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Does Tax Simplification yield more Equity and Efficiency? An empirical analysis for Germany

by

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Abstract

This paper investigates the impact of tax simplification on various indicators of the efficiency of the tax system and on the distribution of income. The analysis is based on a simulation model (FiFoSiM) using German income tax and household survey microdata. We model tax simplification as the abolition of a set of deductions from the tax base included in the German income tax system. We find that this form of tax base simplification leads to a reduction in the use of professional tax advice, a more equitable income distribution and an increase in tax revenue. If these measures are combined with a reduction of income tax rates to preserve revenue neutrality, the effects depend on the type of rate schedule adjustment. The combination with a flat rate tax implies redistribution in favour of very high incomes, and an overall increase in income inequality. Efficiency effects in terms of changes in marginal tax rates and labor supply effects are mixed. The combination with a rate schedule adjustment which preserves the directly progressive rate schedule yields a tax reform which reduces the inequality of after tax incomes. We conclude that tax simplification may improve the efficiency of the tax system without increasing inequality of after tax income.

JEL Codes: D3, H2, J22

Keywords: Income distribution, polarisation, tax simplification, flat tax

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1 Introduction

The simplification of the tax system is a key objective of many income tax reform proposals in various countries[1]. This is not only because complexity leads to high compliance costs for taxpayers and to tax evasion. The complexity of the income tax system is also widely seen as an obstacle to fairness and efficiency beyond costs of administration and compliance. For instance, complexity is thought to be a barrier to achieving a fair distribution of the tax burden because it might allow taxpayers with high incomes to use tax loopholes and reduce their tax burden.

Given the importance attributed to tax simplification in tax reform debates, there is surprisingly little empirical research on the impact of tax simplification on the equity and the efficiency of the tax system. To some extent, this may be due to the fact that the theoretical and empirical analysis of tax simplification faces considerable conceptual problems. In particular, tax simplification itself is not a clearly defined concept. It is not always clear whether changes in the tax law increase or decrease the complexity of the tax system. In many cases, measures which broaden the tax base are considered to be simplifications. But in some cases (e.g. the taxation of the imputed rent of owner occupied housing) tax base broadening may also complicate the system.[2] Despite these difficulties, it is important to investigate whether the idea that tax simplification also leads to a more equitable and a more efficient tax system can be supported empirically.

The present paper uses a simulation model based on German micro data to quantify the impact of tax simplification on the use of professional tax advice, the distribution of after tax income, the marginal income tax rates faced by different types of taxpayers, and the supply of labour. The use of professional tax advice is an indicator of both the complexity of the tax system and the compliance cost. The change in marginal income tax rates is of interest because marginal tax rates may be considered as rough indicators for the distortions caused by the tax system. Our analysis is based on a simulation model for the German tax and transfer system (FiFoSiM)[3] using income tax microdata and household survey data. The qualitative results should be of interest to a wider range of countries.

We model tax simplification as the abolition of a set of deductions from the tax base included in the current income tax system. We find that this form of tax base simplification reduces the use of professional tax advice, leads to a more equitable income distribution and, not surprisingly, an increase in tax revenue. If these measures are combined with a reduction of

[1] Cf. Gale (2001) for the U.S., James et al. (1997) for Australia, New Zealand and the United Kingdom, Tran-Nam (2000) for Australia or Fuest et al. (2006 (forthcoming)) or Wagner (2006) for Germany.

[2] Cf. Slemrod (1984).

[3] The model is described in Fuest et al. (2005). A specific feature of FiFoSiM is the use of a dual database of FAST- and SOEP-data.

income tax rates to preserve revenue neutrality, the distributional impact depends on the type of rate schedule adjustment. The combination with a flat rate tax implies that the reform redistributes in favour of the very high and very low incomes, while overall income inequality increases. The combination with a less radical rate schedule adjustment, which preserves the directly progressive rate schedule, yields a tax reform which reduces the inequality of after tax incomes.

We also consider the effect of these tax measures on the marginal income tax rate. If we combine the tax base simplification measures with the revenue neutral introduction of a flat rate tax, we find that marginal income tax rates for very high incomes decline whereas marginal tax rates of middle income taxpayers increase. Therefore, the overall effect of introducing a flat rate on tax distortions is ambiguous. The combination of tax simplification with a directly progressive tax rate schedule assures a reduction of the marginal income tax rate for all taxpayers except the highest income decile.

