FiFo-CPE Discussion Papers
Finanzwissenschaftliche Diskussionsbeiträge

Discussion Paper No. 07-6

Is a Flat Tax politically feasible in a grown-up Welfare State?

Clemens Fuest, Andreas Peichl und Thilo Schaefer

2007

Finanzwissenschaftliches Forschungsinstitut an der Universität zu Köln

FiFo Köln is a Member of CPE -
Cologne Center for Public Economics

fifo-koeln.de
cpe.uni-koeln.de

FiFo-CPE Discussion Papers
Finanzwissenschaftliche Diskussionsbeiträge
No. 07-6 / June 2007
ISSN 0945-490X

Is a Flat Tax politically feasible in a grown-up Welfare State?

Prof. Dr. Clemens Fuest[1]
Dipl.-Volksw. Andreas Peichl[2]
Dipl.-Volksw. Thilo Schaefer[3]

[1] clemens.fuest@uni-koeln.de.
[2] a.peichl@uni-koeln.de.
[3] schaefer@fifo-koeln.de.

Finanzwissenschaftliches Forschungsinstitut
an der Universität zu Köln

A Member of CPE -
Cologne Center for Public Economics
P.O. Box 420520, D-50899 KÖLN
Zülpicher Str. 182, D-50937 KÖLN
T. +49-221-426979
F. +49-221-422352
http://fifo-koeln.de
http://cpe.uni-koeln.de

Is a Flat Tax politically feasible in a grown-up Welfare State?

Clemens Fuest, Andreas Peichl, Thilo Schaefer*

This version: June, 2007

Abstract

The introduction of a flat tax is supposed to have several advantages. Administration and compliance costs are reduced, as well as incentives for tax evasion. Furthermore, positive employment and growth effects are expected. Despite these advantages, a flat rate tax is not very popular in most Western European countries. The most important objection against a flat tax states that a flat rate tax would be inequitable and unfair. The present paper uses a simulation model based on a unique database of German micro data to provide empirical evidence for the analysis of the equity and efficiency effects as indicators for the political feasibility of flat rate tax reforms. Our analysis shows that the selection of the schedule and tax base parameters are crucial for the effects of flat tax reforms in terms of equity and efficiency. A flat rate tax with a higher basic allowance and a higher single rate has less harmful distributional effects than a flat rate tax with low basic allowance and tax rate. Nevertheless, the scenario with the lowest parameter values for basic allowance and tax rate is the only alternative that leads to positive labour supply and significantly positive welfare effects. Both labour supply and static welfare effects, however, are quite small. Although we have derived our results for the case of Germany, we do think that similar patterns would be observed in other countries of Western Europe. If this proves to be correct, it will be hard for flat tax reforms to invade the grown-up welfare states of "Old Europe".

JEL Codes: D31, D60, H20

Keywords: Flat Tax reform, equity, efficiency, distribution, welfare

* Cologne Center for Public Economics (CPE), University of Cologne, Germany. E-Mail: clemens.fuest@uni-koeln.de, a.peichl@uni-koeln.de, schaefer@fifo-koeln.de

1 Introduction

European welfare states are under pressure because of population ageing and globalisation. The former increases the need for public funds whereas the latter makes tax bases (sources of public funds) more elastic and tends to increase unemployment of low-skilled workers. The complex tax benefit systems of grown-up welfare states are frequently seen as inappropriate to meet the economic challenges ahead. Therefore, fundamental reforms of the tax system are proposed. The introduction of flat rate tax systems is widely seen as a reform which may boost efficiency, employment and growth through simplification and higher incentives. However, these efficiency effects do not come for free. Inequality is likely to increase as a consequence of a flat tax reform. This, in effect, questions their chances to gain political support.

For a long period of time, flat rate taxes have only been implemented in tax havens like Hong Kong or the Channel Islands. But during the last decade, the flat tax idea has been very successful in Eastern Europe. Estonia (1994), Lithuania (1994), Latvia (1997), Russia (2001), Slovakia (2004), Ukraine (2004), Georgia (2005) and Romania (2005) recently adopted flat tax systems.[1] So far, this development has not yet reached the grown-up welfare states of "Old Europe". Nevertheless, flat rate taxes are high on the political agenda in various countries. This is not only true for other Eastern European countries like for example the Czech Republic, Poland or Slovenia. The idea is also discussed in Western European countries like the Netherlands, Denmark or Germany. If the flat tax continues creeping up to the West, geographically, Germany would be the next and the first Western country to adopt a flat tax. Recently, the council of economic advisors to the ministry of finance proposed a flat rate tax for Germany.[2] Furthermore, the reform proposals of Kirchhof (2003) and Mitschke (2004), which have been controversially discussed before the election in 2005, chose (almost) flat schedules.

In the discussion of the flat tax "a notable and troubling feature [...] is that it has been marked more by rhetoric and assertion than by analysis and evidence".[3] As flat taxes have not been implemented in Western countries yet, only simulation models are able to provide empirical data for the analysis of reform proposals to satisfy this need for empirical evidence. The aim of this paper is to conduct a comprehensive empirical analysis of the economic short-term effects for different flat tax reform proposals in terms of both equity and efficiency within the same microeconometric framework. We use a microsimulation model based on a unique database of German micro data to provide empirical evidence for our analysis. We analyse if different kinds of flat rate taxes always yield distributional effects at the expenses of the middle class and if they indeed result in positive efficiency and employment effects. We concentrate on

[1] C.f. OECD (2006) or Keen et al. (2006).

[2] C.f. Wissenschaftlicher Beirat beim Bundesministerium der Finanzen (2004).

[3] Keen et al. (2006), p. 3.

the short-term effects using a static comparison. There might be further efficiency gains from the introduction of a flat tax system in the long term but the short term effects will decide the political feasibility of a tax reform. Comparing the results for different flat tax reform scenarios allows us to analyse the effects of the two main schedule parameters - marginal rate and basic allowance - on the results. We quantify the impact of these flat tax reform scenarios on the distribution of after tax disposable income, the effective marginal income tax rates faced by different types of taxpayers, and the supply of labour. Furthermore, we estimate the change in welfare caused by the tax system. As far as we know, this has not been analysed with real mirco data yet.[4] Our analysis is based on a simulation model for the German tax and transfer system (FiFoSiM) using income tax microdata and household survey data. The qualitative results should be of interest to a wider range of countries, especially with a similar structure of the tax benefit system.

Our analysis yields the following results. A flat rate tax reform increases the inequality and reduces the polarisation of the distribution of disposable incomes. Inequality increases less the higher the marginal tax rate and basic allowance are. The efficiency effects are ambiguous and depend on the selection of the flat tax parameters. The effective marginal tax rates are decreasing for some taxpayers (especially with high incomes) and increasing for others. The labour supply effects are negative for high marginal rates but positive for scenarios with low parameter values. The welfare analysis shows, that scenarios with low marginal tax rates increase welfare, whereas scenarios with high marginal rates result in negative welfare effects. Thus, the selection of the schedule and tax base parameters have decisive effects on the results in terms of equity and efficiency. Therefore politicians have to evaluate these effects carefully when choosing the parameters of a flat tax reform.

The setup of the paper is organised as follows: chapter 2 gives a short review of the flat tax and describes our reform scenarios. Chapter 3 contains a short description of our model and the database. Chapter 4 illustrates the distributional effects in terms of inequality, polarisation, winners and losers. Chapter 5 presents the efficiency effects in terms of effective marginal tax rates, labour supply reactions and welfare effects. The concluding chapter 6 confronts the effects on distribution and efficiency of the presented flat tax alternatives.

