, 5 and 6. DM figures rounded to full 500 DM.

4.3. Incentives

To analyze the impact of the tax reform on labor supply incentives and income distribution, all taxes, social security contributions and transfers of the financial years 1984–1997 are assessed again with all applicable changes of the tax, social security and transfer laws. The simulations are based on the data for the financial year 1997, updated to the financial year 2000. Then I simulate the economic impact of all reform variants allowing for behavioral changes induced by the reform.

Table 7 shows the percentage increase of labor supply as well as the corresponding bootstrapped confidence intervals[10] for the final stages of the reform proposals. Labor supply increases some two percent. There is evidence that the labor supply incentives are somewhat stronger for the CDU/CSU opposition party proposal. The 95% confidence intervals reveal that the differences are not significant.

10 See Xu (2000) on inference using the iterated-bootstrap method.

Table 7
Percentage Increase of Labor Supply

Proposal	Financial Year	Increase (in %)	95% Confidence Interval
Government	2005	2.05	1.52 2.56
Opposition	2003	2.21	1.67 2.73
Compromise	2005	1.89	1.36 2.41

Source: Own calculations. Bias-corrected 95% bootstrap-confidence intervals based on 1,000 replications.

Table 8
Cash Gains: Means and Medians in DM per Month

Proposal	Financial Year	Cash Gain (Mean)	Cash Gain (Median)
Government	2001	90	90
	2003	150	150
	2005	200	200
Opposition	2003	260	200
Compromise	2005	260	200

Source: Own calculations rounded to full 10 DM.

4.4. Cash Gains

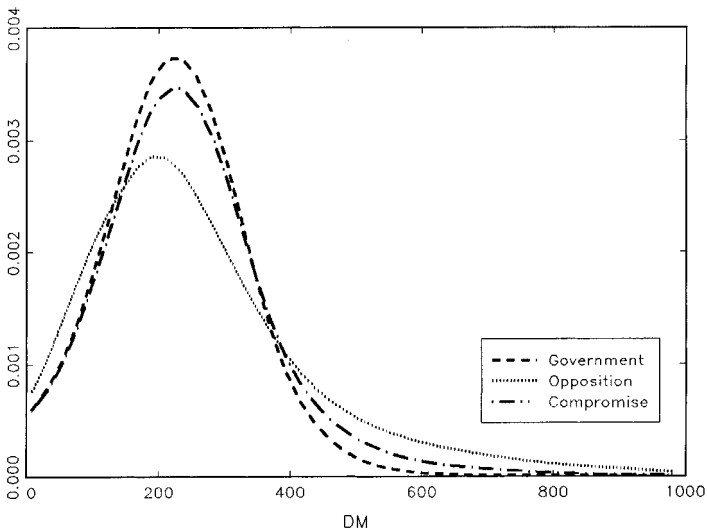
Now I look at the distribution of cash gains. The cash gain for financial year t is defined as the difference between the net disposable income in year t and in the year 2000, allowing for adjustments in labor supply[11].

Figure 2 shows estimated density functions of the monthly cash gains for three tax reform proposals, allowing for labor supply adjustments. They are based on Epanechnikov kernels, other kernel types do not change the estimated density significantly.

Table 8 shows location parameters of the monthly cash gain distributions according to alternative reform proposals. The government's original propo-

11 This reflects only the consumption dimension of the allocation problem faced by the household. The calculation of equivalent or compensating variations would be more satisfactory. However, because of the enormous complexity of the German tax-benefit system and the necessity to compute expected values across the total range of the error distribution, this is still a prohibitively time consuming process (see Preston and Walker, 1999).

Figure 2
Distribution of Monthly Cash Gains, 2005. Approximation by Kernel Density Estimator



Source: Own calculations based on Epanechnikov kernels.

sal implies that median and arithmetic mean of the gains are roughly equal, the opposition's proposal and the compromise imply that the arithmetic means of the distributions are some 60 DM above their median. This indicates a somewhat higher inequality of cash gains for the opposition and compromise proposals, which can be traced back to lower marginal tax rates for higher taxable incomes.

4.5. Income Distribution

To assess changes in the distribution of net disposable income due to the reform I estimated various inequality measures. I calculated the indices proposed by Piesch, Gini and Theil. The Piesch index is most sensitive to changes in high incomes, the Gini index to changes in middle incomes, and the Theil index to changes in low incomes[12].

Table 9 shows that all measures indicate increasing inequality compared to the pre-reform status quo 2000. The percentage increase attains its maxi-

12 See e.g. Piesch (1975) for formal definitions of these inequality measures.

Table 9

Impact on Distribution: Inequality of Net Disposable Income and of Gross Income. Piesch, Gini, and Theil Indices (Bootstrapped Standard Errors in Italics)

Proposal		Piesch	Gini	Theil
Status Quo	2000	0.1367 *0.0018*	0.1670 *0.0018*	0.0545 *0.0020*
Government	2001	0.1381 *0.0019*	0.1689 *0.0019*	0.0556 *0.0022*
	2003	0.1375 *0.0019*	0.1683 *0.0019*	0.0554 *0.0021*
	2005	0.1385 *0.0020*	0.1696 *0.0020*	0.0563 *0.0023*
Opposition	2003	0.1458 *0.0021*	0.1774 *0.0022*	0.0631 *0.0028*
Compromise	2005	0.1403 *0.0020*	0.1716 *0.0019*	0.0581 *0.0225*
Gross income	2000	0.1865 *0.0024*	0.2307 *0.0024*	0.0989 *0.0036*

Source: Own calculations. Bootstrapped standard errors based on 1,000 replications. Bias is of no concern because it is always less than 5% of the standard error (see Efron, 1982, p. 8).