In the literature, quantitative studies of the impact of tax simplification on the efficiency of the tax system and the distribution of income exist for the U.S.. In a recent contribution, Gale and Rohaly (2003) study the effect of different tax simplification proposals. Among other things, they consider the introduction of a flat rate income tax, combined with a value added tax reform. They find that such a tax reform would increase the tax burden of the middle class and reduce the tax burden for very high and very low incomes. Gale et al. (1996) analyse the effects of introducing a flat tax in the US according to the concept of Hall and Rabushka (1995) and similar versions. They conclude that high income households profit most while households with low incomes suffer from a flat tax reform. This study does not distinguish between the effects of tax base variation and tax rate changes, though. As far as we know there is no empirical analysis of the distributional effects of tax simplification for the German tax system. But there are several studies on the effects on revenue and distribution of tax reform proposals including the objective of tax simplification.[4] Wagenhals (2001) examines the incentive and distributional effects of the reform proposal by Kirchhof et al. (2001). He finds that families with children gain particularly as consequence of the proposed reform.

The setup of the paper is organised as follows: chapter 2 contains a short description of FiFoSiM, chapter 3 presents the tax simplification scenarios. In chapter 4, we estimate the effect of tax simplification on the use of professional tax advice. Chapter 5 illustrates the effects on distribution. Chapter 6 presents the effects on the marginal tax rates as a measure for efficiency and in chapter 7 we estimate the labour supply effects. Chapter 8 concludes.

[4] A survey of current tax transfer microsimulation models for Germany can be found in Peichl (2005) or Wagenhals (2004), international models in O'Hare and Gupta (2000).

2 FiFoSiM: Database and Model

Our analysis is based on a behavioural microsimulation model for the German tax and transfer system (FiFoSiM)[5] 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.[6] FAST98 is the income tax scientific use-file 1998 (FAST98) containing a 10%-sample of the German federal income tax statistics.[7] 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.[8] 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.[9]

The layout of FiFoSiM follows several steps: First the database is updated using the static ageing technique[10] 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.[11] 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 tay 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 Fuest et al. (2005).

[5] C.f. Fuest et al. (2005) for a detailed description of the FiFoSiM simulation model.

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

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

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

[9] See Rässler (2002) for an introduction to statistical matching procedures and imputation techniques.

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

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

3 Tax simplification scenarios

The basic steps for the calculation of the personal income tax under German tax law are as follows. The first step is to determine the income of a taxpayer from different sources and to allocate it to the seven forms of income defined in the German income tax law. For each type of income, the tax law allows for certain income related expenses. The second step is to sum up these incomes. Third, deductions like contributions to pension plans or charitable donations are taken into account, which gives taxable income as a result. Finally, the income tax is calculated by applying the tax rate schedule to taxable income.

Tax simplification can appear in the form of tax base simplification, the simplification of the tax rate schedule or both. We focus mainly on tax base simplification. Changes in tax rates are considered to control for revenue neutrality. Among other things, we consider the introduction of a flat rate tax schedule, which is also an element of tax simplification. Tax base simplification is modelled as the abolition of a set of specific deductions from the tax base included in the German income tax system. Our choice of simplification measures is influenced by the German policy debate about existing tax breaks and deductions. Naturally, the analysis is restricted by the availability of data. The effects of various tax simplification scenarios are calculated in the microsimulation model FiFoSiM. In the first step, we abstract from behavioural adjustments, i.e. we assume that the economic agents do not change their behaviour in response to tax reforms. In the second step (see chapter 7), we consider the effects on labour supply.

Tax simplification in terms of tax break abolition generates additional revenue. As we intend to design a potential tax reform without revenue effects, we model the following progressive tax schedule according to the current tax law:

$$T(x) = \begin{cases} 0 & \text{if } x \leq G \\ \left(\frac{t_m - t_e}{2(M-G)}\,(x-G) + t_e\right)(x-G) & \text{if } G < x \leq M \\ \left(\frac{t_s - t_m}{2(S-M)}\,(x-M) + t_m\right)(x-M) + (M-G)\frac{t_m + t_e}{2} & \text{if } M < x \leq S \\ t_s\,(x-S) + \frac{t_s + t_m}{2}(S-M) + \frac{t_m + t_e}{2}(M-G) & \text{if } x > S \end{cases}$$

x indicates the tax base, $T(x)$ the tax payment, G is the basic personal allowance, M the upper limit of the first progression zone, S the lower limit applicable to the top rate t_s, t_e the lowest tax rate and t_m the highest tax rate of the lower progression zone (i.e. the lowest tax rate of the upper progression zone). To ensure revenue neutrality in combination with tax simplification, we adjust the rate schedule to the right (progressive adjustment) on the one hand and we introduce a flat tax rate of 30% on the other hand. The parameters for the reform scenarios can be found in table 1. A graphical comparison of the different tariffs can be found in figure 1.