2 The Flat Tax

Flat rate tax systems may differ considerably in their design. In the literal sense a "Flat Tax" is a uniform tax rate on the total tax base.[5] Usually, a flat rate personal income tax is regarded

[4] We follow the method proposed by Creedy and Kalb (2006) which they only apply to an example with hypothetical data so far.

[5] This form of a flat rate (personal income) tax is at present only implemented in Georgia.

as an indirect progressive tax schedule with a basic tax allowance and a uniform marginal tax rate. Reform concepts proposing a flat rate tax generally combine the introduction of a new tax schedule with a broadening and simplification of the tax base to make the tax system more transparent (tax rate cut cum base broadening). These proposals aim at a complete coverage of all kinds of incomes. Therefore exemptions are abolished and double taxation is avoided. The latter is of special importance regarding the corporate taxation (capital gains). The most popular flat rate tax proposal is the "Flat Tax" of Hall and Rabushka (1995), which has not been implemented in its pure form yet. This proposal combines a cash flow taxation on business incomes with the same single marginal tax rate on labour income. Real investments are granted an immediate write-off, whereas financial investments are tax exempt. Therefore, the neutrality of the savings and investment decision is achieved through this S-Base Tax. Our analysis focuses on the first two elements of a flat tax - the indirect progressive tax schedule and the - as complete as possible - coverage of all types of incomes in the tax base.

The introduction of a flat tax with a basic tax allowance, low uniform marginal tax rate and a broad tax base to reform existing tax systems is supposed to have several advantages. Administration and compliance costs are reduced, as well as incentives for legal or illegal tax evasion.[6] Profit shifting and the relocation of investments in the international tax competition is avoided. Furthermore, positive employment and growth effects are expected. Moreover, Mirrlees (1971) simulated the optimal tax schedule being close to linearity. Browning and Browning (1985) estimate an increase in labour supply in the US by 5%, whereas Heer and Trede (2003) simulate an incline in employment by 2% in Germany using a macro data CGE model. Cajner et al. (2006) use a CGE model for Slovenia to simulate several tax reform scenarios. They find that in general progressive tax systems yield better results in terms of welfare than flat tax regimes but some flat tax scenarios might perform better in terms of growth and employment. From a theoretical point of view, the investment and employment effects are ambiguous. They depend on the composition of the tax base and the underlying labour market model (c.f. Fuest (2000)). In incomplete labour markets with collective bargaining and information asymmetries resulting in involuntary unemployment, the effects of lower marginal tax rates on employment are ex ante ambiguous.

Despite these advantages, a flat rate tax is not very popular in most Western European countries. The most important objection against a flat tax asserts, that a flat rate tax would be inequitable and unfair. The eligibility of this allegation depends crucially on the criteria for an equitable burden-sharing. The very reference to the ability-to-pay-principle is not sufficient, because this principle does not allow determining an optimal degree of progression or if a tax

[6] In Russia, for example, the revenue of the personal income tax increased by 25% in real terms, despite the sharp cuts in marginal tax rates on labour income. For Germany, Fuest et al. (2006) show that revenue neutral simplification of the tax base can reduce the compliance cost by appr. 8%.

system should be progressive at all. From a scientific point of view it is more distinct to analyse the effects of flat tax reforms on the tax burdens of different groups of tax payers. This analysis is extremely important with regard to the enforceability of such a reform proposal in the political process. Ho and Stiroh (1998), Dunbar and Pogue (1998) and Ventura (1999) show for the US that high income households are relieved, whereas especially middle income households are burdened by a flat tax reform. Altig et al. (2001) conclude that the lowest income households lose through a flat tax. In a study for the Netherlands, Caminada and Goudswaard (2001) also derive the result that a flat tax would yield redistribution at the expense of the lowest income deciles, whereas the magnitude of these effects is rather small.

We analyse two different flat rate tax reform scenarios which vary in the marginal tax rate and the basic tax allowance. The two combinations (FT 1 and FT 2) are chosen to be revenue neutral in combination with rigid simplification[7] of the German income tax system to broaden the tax base. The premise of revenue neutrality is chosen for a better comparability of the different scenarios. Table 1 presents the fiscal effects for the federal income tax including the solidarity surcharge.

	tax schedule parameters		fiscal effects	total fiscal effects
	basic allowance	marginal tax rate	tax schedule	in billion Euro
status quo	7664	15-42	190.93	190.93
FT 1	7664	26.5	-17.10	+0.21
FT 2	11650	32	-19.14	+0.07

Table 1: Reform scenarios and fiscal effects
Source: own calculations based on FiFoSiM

The column "fiscal effects tax schedule" reports the immediate fiscal effects when introducing the flat rate schedules without broadening the tax base. The combination of simplification and schedule adjustment yield the fiscal effects of column "total fiscal effects tax". When comparing the flat tax scenarios one can state that the short term loss of revenue increases with an increasing marginal tax rate and basic allowance. As the measures to broaden the tax base will strike in medium term the revenue neutral total fiscal effects are to be expected only after several years.

[7] The simplification bundle consists of the following measures: the abolition of deductibility of commuting costs and of the saver's allowance and the restriction of labour income related expenses to 1000 €, as well as the abolition of allowances for age, single parents, children and deductions for tax accountancy costs, church tax and donations (charitable and for political parties). A detailed analysis of the isolated and combined effects of these measures can be found in Fuest et al. (2006).

3 FiFoSiM: Database and Model

Our analysis is based on a behavioural microsimulation model for the German tax and benefit system (FiFoSiM)[8] using income tax and household survey microdata. The approach of FiFoSiM is innovative in so far as it creates a dual database using two microdata sets for Germany: FAST98 and GSOEP.[9] FAST98 is the income tax scientific use-file 1998 (FAST98) containing a 10%-sample of the German federal income tax statistics.[10] FAST98 includes the relevant data from income tax files of nearly 3 million households in Germany. Our second data source, the German Socio-Economic Panel (GSOEP), is a representative panel study of private households in Germany.[11] In 2003 GSOEP consists of more than 12,000 households with more than 30,000 individuals. A specific feature of FiFoSiM is the simultaneous use of both databases allowing for the imputation of missing values or variables in the other dataset.

The layout of FiFoSiM follows several steps: First the database is updated using the static ageing technique[12] which allows controlling for changes in global structural variables and a differentiated adjustment for different income components of the households. Second, we simulate the current tax system in 2006 using the modified data. The result of this simulation is the benchmark for different reform scenarios which are also modelled using the modified database.

The modelling of the tax and transfer system uses the technique of microsimulation.[13] FiFoSiM computes individual tax payments for each case in the sample considering gross incomes and deductions. The individual results are multiplied by the individual sample weights to extrapolate the fiscal effects of the reform with respect to the whole population. After simulating the tax payments and the received benefits we can compute the disposable income for each household. Based on these households net incomes we estimate the distributional and the labour supply effects of the analysed tax reforms. A detailed description of the FiFoSiM simulation model can be found in Peichl and Schaefer (2006).

[8] C.f. Fuest et al. (2005) and Peichl and Schaefer (2006) for a detailed description of the FiFoSiM simulation model.

[9] In the last years several tax benefit microsimulationsmodels for Germany have been developed (see for example Peichl (2005) or Wagenhals (2004)). Most of these models use either GSOEP or FAST data. FiFoSiM is so far the first model to combine these two databases.

[10] Cf. Merz et al. (2005) for a description of FAST98.

[11] Cf. Haisken De-New and Frick (2003) for an introduction to GSOEP.

[12] Cf. Gupta and Kapur (2000) for an overview of the techniques to modify the data for the use in microsimulation models.

[13] Cf. Gupta and Kapur (2000) or Harding (1996) for an introduction to the field of microsimulation.