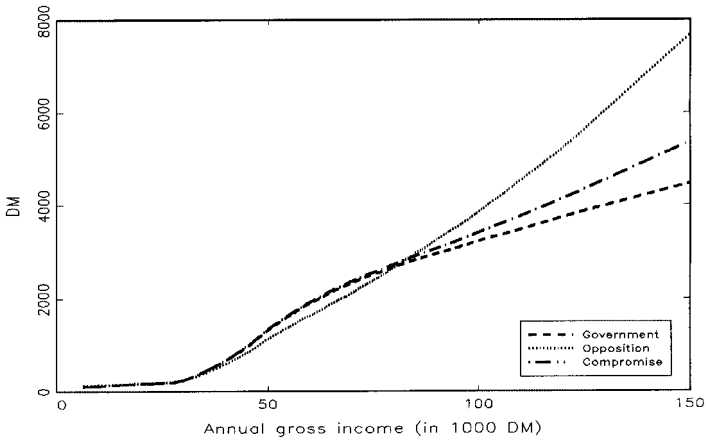
mum when the bottom-sensitive Theil index is used. However, the absolute increases are small when compared to their bootstrapped standard errors. After the reform, the inequality of the distribution of the net disposable income remains still considerably smaller than the inequality of the distribution of gross income ("Gesamtbetrag der Einkünfte").

4.6. Who Profits?

Most households profit from the tax reform: in 2005, the real net disposable income of some 97 percent of all households will be higher than in 2000. Only some three percent of all households do not profit from the tax reform because their taxable income is smaller than their basic personal allowance before and after the reform.

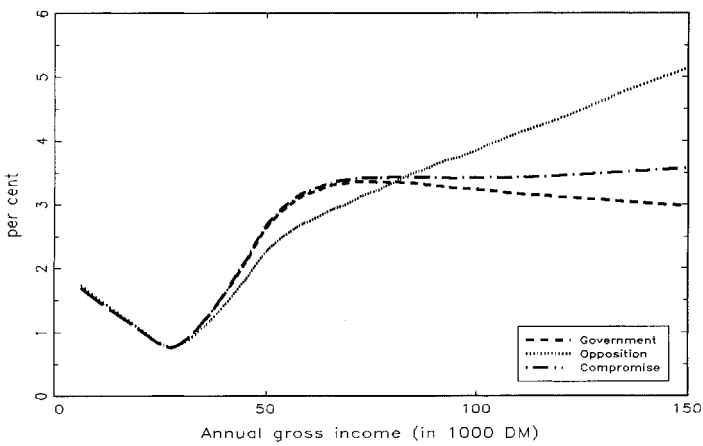
Figure 3 shows the *absolute relief* of the households, measured as annual cash gains, depending on annual gross income, for the initial government proposal, the proposal of the CDU/CSU opposition, and the Bundesrat compromise. I use the nonparametric robust local regression estimator proposed by

Figure 3
Annual Cash Gains Depending on Annual Gross Income



Source: Own calculations. Nonparametric local regression using a *lowess running-line smoother* (Cleveland, 1979). Bandwidth: 0.1.

Figure 4
Annual Cash Gains as Percentage of Annual Gross Income Depending on Annual Gross Income



Source: Own calculations. Nonparametric local regression using a *lowess running-line smoother* (Cleveland, 1979). Bandwidth: 0.1.

Cleveland (1979). Not surprisingly, for all reform proposals, gains increase with gross income.

Figure 4 shows the *relative relief* of the households, measured by the annual cash gains as percentage of the annual gross income, depending on annual gross income for the same three reform proposals. The relative relief for households with very small incomes amounts to some two percent. With increasing gross income, relative relief first decreases somewhat, to increase again to a level of some three percent of the gross income. The CDU/CSU opposition's proposal implies a somewhat higher relative relief for higher income brackets.

5. Conclusions

This paper uses reforms of the German tax, social security and transfer system to identify labor supply responses of married females. It closely follows a very flexible microeconometric model proposed by Blundell, Duncan and Meghir (1998) and adapts it to German conditions. I combine this microeconometric model with my microsimulation model GMOD to analyze the most important aspects of the tax reform 2000 for persons in dependent employment. However, I cannot model and analyze the reform of corporate taxation because a suitable representative data set does not exist. Particularly, I cannot account for the replacement of the system of full imputation of corporation tax by a so called half-income system, which might be disadvantageous to some of the small shareholders in the sample. Although I do have some information on the level of income from capital investment, I do not know the structure of the households' portfolios. If I assume that households with higher gross incomes tend to have higher dividend incomes, then the increase in relief of households with higher gross income may be somewhat smaller than indicated above.

Summing up, the tax reform 2000 is a first important step to reduce the disincentive effects of labor taxation. Although the tax reform alone will not lead to a dramatic decline in unemployment, significant positive incentives on labor supply cannot be ignored. If the impacts of tax reforms have to be judged, behavioral changes must not be neglected.

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