	G	M	S	t_e	t_m	t_s
status quo	7664	12739	52151	0.15	0.2397	0.42
progr. adjustm.	9500	14575	53987	0.1480	0.2365	0.4144
flat tax	9500	9500	9500	0.3	0.3	0.3

Table 1: Tax rate parameters

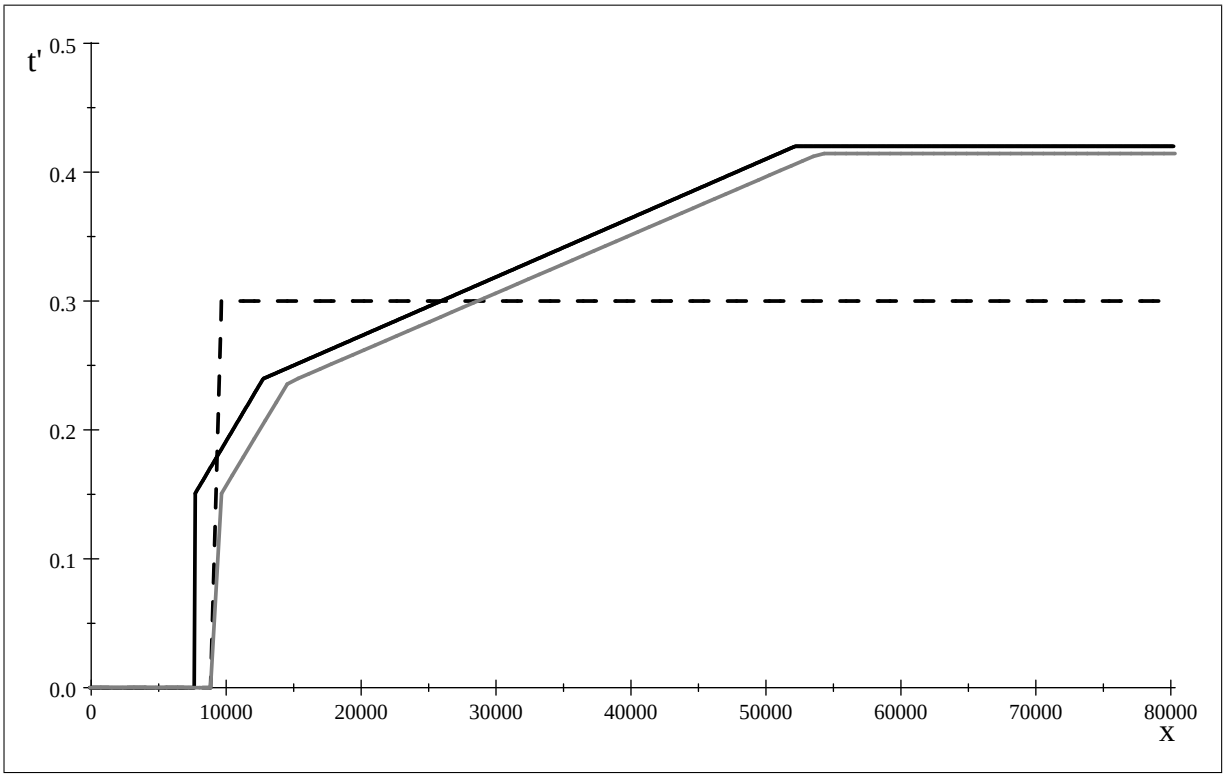

Figure 1: Marginal tax rates

All scenarios and the corresponding fiscal effects are presented in table 7 in the appendix. The simulated measures are separated into two categories: measures concerning the determination of earnings (category A) and those concerning the calculation of the taxable income (category B). First, we analyse the segregated effects on these measures of tax simplification before we examine joint effects of combined measures. Subsequently, we take the aforementioned tax rate decreases into account which allows us to model the complete reform with revenue neutrality. For the latter, the distributional effects are also simulated.

Concerning the determination of earnings (category A), we focus on labour income related expenses. According to § 19 EStG (German income tax law) labour income consists of gross wages minus related expenses; there is a lump sum amount of 920€ unless higher expenses can be claimed. An integral part of these expenses are commuting costs. The applicable law allows for a deduction of 0,3€ per kilometer. Furthermore, we examine the abolition of tax

free bonuses for night, weekend and holiday labour. Concerning capital income we look at the reduction and abolition of the saver's allowance (*Sparerfreibetrag*: current system 1370€ for a single, 2740€ for a couple household).

In category B, we look at several tax allowances for age, single parents, children[12] and deductions for tax accountancy costs, church tax and donations (charitable and for political parties).