4 Distributional effects

4.1 Distribution of disposable income

The introduction of a revenue neutral tax reform always yields winners as well as losers. To analyse the distributional effects of different reform scenarios we compute different distributional measures based on household equivalence disposable incomes[14]. The main results are presented in table 2. The first column contains the values for the current tax system in 2006 (status quo). In the following rows the changes of the mean disposable income for each decile, the fractions of households winning or losing disposable income[15] and the measures of inequality and polarisation[16] are reported in per cent for each scenario before and after labour supply reactions (LS)[17].[18]

The highest decile is gaining in every flat tax scenario, while the middle to high incomes are burdened. In case of a low basic allowance (FT 1) tax simplification strongly burdens the lowest deciles[19]. This leads to redistribution from poor to rich: all other deciles finance the relief of the 10% richest tax payers. This result is reflected in the sharp increase of the Gini coefficient. The gains for the highest decile are declining while the upper middle class is losing less with an increasing marginal rate and basic allowance. In scenario FT 2 not only the highest but also some of the lower deciles are gaining. When taking the labour supply reactions into account this picture is changed. Especially the lowest deciles gain above average in relative terms.[20] Still, for low parameter values, the highest decile gains the most in absolute terms. In contrast, in scenario FT 2 the highest decile looses after labour supply reactions. Inequality is even reduced in this scenario after labour supply reactions whereas for the first scenario the increase in inequality is not as strong as before.

[14] We use the new OECD equivalence scale which weights the household head with a factor of 1, household members over the age of 15 with 0.5, and under 15 with 0.3. The households net income is divided by the sum of the individual weights of each member (=equivalence factor) to compute the equivalence weighted household income.

[15] Households whose disposable income does not change more than 50 euros in either direction are regarded as „unchanged".

[16] Schmidt (2004) creates a polarisation index which in analogy to the Gini index (Lorenz curve) is based on a polarisation curve for better comparability of the results and their interpretations. Generally speaking, polarisation is the occurrence of two antipodes. A rising income polarisation describes the phenomenon of a declining middle class resulting in an increasing gap between rich and poor. The proportion of middle income households is declining while the shares of the poor and the rich are both rising.

[17] A detailed analysis of the labour supply effects follows in section 5.2.

[18] We've also computed various indicators of poverty and richness. These measures, however, did not differ significantly from the status quo values.

[19] Households in the lowest decile (and most in the second as well) do not pay taxes in the status quo. Therefore, the broadening of the tax base yields that some of these households start paying taxes and therefore lose disposable income.

[20] The high relative changes for the lowest deciles can be explained by the low absolute values for the decile's mean incomes.

Decile	status quo 2006 in Euro	before LS FT 1	before LS FT 2	after LS FT 1	after LS FT 2
		changes in per cent			
1	1,764.33	-0.01	-0.01	92.39	93.64
2	6,746.45	-0.23	-0.02	14.27	15.09
3	10,699.33	-1.71	0.76	8.21	9.04
4	13,390.85	-2.81	0.99	5.33	5.73
5	15,658.02	-3.30	0.28	3.20	3.66
6	17,869.07	-3.40	-0.48	1.49	1.97
7	20,296.47	-3.19	-1.13	-0.01	0.04
8	23,474.42	-2.53	-1.44	-0.15	-0.55
9	28,726.24	-1.36	-1.52	1.79	0.87
10	62,504.71	5.85	1.86	6.67	-0.22
Gini	0.41	3.71	0.62	1.63	-2.24
Polarisation	0.32	-1.36	-1.89	-3.78	-4.95
Winners	0	15.15	30.17	17.06	29.22
unchanged	100	43.02	44.70	42.22	42.94
Losers	0	41.83	25.14	40.72	26.38

Table 2: Distributional effects
Source: own calculations based on FiFoSiM

The polarisation is decreasing for all flat tax scenarios before and after labour supply reactions. This decrease in polarisation is surprising at first glance, but the result can be explained by the following two effects: The heterogeneity between the two groups decreases because of the higher tax burden for most people above the median income and because of a decrease of the tax liability of some people below the median. The homogeneity within the upper group decreases as well because of the opposite directions of the effects in those deciles. Both effects lead to a decrease in the polarisation index. In other words: the fraction of people with middle incomes is increasing while the fractions of poor and rich people are decreasing due to these reform scenarios. There are less rich people but they have a higher average income.

The flat tax scenarios lead to an increasing number of winners and a decreasing number of losers with increasing marginal tax rates (and basic allowance).[21] Because of the large fraction of people losing disposable income, the implementation of a revenue neutral flat tax reform proposal with low parameter values in the political process seems unlikely (see Bönke and Corneo (2006)). For FT 2, however, there are slightly more winners than losers. Therefore, such a reform proposal could be successful in the political process.

[21]It might be surprising that after labour supply reactions still a large fractions of households is losing even though the mean income has increased in allmost all deciles. This can be explained by the fact that many household's incomes slightly decreased whereas only few households receive a large increase in disposable income due to positive labour supply reactions.

4.2 Distribution of tax payments

Table 3 presents the changes in the average tax payments per decile for each scenario.

	status quo	FT 1	FT 2
	2006 in Euro	changes in per cent	
1. Decile	.	.	.
2. Decile	.	.	.
3. Decile	147,67	165,99	-48,18
4. Decile	641,86	65,85	-37,78
5. Decile	1.398,88	38,03	-8,95
6. Decile	2.285,63	26,20	3,21
7. Decile	3.299,88	18,40	6,93
8. Decile	4.606,83	12,36	8,27
9. Decile	6.844,98	5,47	7,58
10. Decile	25.658,88	-19,30	-9,45
Gini	0,73	-9,87	-1,38

Table 3: Distribution of tax payments
Source: own calculations based on FiFoSiM

The changes in the distribution of tax payments are much more significant. Obviously, the 10th decile, that pays the biggest part of the overall tax payments, profits in all scenarios. The lower deciles have to pay a lot more taxes in scenarios 1 and 2. The Gini coefficient is decreasing in both scenarios which indicates less redistribution through the income tax system.

5 Efficiency effects

There are many ways in which a tax reform affects the efficiency of the tax system. In this section, we analyse the effects of the flat tax reform scenarios on the effective marginal tax rates, the labour supply decision and the welfare of households.

5.1 Effective marginal tax rates

In this section, we analyse the effects on the effective marginal income tax rates faced by different groups of taxpayers. The underlying idea is that the marginal income tax rate affects the labour supply[22] and savings incentives. Therefore, the changes in effective marginal income tax rates may be considered as rough indicators for the distortions caused by the tax system. The results are summarised in table 4.

[22] A detailed analysis of the labour supply effects follows in section 5.2.

Decile	2006	FT 1	Diff.	FT 2	Diff.
1	0,00	0,01	0,00	0,00	0,00
2	4,40	6,87	2,48	0,24	-4,16
3	17,25	19,68	2,44	18,15	0,90
4	22,09	22,14	0,05	24,22	2,14
5	24,58	23,74	-0,84	23,06	-1,51
6	25,69	24,99	-0,70	23,02	-2,67
7	26,88	25,78	-1,10	26,79	-0,09
8	28,37	26,17	-2,20	30,13	1,76
9	30,50	26,27	-4,23	31,33	0,83
10	36,36	26,28	-10,07	31,56	-4,79

Table 4: Changes in Effective Marginal Tax Rates in percentage points
Source: own calculations based on FiFoSiM

The introduction of a flat rate tax increases the effective marginal tax rates for the lowest deciles and decreases those of the highest deciles. Depending on the combination of marginal rate and allowance marginal tax rates are increasing or decreasing for more or fewer groups resulting in decreasing or increasing incentives. The absolute and relative changes of the effective marginal tax rates also depend on the combinations. Scenario FT 1 with a low marginal tax rate (and basic tax allowance) yield sharp increases in marginal tax rates for the lower to middle deciles while the highest deciles' rates are strongly decreased. This tendency is reduced with an increase in the statutory marginal rate (and allowance). The decrease in the effective marginal tax rate of the highest decile is not as strong as before while the lower to middle deciles' effective rates increase not as strong as before or are even reduced.