4 Complexity of the tax system

We start analysing the effects of tax simplification by asking whether there is an impact of the measures described in the preceding section on the use of professional tax advice, which, following Gale and Rohaly (2003), may be considered as an indicator of both the complexity of the tax system and the compliance costs. Although using this indicator is certainly not without problems, it has the advantage of being "simple and straightforward"[13] and it offers evidence on the tax payer's perception of the complexity of the tax system.

We estimate a logistic regression equation to explain the probability of using a tax consultant ($y = 1$) depending on various factors x like net income, gross income, income sources and age:

$$P(y = 1|\mathbf{x}) = \Lambda(\mathbf{x}\beta) = \frac{\exp(\mathbf{x}\beta)}{1 + \exp(\mathbf{x}\beta)}$$

	β	p	min95	max95
business	0.0446***	0.0000	0.0444	0.0448
divneg	0.0125***	0.0000	0.0093	0.0157
div01000	0.0208***	0.0000	0.0204	0.0211
divg1000	0.0333***	0.0000	0.0330	0.0336
rental	0.0565***	0.0000	0.0563	0.0567
ageu25	−0.0972***	0.0000	−0.0977	−0.0966
ageg55	0.0138***	0.0000	0.0136	0.0141
joint	0.0030***	0.0000	0.0028	0.0032
delta	0.1532***	0.0000	0.1526	0.1537
cons	−4.1437***	0.0000	−4.1517	−4.1357

Table 2: Regression on the use of tax consultants

Source: own calculations based on FiFoSiM. *** indicate significance at the 1% level.

The estimation results for the coefficients β are presented in table 2. DELTA is the difference between gross income and taxable income measuring the level of deductions. The higher these

[12] Child benefits are still paid.

[13] Gale and Rohaly (2003), p.13, further discussed for example by Slemrod (1992).

deductions are the higher the probability of using a tax consultant. The other variables are dummies interacted with the log of gross income. The presence of business income (BUSINESS), income from dividends or interests (in three categories: DIVNEG (< 0), DIV01000 ($0 <$DIV$<$ 1000), DIVG1000 (≥ 1000)) or income from rent or leasing (RENTAL) have positive effects on the probability. Joint filing (JOINT) and age (AGEG55) also have a positive impact, while tax payers under 25 (AGEU25) use tax consultants less frequently.

	E06	kumA	kumB	kumAB
$P(y = 1\|\mathbf{x})$	19.5	18.8	19.1	18.3
costs (bill. €)	1.668	1.602	1.610	1.530

Table 3: Probability of using a tax consultant
Source: own calculations based on FiFoSiM

Using these estimates we predict the probability of using a tax consultant and the expected aggregated national costs of tax consulting for different reform scenarios. Table 3 reports the results. In the data for the current tax system 19.5% of the tax payers use a consultant which results in costs of 1.668 billion euros. The measures modelled here reduce this probability significantly and hence lead to a less complex tax system. The abolition of several tax rule exemptions in category A (determination of adjusted gross income) reduces the probability for the usage of a tax consultant by 0.7 percentage points and the costs by 66 million euros, in category B (calculation of taxable income) by 0.4 percentage points or 58 million, and both bundles combined by 1.2 percentage points, i.e. approximately six percent, and 138 million or 8.3 percent.

5 Distributional effects

The introduction of a revenue neutral tax reform always yields winners and loosers. To analyse the distributional effects of different reform scenarios we compute different distributional measures based on equivalenced household net incomes[14]. Furthermore, as an innovative element of our analysis, we estimate the polarisation effects of each alternative. Distributional measures have been widely used in simulation studies[15], whereas polarisation measures have been seldom respectively never used in microsimulations (for Germany)[16]. Generally speaking, polarisation

[14] We use the OECD-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] Peichl (2005) presents a survey.

[16] The measurement of polarisation was introduced by Wolfson (1994) and Esteban and Ray (1994) to analyse the phenomenon of the "declining middle class" in the United States which could not be satisfactorily explained by standard inequality measures (see Schmidt (2004) for a survey). The distinction between inequality and

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.

We compute the Gini coefficient[17] as a distributional measure and the polarisation index of Schmidt (2004)[18]. The main results are presented in table 4. We simulate the percentage changes of the mean income in each decile and of the distributional and polarisation indices compared to the status-quo for each tax rate schedule adjustment, the simplification bundle[19] and the combinations of rate schedule reforms and tax base simplification.