Comparing results for the different scenarios shows that the lower incomes can be compensated for a high marginal tax rate with a high basic tax allowance. The incentives for the highest incomes are the more increasing the lower the marginal rate.

As a first conclusion from this section, we can state that because of ambivalent effects the analysis of the effective marginal tax rates does not allow for a clear evaluation of incentive and efficiency effects of these scenarios. Therefore a detailed analysis of the labour supply effects is undertaken in the following section.

5.2 Labour supply effects

To analyse the behavioural responses induced by different tax reform scenarios we simulate the labour supply responses. Following Van Soest (1995) we apply a structural discrete choice household labour supply model.[23] Recent surveys of the empirical labour market literature and

[23] A detailed description of the FiFoSiM labour supply module is provided in the technical appendix and by Fuest et al. (2005).

different kinds of labour supply models are for example provided by Heckman (1993), Blundell and MaCurdy (1999) or Creedy et al. (2002). A major finding of this literature is that labour supply responds rather along the extensive than the intensive margin (see also Immervoll et al. (2007)). Working-hours elasticities are close to zero for men (see Blundell and MaCurdy (1999)) and women (see Mroz (1987), Triest (1990)). In contrast, extensive labour supply responses seem to be much stronger than intensive (Heckman (1993)), especially particular subgroups (at the bottom of the income distribution) have rather high participation elasticities (see Eissa and Liebman (1996), Meyer and Rosenbaum (2001) and Immervoll et al. (2007)).

In the standard continuous model (see Hausman (1985)), labour supply responds along the intensive margin: an infinitesimal change of the marginal tax rate changes the working hours only a little, whereas participation responses cannot be analysed within this framework satisfactorily (Blundell and MaCurdy (1999)). Discrete choice labour supply models allow to analyse both the extensive (participation) and the intensive (hours worked) labour supply decision within the same modelling framework (Blundell and MaCurdy (1999), Van Soest and Das (2001) and Van Soest et al. (2002)). The intensive decision depends on the effective marginal tax rate, whereas the extensive participation decision depends on the tax wedge between gross (pre-tax) labour costs and the after-tax net income of workers (see Kleven and Kreiner (2003)).

The continuous model "appears not to capture the data, in the sense that the number of part-time jobs is strongly overpredicted" (Van Soest (1995)). There seems to be a lack of part-time jobs because of fixed costs of hiring workers or increasing returns to scale of the worker's production. Furthermore, because of fixed costs of working (Cogan (1981)) individuals are not willing to work below a minimum number of hours. In addition, there are working time regulations that limit the number of possible working hours to a discrete set. Therefore, a discrete choice between distinct categories of working time seems to be more realistic than a continuum of infinitesimal choices. Using a discrete choice labour supply model has also the advantage to model nonlinear budget constraints as a result of, for example, nonlinear taxes, joint filing and unemployment benefits (see MaCurdy et al. (1990), Van Soest (1995) or Blundell and MaCurdy (1999)). Furthermore, a richer stochastic specification in terms of unobserved wage rates of nonworkers and random preferences can be incorporated into a discrete choice model.

Table 5 contains the full-time equivalents of new jobs created as results of our labour supply estimations.

The variant with a low basic allowance and marginal tax rate (FT 1) increases labour supply, while the total labour supply effect of scenario FT 2 (high allowance and marginal tax rate) is negative.

	couple male	couple female	single male	single female	Σ
FT 1	-11,839	41,298	15,593	27,846	72,898
FT 2	11,237	-18,082	6,439	-8,848	-9,254

Table 5: Labour supply effects (fulltime equivalents)
Source: own calculations based on FiFoSiM

The distribution of these labour supply effects differs considerably between the different groups. Women and male singles decrease their labour supply with an increasing marginal rate and allowance, whereas married men increase it. The reaction of married people can be explained by the German system of joint taxation, which makes it quite attractive for only one of the spouses to work.

The labour supply effects classified into deciles are reported in table 6.

Decile	FT 1	FT 2
1	12	1,736
2	-2,434	4,478
3	-3,679	12,018
4	-9,260	14,351
5	-12,749	-14
6	-7,040	796
7	-2,665	10,686
8	-7,276	-3,287
9	12,905	-46,209
10	105,083	-3,811
Σ	72,897	-9,256

Table 6: Distribution of labour supply effects
Source: own calculations based on FiFoSiM

The sign of the labour supply effects of each decile is inversely related to the changes of the effective marginal tax rates, but not completely determined by these incentive effects. A reduction of the effective marginal tax rate implies increasing incentives but does not necessarily lead to an increase in labour supply.[24]

A low marginal tax rate and basic allowance (FT 1) yields a strong increase in the labour supply of the highest decile which compensates the negative effects of the lower deciles. These results change with increasing marginal tax rates and basic allowance. In scenario FT 2 the labour supply reactions of the highest deciles are negative while the low income deciles increase their labour supply. The total effects remain negative but are not as strong as in the case of a low marginal tax rate and basic allowance.

[24]For example decile 8 faces in variant FT 1 a decreasing EMTR (increasing incentives) but also reduces labour supply.

5.3 Welfare effects

The computation of welfare measures is another important aspect for the evaluation of efficiency effects of tax reforms. Several methods and measures have been developed in the long literature of Welfare Economics.[25] The empirical application of these methods mostly focuses on the ex-post evaluation of consumer demand using time-series data from before and after a tax reform. Creedy and Kalb (2006) propose a method for the ex-ante analysis of the effects of tax reforms on the labour-leisure decision. As far as we know, this method has not been applied in a microsimulation model to real micro data yet.[26] Following this method, we compute the changes in the equivalent variation as a money metric welfare measure based on the microeconometrically estimated utility function of the labour supply model described in the appendix. The equivalent variation EV_i for each individual i can be expressed as:

$$EV_i = E_i(p^0, U_i^0) - E_i(p^0, U_i^1) = E_i(p^1, U_i^1) - E_i(p^0, U_i^1)$$

where E_i is the expenditure function, p the price (wage) vector and U_i the utility level before (superscript 0) and after (1) the reform. The change in the welfare (in terms of the (negative) excess burden) of the individual $\triangle W_i$ can be expressed as

$$\triangle W_i = -\left(EV_i - \triangle T_i\right)$$

where $\triangle T$ is the change in tax revenue. Assuming a Utilitarian aggregation function, the overall changes in welfare can be expressed as

$$\triangle W = \sum_i \triangle W_i.$$

Table 7 presents the estimated aggregate welfare changes for the different scenarios. For a more comprehensive analysis, the distribution of the welfare changes together with the changes in tax payments before ($T0$) and after ($T1$)[27] the labour supply effects (LS) for the income deciles is presented.

The overall welfare effects are positive for the flat tax with a low marginal tax rate and basic allowance FT 1 but decreasing with increasing tax rate and allowance values and therefore negative for the high marginal tax rate scenario FT 2. The tax revenue increase induced by

[25] See Slesnick (1998) for a comprehensive survey.

[26] Creedy and Kalb (2006), chapter 8, present an example with hypothetical data.