	simplification	schedule adj.		combinations	
	kumAB	progr.	flat rate	progr.	flat rate
1. Decile	-0,01	0,00	0,00	-0,01	-0,01
2. Decile	-0,12	0,05	0,04	-0,03	-0,06
3. Decile	-0,67	0,95	0,39	0,50	-0,22
4. Decile	-1,06	1,76	0,02	0,90	-1,11
5. Decile	-1,31	2,14	-0,48	0,99	-1,90
6. Decile	-1,47	2,36	-0,91	1,02	-2,49
7. Decile	-1,60	2,48	-1,09	0,97	-2,78
8. Decile	-1,57	2,69	-0,83	0,99	-2,61
9. Decile	-1,57	2,98	-0,02	0,91	-1,96
10. Decile	-1,72	2,12	6,32	-0,04	4,68
Gini	-0,38	0,48	2,86	-0,21	2,54
PolS	-0,98	0,91	-0,56	-0,09	-1,69
P 90/10	-1,65	3,05	0,63	0,78	-1,36

Table 4: Percentage change of household equivalence weighted net income
Source: own calculations based on FiFoSiM

The first column of table 4 shows the cumulated effects of the simplification bundle (kumAB). The accumulated measures of tax simplification burden the higher incomes more heavily than the middle and the lower incomes. Inequality and polarisation are both reduced. The

polarisation can be vividly explained using the extremes: minimal inequality and minimal polarisation is given by a uniform distribution of income, that is everybody has the same income. Maximal inequality is given if $N-1$ people realize a zero income and the remaining person receives the whole income. Polarisation is maximal if there are two (almost identically large) groups which are very heterogeneous regarding their incomes (heterogeneity between groups) but very homogeneous inside each group (homogeneity within groups). Put it another way: polarisation considers the relative importance of the middle class while inequality looks at the distribution of the incomes of the individual agents.

[17] Cf. Cowell (1995) for a textbook presentation of the Gini index.

[18] Schmidt (2004) creates a polarisation index which in analogy to the gini index (lorenz curve) is based on a polarisation curve for a better comparability of the results and their interpretations.

[19] The complete simplification bundle (kumAB) consists of bundles A (kumA) and B (kumB). All category B measures of table 7 are combined in bundle B, bundle A contains the abolition of deductibility of commuting costs (A1: noKm), the abolition of the saver's allowance (*Sparerfreibetrag*, A4: noSpfb) and the restriction of labour income related expenses to 1000 € (A8: wkfix).

separate examination of each bundle yields the same qualitative results.[20] The abolition of several tax rule exemptions in both categories A (determination of adjusted gross income) and B (calculation of taxable income) affects the high incomes more than the middle and low incomes.

The isolated effects of changes in the tax schedule are as follows. The adjustment to the right of the current schedule (column 2) increases inequality as well as polarisation. The flat rate tax strongly increases inequality while the polarisation index decreases. The obvious winner of a flat tax rate is the 10th decile due to lower statutory and effective marginal rates and to some extent the first deciles while the middle to upper deciles suffer from an increased tax charge due to the flat tax reform. These effects result in an overall increase in the Gini index. The decrease in polarisation is surprising at first glance, but this result can be attributed to 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. The increase of the polarisation index for the adjusted current schedule can be explained by the relatively larger relief for people above the median income resulting in an increasing heterogeneity between the two groups.

The revenue neutral combination of the tax base simplification bundle with a tax schedule adjustment to the right (column 4) decreases both the inequality and the polarisation indices, whereas the combination with a flat-tax (column 5) increases the inequality but reduces the polarisation. The explanation is analogous to the effects of the pure tariff reforms. Given these results, we can conclude that revenue neutral tax simplification does not necessarily lead to redistribution from poor to rich. The combination with the adjustment of the current tax schedule even leads to a decrease of inequality, i.e. the simplification of the tax system can lead to a more equal distribution of after tax income. More inequality only arises if tax base simplification is combined with the introduction of a flat rate tax.

The distributional effects of the single simplification measures are described in the appendix and yield some interesting results.[21] The abolition of tax free bonuses for night, weekend and holiday labour results in an increase of income equality which seems to be counter-intuitive. The burden of this simplification particularly affects middle and high incomes. The same results apply to the abolition of the deduction for commuting costs. This measure also burdens middle and higher incomes more heavily than lower income categories.

[20] The separated results for each simplification measure can be found in tables 9 and 10.

[21] Table 8 presents the fractions of the income deciles on the households equivalent weighted net income, the respective mean income and the upper bound of the decile income. Table 9 contains the simplification measures of category A (determination of adjusted gross income) which would lead to a decrease in both inequality and polarisation. Table 10 presents the results for category B (calculation of taxable income) where both inequality and polarisation decrease.

6 Tax simplification and effective marginal tax rates

There are many ways in which the simplification of the tax system affects its efficiency. In this section, we analyse the effect of tax simplification on the effective marginal income tax rate faced by different groups of taxpayers. The underlying idea is that the marginal income tax rate affects the labour supply and savings incentives. Here, we focus on the marginal labour income tax rate. The results are summarised in table 5.

	status quo	simplification			schedule adj.		combinations	
	E06	Δ kumA	Δ kumB	Δ kumAB	Δ progr.	Δ flat rate	Δ progr.	Δ flat rate
1	0,00	0,00	0,00	0,00	-0,00	-0,00	-0,00	-0,00
2	3,17	0,57	0,30	0,91	-2,12	-1,26	-1,80	-0,68
3	14,74	0,90	0,98	1,82	-2,86	1,99	-0,74	4,64
4	20,58	0,55	0,57	1,11	-2,11	1,70	-0,91	2,54
5	23,02	0,57	0,61	1,20	-2,69	0,03	-1,68	0,79
6	24,32	0,63	0,61	1,22	-3,11	0,27	-1,83	1,43
7	25,84	0,54	0,50	1,01	-2,54	1,02	-1,32	1,94
8	27,73	0,41	0,36	0,73	-1,79	0,95	-0,89	1,37
9	29,90	0,33	0,32	0,65	-1,37	-0,46	-0,66	-0,34
10	35,09	0,35	0,81	1,18	-1,13	-5,66	0,08	-5,58

Table 5: Changes in effective marginal tax rates in percentage points
Source: own calculations based on FiFoSiM

It turns out that tax base simplification without tax rate adjustments increases the marginal tax rate for all taxpayers. This is not surprising, given the progressive nature of the income tax schedule. Combining these measures with a reduction of tax rates over the entire income tax schedule reduces the marginal tax rate for almost all taxpayers with the exception of the highest income decile. The combination with a flat rate tax, in contrast, reduces the marginal tax rate considerably (by five percentage points) for the highest income decile. For the middle income deciles, the marginal tax rate increases, especially for the third and the fourth income decile. This suggests that the efficiency gains that can be achieved through tax simplification, combined with the introduction of a flat rate tax, are limited. This is mainly due to the fact that revenue neutrality requires a flat tax rate of 30%. If the broadening of the tax base goes beyond the measures considered here, revenue neutrality can be achieved at a lower statutory tax rate. In this case, it would be possible to attain lower marginal tax rates for more households.

7 Labour supply effects

7.1 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,[22] 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[23] household utility function

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

where $x = \left(\ln y_{ij}, \ \ln lm_{ij}, \ \ln lf_{ij} \right)'$ 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 $(p = 1, ..., P)$[24] we control for observed heterogeneity in household preferences by 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[25] we add a

[22] A detailed description of the FiFoSiM labour supply module can be found in Fuest et al. (2005). A survey of different kinds of labour supply models is provided by Blundell and MaCurdy (1999), Creedy et al. (2002) and Hausman (1985) especially for continuous models. Using a discrete choice model has the advantage of the possibility to model nonlinear budget constraints (see Van Soest (1995) or MaCurdy et al. (1990)). Furthermore a discrete choice between distinct categories of working time seems to be more realistic as a continuum of choices because of working time regulations.

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

[24] 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)).

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

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[26]:

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

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.[27] For unemployed people we estimate their (possible) hourly wages by using the Heckman correction for sample selection[28]. The household net incomes for each working time category are computed in the microsimulation module of FiFoSiM.

7.2 Results

Table 6 contains the full time equivalents of new jobs created as results of our labour supply estimations.

The higher tax burden due to tax base simplification leads to a decrease of labour supply,

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

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

[28] Cf. Heckman (1976) and Heckman (1979). A detailed description of these estimations can be found in Fuest et al. (2005).

	simplification	schedule adj.		combinations	
	Δ kumAB	Δ progr.	Δ flat rate	Δ progr.	Δ flat rate
couple male	$-113,964$	$91,643$	$78,760$	$9,731$	$-7,114$
couple female	$-27,662$	$16,333$	-4	$-3,475$	$-15,983$
single male	$-33,382$	$37,205$	$19,991$	$14,301$	$-2,923$
single female	$-21,512$	$15,817$	$9,963$	423	$-4,771$
Σ	$-196,520$	$160,998$	$108,710$	$20,980$	$-30,791$

Table 6: Full time equivalents

while the relief of the tax payers due to the schedule adjustments increases the labour supply. The effect for the flat rate tax is weaker than that of the progressive adjustment. The combination of simplification and schedule adjustment yield two ambiguous results. The combination with the progressive adjustment increases labour supply by 21,000 full time equivalents while the revenue-neutral combination with a flat tax decreases the labour supply by 30,800. In both cases, the overall effects on labour supply are thus rather small.