[27] The scenarios are designed to be revenue neutral before labour supply reactions (sum of $T0$). Therefore they are not revenue neutral when taking into account the labour supply reactions ($T1$). If the reforms were designed to be revenue neutral after labour supply reactions, different questions would be analysed. The ex post fiscal and efficiency effects, however, would be similar for both scenarios.

	FT 1					FT 2				
	T0	T1	LS	EV	W	T0	T1	LS	EV	W
1	-1.1	0.5	12	-5.5	-5.1	-2.0	-9.5	1,736	42.5	33.1
2	7.4	20.7	-2,434	-48.3	-27.6	-6.1	-14.2	4,478	100.9	86.8
3	63.2	41.1	-3,679	-82.9	-41.8	-72.8	-87.2	12,018	193.6	106.4
4	186.0	179.0	-9,260	-275.4	-96.4	-344.5	-365.9	14,351	512.9	147.1
5	492.8	418.0	-12,749	-521.5	-103.6	-1,029.4	-977.3	-14	1,032.8	55.4
6	1,117.5	797.0	-7,040	-909.2	-112.2	-1,534.0	-1,249.1	796	1,193.2	-55.9
7	1,969.5	1,489.6	-2,665	-1,634.5	-144.9	-1,226.7	-1,228.6	10,686	1,030.4	-198.2
8	2,581.8	1,941.5	-7,276	-1,960.8	-19.3	-45.2	-424.6	-3,287	88.8	-335.9
9	2,466.2	1,884.2	12,905	-1,538.6	345.7	2,024.3	1,009.1	-46,209	-1,546.5	-537.4
10	-8,872.5	-4,567.0	105,083	7,640.7	3,073.8	2,136.3	1,847.9	-3,811	-1,298.0	549.9
Σ	0.8	2,204.6	72,897	664.0	2,868.5	-0.2	-1,499.4	-9,256	1,350.5	-148.9

Table 7: Distribution of labour supply (fulltime equivalents), tax payments and welfare changes (in million €)

Source: own calculations based on FiFoSiM.

the simplification measures increases the distortion of the labour-leisure decision and results in negative labour supply reactions. The tax cuts through the schedule adjustments reduce this distortion and increase labour supply. Therefore, the overall welfare effects of the revenue-neutral combinations presented here depend on the interaction of tax base and tax schedule. If the labour-leisure distortion is increased, the welfare effects are c.p. negative, if the distortion is decreased the effects are positive. Nevertheless, the change in tax revenue necessary to induce a (relatively small) positive labour supply and welfare effect is rather large.

The welfare effects are unequally distributed across the deciles. The highest deciles are by far the ones which are most affected in absolute numbers. They also largely determine the sign of the overall effect in terms of the money metric welfare measure. The differences in the welfare effects can be explained taking into account the distribution of the labour supply effects and the changes in tax payments. The labour supply reactions are the strongest in the deciles showing the largest welfare effects in each scenario and the sign of the labour supply reactions is correlated with the sign of the welfare effects in these deciles. The highest deciles are those paying the largest fraction of the taxes. In the scenarios with low marginal tax rates, the highest deciles are tremendously relieved and therefore labour supply and welfare effects increase in those deciles. These effects decline with increasing marginal rates and become even negative in FT 2. The overall size of the welfare effects, though, is relatively small: it is well below one percent of tax revenue.

6 Summary and conclusion

In this paper, we have examined the economic effects of different flat tax reform scenarios for Germany in terms of equity and efficiency. The analysis is based on micro data provided by a behavioural microsimulation model for the German tax and benefit system (FiFoSiM). The main results are:

- The labour supply and welfare effects are positive for low marginal tax rates but negative for higher marginal rates and basic allowances.
- A flat rate tax reform reduces the polarisation of the distribution of after tax disposable income.
- The inequality effects (after labour supply effects) and, thus, the political feasibility of the reform, depend on the combination of the tax rate and the allowance.

In general, the effects of a flat tax reform differ considerably with changes in the marginal tax rate and the basic tax allowance. Table 8[28] compares the two scenarios (FT 1 and FT 2).

	FT 1 (7,664 €, 26.5%)				FT 2 (11,650 €, 32%)			
Decile	Distribution	EMTR	labour supply	Welfare	Distribution	EMTR	labour supply	Welfare
1	92.39	0,00	12	-5.1	93.64	0,00	1,736	33.1
2	14.27	2,48	-2,434	-27.6	15.09	-4,16	4,478	86.8
3	8.21	2,44	-3,679	-41.8	9.04	0,90	12,018	106.4
4	5.33	0,05	-9,260	-96.4	5.73	2,14	14,351	147.1
5	3.20	-0,84	-12,749	-103.6	3.66	-1,51	-14	55.4
6	1.49	-0,70	-7,040	-112.2	1.97	-2,67	796	-55.9
7	-0.01	-1,10	-2,665	-144.9	0.04	-0,09	10,686	-198.2
8	-0.15	-2,20	-7,276	-19.3	-0.55	1,76	-3,287	-335.9
9	1.79	-4,23	12,905	345.7	0.87	0,83	-46,209	-537.4
10	6.67	-10,07	105,083	3,073.8	-0.22	-4,79	-3,811	549.9
mean/Σ	13.32	-0,40	72,897	2,868.5	12.93	0.14	-9,256	-148.9

Table 8: Summary of results for scenarios 1 and 2
Source: own calculations based on FiFoSiM

The effects on distribution and efficiency do not move in the same direction for different deciles when the flat tax parameters (marginal rate and basic allowance) are changed. The richest people increase their labour supply only if the effective marginal tax rate is significantly reduced (FT 1). If this effect is rather small (FT 2), they even decrease their labour supply

[28] Distributional effects in percent, changes in effective marginal tax rates in percentage points, labour supply effects in fulltime equivalents and welfare effects in million €.

due to the income effect of the increase in disposable income. The labour leisure decision does not solely depend on income variables. Apparently, decreasing marginal tax rates does not necessarily increase labour supply. The welfare effects correspond to the labour supply effects in most cases. In the highest deciles the welfare effects are the strongest due to the higher absolute changes in both labour supply and tax payments.

The revenue neutral introduction of a flat rate tax with the current basic allowance (FT 1) leads, on the one hand, to redistribution in favour of the highest incomes but on the other hand to positive efficiency effects. In contrast, for FT 2 inequality is decreased (when taking labour supply reactions into account) but the efficiency effects in terms of labour supply and welfare are negative. Therefore, our calculations suggest that the flat tax scenarios cannot overcome the trade-off between equity and efficiency. Summing up, the effects of a flat tax reform do not only depend on the form of the tax schedule (marginal rate and basic allowance) but also on the form of financing and simplification of the tax base.

When interpreting these results and especially the efficiency effects, it has to be taken into account that we limit our analysis to static models. However, flat rate taxes are also supposed to have positive dynamic efficiency and growth effects.[29] In combination with tax simplification, compliance and administrative costs are reduced, as well as incentives and possibilities for legal or illegal tax evasion. Furthermore, more extreme flat tax proposals often demand cuts in government spending and subsidies. These scenarios rather lead to positive employment and growths effects.[30] As a result of these effects an increase in inequality might be acceptable. The question arises whether the scope of increasing growth and employment through personal income tax reforms is sufficiently large. The user costs of labour and capital, which play an important role in determining the demand for labour and investment, are rather determined by social security contributions and corporate taxes than by the personal income tax.

Regarding the political feasibility of a flat tax reform, the immediate and short-term effects documented in this paper are most likely to be decisive. The main problem of implementing a flat rate tax could be to convince a majority of the population that a redistribution in favour of the highest income decile is acceptable. These distributional effects at the expense of the middle class might explain why flat rate taxes have not been successful in the political process in Western Europe. Furthermore, it is uncertain whether a tax system that abolishes a large number of exemptions and tax reliefs is politically sustainable. The temptation for politicians to serve special interest groups with special deductions will not easily disappear. Moreover, from a political economy perspective, a broad tax base allows the government to increase revenue with small increases in tax rates. Therefore, narrow tax bases might be disadvantageous for a given

[29] C.f. Stokey and Rebelo (1995) or Cassou and Lansing (2004).
[30] C.f. Diamond (2005) or Gale and Orszag (2002).

amount of tax revenue, nevertheless, they might protect the taxpayers from excess taxation by the government.[31]

To conclude, our analysis shows that the selection of the schedule and tax base parameters are crucial for the effects of flat tax reforms in terms of equity and efficiency. A flat rate tax with a higher basic allowance and a higher single rate has less harmful distributional effects than a flat rate tax with low basic allowance and tax rate. Nevertheless, the scenario with the lowest parameter values for basic allowance and tax rate is the only alternative that leads to positive labour supply and significantly positive welfare effects. Both labour supply and static welfare effects, however, are quite small. Although we have derived our results for the case of Germany, we do think that similar patterns would be observed in other countries of Western Europe. Of course, this remains to be shown. If this proves to be correct, it will be hard for flat tax reforms to invade the grown-up welfare states of "Old Europe".

A Appendix: Labour supply model

To analyse the behavioural responses induced by the different tax reform scenarios we simulate their labour supply effects. Following Van Soest (1995) we apply a discrete choice household labour supply model,[32] assuming that the household's head and his partner jointly maximise a household utility function in the arguments leisure of both partners and net income. Household i $(i = 1, ..., N)$ can choose between a finite number of combinations $(y_{ij}, lm_{ij}, lf_{ij})$, where $j = 1, ..., J$, y_{ij} the net income, lm_{ij} the leisure of the husband and lf_{ij} the leisure of the wife of household i in combination j. Based on our data we choose three working time categories for men (unemployed, employed, overtime) and five for women (unemployed, employed, overtime and two part time categories).

We model the following translog[33] household utility function

$$V_{ij}(x_{ij}) = x'_{ij} A x_{ij} + \beta' x_{ij} \tag{1}$$

where $x = \left(\ln y_{ij}, \quad \ln lm_{ij}, \quad \ln lf_{ij} \right)'$ is the vector of the natural logs of the arguments of the utility function. The elements of x enter the utility function in linear (coefficients $\beta = (\beta_1, \beta_2, \beta_3)'$) and in quadratic and gross terms (coefficients $A_{(3\times3)} = (a_{ij})$). Using control variables z_p $(p = 1, ..., P)$[34] we control for observed heterogeneity in household preferences by

[31] C.f. Brennan and Buchanan (1980).

[32] A detailed description of the FiFoSiM labour supply module can be found in Fuest et al. (2005).

[33] Cf. Christensen et al. (1971).

[34] We use control variables for age, children, region and nationality, which are interacted with the leisure terms in the utility function because variables without variation across alternatives drop out of the estimation in the conditional logit model (see Train (2003)).

defining the parameters β_m, α_{mn} as

$$\beta_m = \sum_{p=1}^{P} \beta_{mp} z_p \tag{2}$$

$$\alpha_{mn} = \sum_{p=1}^{P} \alpha_{mnp} z_p \tag{3}$$

where $m, n = 1, 2, 3$.

Following McFadden (1973) and his concept of random utility maximisation[35] we add a stochastic error term ε_{ij} for unobserved factors to the household utility function:

$$\begin{aligned} U_{ij}(x_{ij}) &= V_{ij}(x_{ij}) + \varepsilon_{ij} \\ &= x'_{ij} A x_{ij} + \beta' x_{ij} + \varepsilon_{ij} \end{aligned} \tag{4}$$

Assuming joint maximisation of the households utility function implies that household i chooses category k if the utility index of category k exceeds the utility index of any other category $l \in \{1, ..., J\} \backslash \{k\}$, if $U_{ik} > U_{il}$. This discrete choice modelling of the labour supply decision uses the probability of i to choose k relative to any other alternative l:

$$P(U_{ik} > U_{il}) = P\left[(x'_{ik} A x_{ik} + \beta' x_{ik}) - (x'_{il} A x_{il} + \beta' x_{il}) > \varepsilon_{il} - \varepsilon_{ik}\right] \tag{5}$$

Assuming that ε_{ij} are independently and identical distributed across all categories j to an Gumbel (extreme value) distribution, the difference of the utility index between any two categories follows a logistic distribution. This distributional assumption implies that the probability of choosing alternative $k \in \{1, ..., J\}$ for household i can be described by a conditional logit model[36]:

$$P(U_{ik} > U_{il}) = \frac{\exp(V_{ik})}{\sum_{l=1}^{J} \exp(V_{il})} = \frac{\exp(x'_{ik} A x_{ik} + \beta' x_{ik})}{\sum_{l=1}^{J} \exp(x'_{il} A x_{il} + \beta' x_{il})} \tag{6}$$

For the maximum likelihood estimation of the coefficients we assume that the hourly wage is constant across the working hour categories and does not depend on the actual working time.[37] For unemployed people we estimate their (possible) hourly wages by using the Heckman correction for sample selection[38]. The household net incomes for each working time category are computed in the microsimulation module of FiFoSiM.

[35] Cf. McFadden (1981), McFadden (1985) and Greene (2003).

[36] McFadden (1973). Cf. Greene (2003) or Train (2003) for textbook presentations.

[37] Cf. Van Soest and Das (2001).

[38] Cf. Heckman (1979). A detailed description of these estimations can be found in Fuest et al. (2005).

References

Altig, D., Auerbach, A., Kotlikoff, L., Smetters, K. and Walliser, J. (2001). Simulating fundamental tax reform in the U. S., *American Economic Review* **91**(3): 574–595.

Blundell, R. and MaCurdy, T. (1999). Labor Supply: A Review of Alternative Approaches, *in* O. Ashenfelter and D. Card (eds), *Handbook of Labor Economics, Vol. 3A*, Elsevier, pp. 1559–1695.

Bönke, T. and Corneo, G. (2006). Was hätte man sonst machen können? Alternativszenarien zur rot-grünen Einkommensteuerreform, Diskussionsbeiträge des Fachbereichs Wirtschaftswissenschaft der Freien Universität Berlin, Volkswirtschaftliche Reihe, 2006/3.

Brennan, G. and Buchanan, J. (1980). *The Power to Tax: Analytical Foundations of a Fiscal Constitution*, Cambridge University Press, New York.

Browning, E. and Browning, J. (1985). Why Not a True Flat Rate Tax, *Cato Journal* **5**: 127–143.

Cajner, T., GrobovŽek, J. and Kozamernik, D. (2006). Welfare and efficiency effects of alternative tax reforms in slovenia, *IB Revija (IB Review)* **XXXX (1-2)**: 125–136.

Caminada, K. and Goudswaard, K. (2001). Does a Flat Rate Individual Income Tax Reduce Tax Progressivity? A Simulation for the Netherlands, *Public Finance and Management* **1 (4)**: 471–499.

Cassou, S. P. and Lansing, K. J. (2004). Growth Effects of Shifting from a Graduated-rate Tax System to a Flat Tax, *Economic Inquiry* **42(2)**: 194–213.

Christensen, L., Jorgenson, D. and Lau, L. (1971). Conjugate Duality and the Transcedental Logarithmic Function, *Econometrica* **39**: 255–256.