8 Summary and conclusion

In this paper, we have examined the effects of tax simplification on the use of professional tax advice, the income distribution, measured by the Gini coefficient and a polarisation index, effective marginal income tax rates, and labour supply. The analysis is based on a behavioural microsimulation model for the German tax and transfer system (FiFoSiM). All effects were simulated for each single simplification measure, for bundles A (determination of earnings) and B (computation of taxable income) and for the complete simplification package. The abolition of tax exemptions increases tax revenue. Therefore our tax simplification package was combined with tax rate reforms to analyse the joint effects on distribution while controlling for revenue neutrality.

The main results are:

- Tax base simplification reduces the use of professional tax advice, which can be seen as an indicator of both the complexity of the tax system and the compliance costs, by approximately six per cent.

- Tax simplification concerning the determination of income for tax purposes (cat. A) reduces inequality and polarisation. Simplifying the determination of taxable income (cat. B) also reduces inequality and polarisation.

- Simplification through the abolition of tax exemptions increases tax revenue. A tax reform with overall revenue neutrality implies tax rate changes with separate distributional effects.

- The adjustment of the current schedule to the right slightly increases inequality and polarisation while a flat tax leads to a distinct increase of inequality and decreases polarisation.

- The combination of a progressive tax rate adjustment and simplification reduces inequality and polarisation, because the highest incomes suffer most. The marginal income tax rate for middle income households is also reduced. Labour supply increases.

- If the simplification package is combined with a flat rate tax, inequality increases while polarisation decreases, as the upper middle class is particularly affected. Hence, the tax rate effect is stronger than the simplification effects on distribution and labour supply incentives of middle income households. Labour supply decreases.

Summing up, revenue neutral tax simplification can increase or decrease inequality depending on the form of rate schedule adjustment. Tax simplification in combination with a directly progressive tax rate schedule can reduce inequality. If inequality is regarded as an indicator for fair taxation, more fairness through tax simplification is possible.

Furthermore, our results suggest that flat tax reforms combining tax base broadening with a single tax rate are likely to increase inequality at the expense of the upper middle class. This might be the reason for the limited success of flat tax proposals in the political process in Germany. Given this, it seems advisable to separate the tax base simplification objective from tax rate schedule issues.

Finally, income distribution is only one relevant aspect of tax reforms. If a higher national income, more efficiency or better incentives can be achieved through an income tax reform, higher inequality of income distribution might be deemed acceptable. Our results suggest that the effects of a flat tax rate reform on efficiency in terms of effective marginal tax rates or labour supply are rather limited. However, it should be emphasized that a flat rate tax is likely to reduce tax distortions in the corporate sector. This may lead to efficiency gains due to more investment and labour demand.

To conclude, one can state that whether tax simplification leads to more fairness in terms of higher after-tax income equality depends on the simplification method. The tax base simplification package considered here, combined with an adjusted direct progressive tax rate reduces the inequality of income distribution and increases labour supply while maintaining revenue neutrality. In this regard, more equity and efficency through tax simplification is possible.

Appendix

		abbr.	income tax	solid. tax	$\sum$
	applicable law 2006	E061	180,97	9,95	190,93
	tax rate 1 (progressive adjustment)	tarif1	−12,35	−0,68	−13,03
	tax rate 2 (flat tax)	tarif2	−11,53	−0,63	−12,16
A	simplification cat. A (earnings)				
A1	abolition commuting costs allowance	noKm	4,29	0,24	4,53
A2	reduction commuting costs allowance 0,25 €/km	km25	0,70	0,04	0,74
A3*	commuting costs allowance starting with km 21	km21	1,34	0,07	1,41
A4	abolition of the saver‘s allowance	noSpfb	1,50	0,08	1,58
A5	reduction of the saver‘s allowance to 750 €	Spfb750	0,61	0,03	0,64
A6*	abolition of tax free bonuses	zuschl	1,34	0,07	1,41
A7	reduction labour income expenses to 600 €	wk600	1,02	0,06	1,07
A8	labour income expenses restricted to 1000 €	wkfix	5,13	0,28	5,41
	A accumulated (A1, A4, A8)	kumA	6,64	0,36	7,00
B	simplification cat. B (taxable income)				
B1	no deduction of tax accountancy costs	noStber	0,53	0,03	0,56
B2	no deduction of church tax	noKist	2,86	0,16	3,02
B3	no deduction of charitable donations	noSpend	0,79	0,04	0,83
B4	no deduction of donations for political parties	noPartei	0,05	0,00	0,05
B5	no age allowance	noAltfb	0,67	0,04	0,71
B6	no tax allowance for single parents	noAllein	0,85	0,05	0,90
B7	no tax allowance for children	noKifb	0,55	0,03	0,58
	B accumulated	kumB	6,30	0,35	6,65
	A, B accumulated	kumAB	13,07	0,72	13,79
	A, B accumulated with tax rate 1 (new)	kumAB1	0,00	0,00	0,00
	A, B accumulated with tax rate 2 (flat)	kumAB2	0,01	0,00	0,01

Table 7: Scenarios and fiscal effects in billion €

Source: own calculations based on FiFoSiM. * means: only GSOEP survey data used.

decile	fraction	accumulated	mean	cutpoint
1	0,88	0,88	1.764,33	4.179,38
2	3,35	4,23	6.746,41	9.019,61
3	5,32	9,55	10.699,30	12.172,71
4	6,66	16,21	13.390,84	14.543,69
5	7,79	23,99	15.658,02	16.756,27
6	8,88	32,88	17.869,07	19.010,10
7	10,09	42,97	20.296,47	21.703,05
8	11,67	54,64	23.474,42	25.549,16
9	14,28	68,92	28.726,24	32.941,36
10	31,08	100,00	62.504,63	.

Table 8: Deciles of weighted equivalent net incomes
Source: own calculations based on FiFoSiM.

	noKm	km25	km21*	noSpfb	Spfb750	zuschl*	wk600	wkfix	kumA
1. Dezil	-0,00	-0,00	0,00	-0,00	-0,00	-0,00	-0,02	0,00	0,00
2. Dezil	-0,04	-0,00	-0,01	-0,01	-0,00	0,00	-0,05	-0,02	-0,02
3. Dezil	-0,32	-0,05	-0,01	-0,03	-0,01	0,00	-0,15	-0,25	-0,28
4. Dezil	-0,56	-0,09	-0,08	-0,05	-0,02	-0,03	-0,17	-0,50	-0,55
5. Dezil	-0,70	-0,11	-0,18	-0,07	-0,02	-0,07	-0,18	-0,66	-0,73
6. Dezil	-0,78	-0,13	-0,18	-0,09	-0,03	-0,11	-0,18	-0,76	-0,85
7. Dezil	-0,84	-0,14	-0,16	-0,12	-0,04	-0,13	-0,18	-0,83	-0,94
8. Dezil	-0,85	-0,14	-0,15	-0,16	-0,06	-0,17	-0,17	-0,91	-1,08
9. Dezil	-0,79	-0,13	-0,13	-0,25	-0,10	-0,16	-0,14	-1,02	-1,28
10. Dezil	-0,31	-0,05	-0,07	-0,35	-0,15	-0,15	-0,06	-0,61	-0,97
Gini	0,04	0,00	-0,00	-0,15	-0,06	-0,07	0,03	-0,11	-0,26
PolS	-0,25	-0,05	-0,06	-0,15	-0,06	-0,13	0,04	-0,49	-0,64
P 90/10	-0,69	-0,12	-0,10	-0,31	-0,14	-0,10	-0,10	-1,02	-1,33

Table 9: Percentage changes of net income in cat. A.
Source: own calculations based on FiFoSiM. * means: only GSOEP survey data used.

	stber	kist	spend	partei	altfb	alerz	kifb	kumB
1. Dezil	-0,00	-0,00	-0,00	-0,00	-0,00	-0,01	0,00	-0,01
2. Dezil	-0,00	-0,01	-0,00	-0,00	-0,00	-0,08	0,00	-0,09
3. Dezil	-0,01	-0,03	-0,02	-0,00	-0,03	-0,27	0,00	-0,37
4. Dezil	-0,02	-0,08	-0,03	-0,00	-0,08	-0,27	0,00	-0,48
5. Dezil	-0,03	-0,16	-0,04	-0,00	-0,10	-0,23	0,00	-0,56
6. Dezil	-0,03	-0,24	-0,05	-0,00	-0,11	-0,16	0,00	-0,61
7. Dezil	-0,04	-0,32	-0,07	-0,00	-0,13	-0,11	0,02	-0,64
8. Dezil	-0,05	-0,40	-0,09	-0,01	-0,14	-0,08	0,21	-0,52
9. Dezil	-0,07	-0,47	-0,12	-0,01	-0,16	-0,05	0,52	-0,33
10. Dezil	-0,13	-0,60	-0,17	-0,01	-0,17	-0,03	0,35	-0,75
Gini	-0,05	-0,25	-0,07	-0,00	-0,05	0,09	0,20	-0,13
PolS	-0,03	-0,18	-0,04	-0,00	-0,19	0,08	0,07	-0,32
P 90/10	-0,08	-0,51	-0,16	-0,01	-0,18	-0,03	0,62	-0,30

Table 10: Percentage changes of net income in cat. B.
Source: own calculations based on FiFoSiM.

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