Cogan, J. (1981). Fixed costs and labor supply, *Econometrica* **49**: 945–963.

Creedy, J., Duncan, A., Harris, M. and Scutella, R. (2002). *Microsimulation Modelling of Taxation and the Labour Market: the Melbourne Institute Tax and Transfer Simulator*, Edward Elgar Publishing, Cheltenham.

Creedy, J. and Kalb, G. (2006). *Labour supply and microsimulation: the evaluation of tax policy reforms*, Edward Elgar, Cheltenham.

Diamond, J. (2005). Dynamic Effects of Extending the 2001 and 2003 Income Tax Cuts, *International Tax and Public Finance* **12(2)**: 165–192.

Dunbar, A. and Pogue, T. (1998). Estimating Flat Tax Incidence and Yield: A Sensitivity Analysis, *National Tax Journal* **51**: 303–324.

Eissa, N. and Liebman, J. (1996). Labor supply response to the earned income tax credit, *Quarterly Journal of Economics* **111**: 605–637.

Fuest, C. (2000). *Steuerpolitik und Arbeitslosigkeit*, Mohr Siebeck, Tübingen.

Fuest, C., Peichl, A. and Schaefer, T. (2005). Dokumentation FiFoSiM: Integriertes Steuer-Transfer-Mikrosimulations- und CGE-Modell, Finanzwissenschaftliche Diskussionsbeiträge Nr. 05 - 03.

Fuest, C., Peichl, A. and Schaefer, T. (2006). Does Tax Simplification yield more Equity and Efficiency? An empirical analysis for Germany, Finanzwissenschaftliche Diskussionsbeiträge Nr. 06 - 05.

Gale, W. G. and Orszag, P. R. (2002). The Economic Effects of Long-Term Fiscal Discipline, Urban-Brookings Tax Policy Center Discussion Paper.

Greene, W. (2003). *Econometric Analysis*, Prentice Hall, New Jersey.

Gupta, A. and Kapur, V. (2000). *Microsimulation in Government Policy and Forecasting*, North-Holland, Amsterdam.

Haisken De-New, J. and Frick, J. (2003). DTC - Desktop Compendium to The German Socio-Economic Panel Study (GSOEP).

Hall, R. E. and Rabushka, A. (1995). *The Flat Tax*, 2nd edn, Hoover Institution Press, Stanford.

Harding, A. (1996). *Microsimulation and public policy*, North-Holland, Elsevier, Amsterdam.

Hausman, J. (1985). Taxes and Labor Supply, *in* A. Auerbach and M. Feldstein (eds), *Handbook of Public Economics*, North-Holland, Amsterdam, pp. 213–263.

Heckman, J. (1979). Sample Selection Bias as a Specification Error, *Econometrica* **47**: 153–161.

Heckman, J. (1993). What has been learned about labor supply in the past twenty years?, *American Economic Review Papers and Proceedings* **85**: 116–121.

Heer, B. and Trede, M. (2003). Efficiency and distribution effects of a revenue-neutral income tax reform, *Journal of Macroeconomics* **25**: 87–107.

Ho, M. and Stiroh, K. (1998). Revenue, Progressivity and the Flat Tax, *Contemporary Economic Policy* **XVI**: 85–97.

Immervoll, H., Kleven, H., Kreiner, C. and Saez, E. (2007). Welfare Reform in European Countries: A Micro-Simulation Analysis, *The Economic Journal* **117 (516)**: 1–44.

Keen, M., Kim, Y. and Varsano, R. (2006). The 'flat tax(es)': Principles and evidence, IMF Working Paper No. 06/218.

Kirchhof, P. (2003). *Einkommensteuergesetzbuch - Ein Vorschlag Zur Reform der Einkommen- und Körperschaftsteuer*, C.F. Müller Verlag, Heidelberg.

Kleven, H. J. and Kreiner, C. (2003). The Marginal Cost of Public Funds in OECD Countries: Hours of Work Versus Labor Force Participation, CESifo Working Paper Series No. 935.

MaCurdy, T., Green, D. and Paarsch, H. (1990). Assessing Empirical Approaches for Analyzing Taxes and Labor Supply, *Journal of Human Resources* **25(3)**: 415–490.

McFadden, D. (1973). Conditional Logit Analysis of Qualitative Choice Behaviour, *in* P. Zarembka (ed.), *Frontiers in Econometrics*, New York, pp. 105–142.

McFadden, D. (1981). Econometric Models of Probabilistic Choice, *in* C. Manski and D. McFadden (eds), *Structural Analysis of Discrete Data and Econometric Applications*, The MIT Press, Cambridge, pp. 198–272.

McFadden, D. (1985). Econometric Analysis of Qualitative Response Models, *in* Z. Griliches and M. Intrilligator (eds), *Handbook of Econometrics*, Elsevier, Amsterdam, pp. 1396–1456.

Merz, J., Vorgrimler, D. and Zwick, M. (2005). De facto anonymised microdata file on income tax statistics 1998, FDZ-Arbeitspapier Nr. 5.

Meyer, B. and Rosenbaum, D. (2001). Welfare, the earned income tax credit, and the labor supply of single mothers, *Quarterly Journal of Economics* **116**: 1063–1114.

Mirrlees, J. A. (1971). An exploration in the theory of optimum income taxation, *Review of Economic Studies* **38**: 175–208.

Mitschke, J. (2004). *Erneuerung des deutschen Einkommensteuerrechts: Gesetzestextentwurf und Begründung*, Verlag Otto Schmidt, Köln.

Mroz, T. (1987). The sensitivity of an empirical model of married womenŠs hours of work to economic and statistical assumptions, *Econometrica* **55**: 765–799.

OECD (2006). Fundamental Reform of Personal Income Tax, OECD Tax Policy Studies No. 13.

Peichl, A. (2005). Die Evaluation von Steuerreformen durch Simulationsmodelle, Finanzwissenschaftliche Diskussionsbeiträge Nr. 05-01.

Peichl, A. and Schaefer, T. (2006). Documentation FiFoSiM: Integrated Tax Benefit Microsimulation and CGE Model, Finanzwissenschaftliche Diskussionsbeiträge Nr. 06 - 10, Universität zu Köln.

Schmidt, A. (2004). *Statistische Messung der Einkommenspolarisation*, Reihe: Quantitative Oekonomie, Band 141, Eul-Verlag, Lohmar.

Slesnick, D. T. (1998). Empirical Approaches to the Measurement of Welfare, *Journal of Economic Literature* **36(4)**: 2108–2165.

Stokey, N. L. and Rebelo, S. (1995). Growth Effects of Flat-Rate Taxes, *Journal of Political Economy* **103(3)**: 519–550.

Train, K. (2003). *Discrete Choice Models Using Simulation*, Cambridge University Press, Cambridge.

Triest, R. (1990). The effect of income taxation on labor supply in the United States, *Journal of Human Resources* **25**: 491–516.

Van Soest, A. (1995). Structural Models of Family Labor Supply: A Discrete Choice Approach, *Journal of Human Resources* **30**: 63–88.

Van Soest, A. and Das, M. (2001). Family Labor Supply and Proposed Tax Reforms in the Netherlands, *De Economist* **149(2)**: 191–218.

Van Soest, A., Das, M. and Gong, X. (2002). A Structural Labour Supply Model with flexible Preferences, *Journal of Econometrics* **107**: 345 – 374.

Ventura, G. (1999). Flat Tax Reform: A Quantitative Exploration, *Journal of Economic Dynamics and Control* **23**: 1425–1458.

Wagenhals, G. (2004). Tax-benefit microsimulation models for Germany: A Survey, *IAW-Report / Institut fuer Angewandte Wirtschaftsforschung (Tübingen)* **32**(1): 55–74.

Wissenschaftlicher Beirat beim Bundesministerium der Finanzen (2004). Flat Tax oder Duale Einkommensteuer? Zwei Entwürfe zur Reform der deutschen Einkommensbesteuerung, http://www.bundesfinanzministerium.de.

FiFo-CPE Discussion Papers

Finanzwissenschaftliche Diskussionsbeiträge

Eine Schriftenreihe des Finanzwissenschaftlichen Forschungsinstituts an der Universität zu Köln; ISSN 0945-490X.

Die Beiträge ab 1998 stehen auch als kostenloser Download zur Verfügung unter: http:// fifo-koeln.de oder http://cpe.uni-koeln.de.
Discussions Papers from 1998 onwards can be downloaded free of charge from: http:// fifo-koeln.de or http://cpe.uni-koeln.de.

93-1 Ewringmann, D.: Ökologische Steuerreform? Vergriffen.

93-2 Gawel, E.: Bundesergänzungszuweisungen als Instrument eines rationalen Finanzausgleichs. Vergriffen.

93-3 Ewringmann, D./Gawel, E./Hansmeyer, K.-H.: Die Abwasserabgabe vor der vierten Novelle: Abschied vom gewässergütepolitischen Lenkungs- und Anreizinstrument, 2. Aufl. Vergriffen.

93-4 Gawel, E.: Neuere Entwicklungen der Umweltökonomik. Vergriffen.

93-5 Gawel, E.: Marktliche und außermarktliche Allokation in staatlich regulierten Umweltmedien: Das Problem der Primärallokation durch Recht. Vergriffen.

94-1 Gawel, E.: Staatliche Steuerung durch Umweltverwaltungsrecht — eine ökonomische Analyse. Vergriffen.

94-2 Gawel, E.: Zur Neuen Politischen Ökonomie der Umweltabgabe. Vergriffen.

94-3 Bizer, K./Scholl, R.: Der Beitrag der Indirekteinleiterabgabe zur Reinhaltung von Klärschlamm. Vergriffen.

94-4 Bizer, K.: Flächenbesteuerung mit ökologischen Lenkungswirkungen. Vergriffen.

95-1 Scholl, R.: Verhaltensanreize der Abwasserabgabe: eine Untersuchung der Tarifstruktur der Abwasserabgabe. 6,50 EUR.

95-2 Kitterer, W: Intergenerative Belastungsrechnungen („Generational Accounting“) - Ein Maßstab für die Belastung zukünftiger Generationen? 7,50 EUR.

96-1 Ewringmann, D./Linscheidt, B./Truger, A.: Nationale Energiebesteuerung: Ausgestaltung und Aufkommensverwendung. 10,00 EUR.

96-2 Ewringmann, D./Scholl. R.: Zur fünften Novellierung der Abwasserabgabe; Meßlösung und sonst nichts? 7,50 EUR.

97-1 Braun, St./Kambeck, R.: Reform der Einkommensteuer. Neugestaltung des Steuertarifs. 7,50 EUR.

97-2 Linscheidt, B./Linnemann, L.: Wirkungen einer ökologischen Steuerreform – eine vergleichende Analyse der Modellsimulationen von DIW und RWI. 5,00 EUR.

97-3 Bizer, K./Joeris, D.: Bodenrichtwerte als Bemessungsgrundlage für eine reformierte Grundsteuer. 7,50 EUR.

98-1 Kitterer, W.: Langfristige Wirkungen öffentlicher Investitionen - theoretische und empirische Aspekte. 6,00 EUR.

98-2 Rhee, P.-W.: Fiskale Illusion und Glory Seeking am Beispiel Koreas (1960-1987). 5,00 EUR.

98-3 Bizer, K.: A land use tax: greening the property tax system. 5,00 EUR.

00-1 Thöne, M.: Ein Selbstbehalt im Länderfinanzausgleich?. 6,00 EUR.

00-2 Braun, S., Kitterer, W.: Umwelt-, Beschäftigungs- und Wohlfahrtswirkungen einer ökologischen Steuerreform: eine dynamische Simulationsanalyse unter besonderer Berücksichtigung der Anpassungsprozesse im Übergang. 7,50 EUR.

02-1 Kitterer, W.: Die Ausgestaltung der Mittelzuweisungen im Solidarpakt II. 5,00 EUR.

05-1 Peichl, A.: Die Evaluation von Steuerreformen durch Simulationsmodelle. 8,00 EUR.

05-2 Heilmann, S.: Abgaben- und Mengenlösungen im Klimaschutz: die Interaktion von europäischem Emissionshandel und deutscher Ökosteuer. 8,00 EUR.

05-3 Fuest, C., Peichl, A., Schaefer, T.: Dokumentation FiFoSiM: Integriertes Steuer-Transfer-Mikrosimulations- und CGE-Modell. 8,00 EUR.

06-1 Fuest, C., Peichl, A., Schaefer, T.: Führt Steuervereinfachung zu einer „gerechteren“ Einkommensverteilung? Eine empirische Analyse für Deutschland. 6,00 EUR.

06-2 Bergs, C., Peichl, A.: Numerische Gleichgewichtsmodelle - Grundlagen und Anwendungsgebiete. 6,00 EUR.

06-3 Thöne, M.: Eine neue Grundsteuer – Nur Anhängsel der Gemeindesteuerreform? 6,00 EUR.

06-4 Mackscheidt, K.: Über die Leistungskurve und die Besoldungsentwicklung im Laufe des Lebens. 6,00 EUR.

06-5 Fuest, C., Peichl, A., Schaefer, T.: Does tax simplification yield more equity and efficiency? An empirical analysis for Germany. 6,00 EUR.

06-6 Fuest, C., Peichl, A., Schaefer, T.: Die Flat Tax: Wer gewinnt? Wer verliert? Eine empirische Analyse für Deutschland. 6,00 EUR.

06-7 Kitterer, W., Finken, J.: Zur Nachhaltigkeit der Länderhaushalte – eine empirische Analyse. 6,00 EUR.

06-8 Bergs, C., Fuest, C., Peichl, A., Schaefer, T.: Reformoptionen der Familienbesteuerung: Aufkommens-, Verteilungs- und Arbeitsangebotseffekte. 6,00 EUR.

06-9 Ochmann, R., Peichl, A.: Measuring distributional effects of fiscal reforms. 10,00 EUR.

06-10 Peichl, A., Schaefer, T.: Documentation FiFoSiM: Integrated tax benefit microsimulation and CGE model. 8,00 EUR.

06-11 Peichl, A., Schaefer, T., Scheicher, C.: Measuring Richness and Poverty. A micro data application to Germany and the EU-15. 6,00 EUR.

07-1 Fuest, C., Mitschke, J., Peichl, A., Schaefer, T.: Wider die Arbeitslosigkeit der beruflich Geringqualifizierten: Entwurf eines Kombilohn-Verfahrens für den Niedriglohnsektor. 8,00 EUR.

07-2 Groneck, M. Plachta, R.: Eine natürliche Schuldenbremse im Finanzausgleich. 6,00 EUR.

07-3 Kitterer, W.: Bundesstaatsreform und Zukunft der Finanzverfassung. 8,00 EUR.

07-4 Brenneisen, F., Peichl, A.: Dokumentation des Wohlfahrtsmoduls von FiFoSiM. 6 EUR.

07-5 Brenneisen, F., Peichl, A.: Empirische Wohlfahrtsmessung von Steuerreformen. 6 EUR.

07-6 Fuest, C., Peichl, A., Schaefer, T.: Is a Flat Tax politically feasible in a grown-up Welfare State? 6 EUR.