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Supply and Intra-household Welfare Effects
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Abstract

This paper assesses the effects that an introduction of the French family splitting mechanism would have on German families' labour supply and intra-household consumption behaviour. We use simulated real world microdata created by means of a 'deterministic' collective labour supply model. The data are generated by a compound procedure of estimation and calibration based on GSOEP data. In a microsimulation the present tax-benefit system with child benefit/allowance is replaced by a tax scheme with family splitting. The resulting changes in labour supply are surprisingly small, even for women. Welfare effects are also modest, but differ for husbands and wives.

Key Words: Collective model, household labour supply, intra-household allocation, tax reform, family splitting

JEL Classification: D11, D12, D13, D31, J12, J22

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Non-technical summary

In this paper we investigate the effects of an apparently family-friendly tax reform in Germany. We introduce a reform of the present tax-benefit system that replaces marital splitting, complemented with child benefits or allowances, by a tax scheme with family splitting, according to the French example. We are interested in the potential labour supply effects of such a reform, particularly for married mothers. We would like to know whether the lower marginal tax rate resulting from the adoption of the family splitting would provide a significant incentive to work for mothers and fathers. We simultaneously investigate the welfare effects within the family and the possible redistribution of resources between the spouses. For this purpose we use simulated real world microdata created by means of a collective labour supply model. This model accounts for the presence of multiple decision centres with individual preferences within the household. It therefore provides a 'collective' representation of the decision processes of the household, in contrast to the traditional, or unitary, representation. The data are generated by a compound procedure of estimation and calibration based on 1998 data from the German Socio-Economic Panel. The data are used to simulate the introduction of the family splitting and analyze the changes in positive aspects (impact on behaviour) and normative aspects (impact on individual welfare). In a microsimulation, the 1998 German tax-benefit system with child benefit/allowance is replaced by the French family splitting mechanism. Due to acceptability reasons, the minimum tax gain from family splitting is set equal to the present child benefit received.

The resulting changes in labour supply are surprisingly small, even for women. Welfare effects are also modest, but differ for husbands and wives. The main result of our simulation study is that the introduction of family splitting within the German tax-benefit system cannot be expected to have a marked effect on households' behaviour, except for very well endowed families. Indeed the existing system of child benefits or allowances in Germany seems relatively generous for the majority of parents. Its effects are not so different from those of our family splitting reform with a guaranteed bottom transfer, at least for the average German household. A switch from marital to family splitting would have noticeable welfare effects only for high-income households, particularly for the women in these households. Individual working hours would shift marginally but aggregate labour supply effects would be close to zero. One reason for the small behavioural adjustments lies in the small number of children in German families. In particular, better-earning couples in Germany have only few or no children. Since noticeable welfare impacts are simulated for multi-children and high-income households only, the scope for changes seems particularly small. This finding is particularly striking in view of a cut in the fiscal budget due to a decreasing tax revenue. Nevertheless, our study underlines that the issue of intra-household reallocation and redistribution should not be neglected when analyzing reforms of the tax-benefit system, since a higher subsidy for children through family splitting would benefit, if any, primarily the poorer parent in the household.

1 Introduction

In comparison with France, the employment rate of women with children is still low in Germany. The difference in the proportion of mothers holding a full-time job is particularly striking: for 21 percent of German couples with children under age 15, both parents were employed full-time in 1996 whereas the corresponding figure for France was 36 percent (Dingeldey, 2002). This pattern seems to persists even when looking at more recent data. Although the OECD reports a gap in the participation rate of mothers with two and more children of merely 2.5 percentage points in 2000, the proportions of those working part-time differ starkly with 60 percent for Germany and 32 percent for France (OECD 2002, p. 77f). At the same time, fertility in Germany is as low as 1.36 children per woman (OECD 2003, Table GE4.1). France, on the contrary, combines employment of mothers with a relatively high birth rate of 1.89, compared to the average in the European countries.

Reasons for these observed differences may lie, among others, in the different tax-benefit systems of the two countries. Among the usual suspects are particularly those regulations that are related to the family status and the presence of children in the household. While the tax-benefit systems of Germany and France are both set up to follow the principle of ability to pay (Leistungs-fähigkeitsprinzip), with the implication that the fraction of household income needed to support a child should not be subject to taxation, the application of this principle differs between the countries. Germany combines joint taxation of married couples with the payment of a lump-sum child benefit, or alternatively a child-related tax exemption. Due to the progression in the tax scheme, low-income households generally opt for the benefit, whereas the tax exemption is chosen by high-income earners. The French system is characterized by a relatively small means-tested child benefit, and joint taxation of all family members. The "quotient familial" (family splitting factor) takes account not only of married adults but also of the number of children in the household. This apparently generous taxation of families is meant to produce horizontal equity between households with and without children (see Sterdyniak, 1992). The fact that high-income households benefit most from the lower tax-liability (in absolute terms) due to progressive taxation is seen as providing an incentive for women to work and contribute to the household income.

Reforms of family taxation are brought up time and again in the public debate in Germany. Experts from various disciplines and political parties have been thinking of introducing variants of family splitting in the actual German tax system. Putting more weight on children's needs when determining a household's tax liability is seen as a promising measure for a family-friendly policy. Starting off from this discussion on the appropriate taxation of families, the aim of our paper is to assess the effects of an application of a French-type family splitting to the German tax-benefit system.

We are interested in the potential labour supply effects of such a reform, particularly for married mothers. We would first like to know whether the lower marginal tax rate resulting from the adoption of the family splitting would provide a significant incentive to work for mothers and fathers. Second, we simultaneously investigate the welfare effects within the family and the possible redistribution of resources between the spouses. Reforms of the tax-benefit system are likely not only to have an impact on households' living conditions

but also on individuals' and families' labour supply and consumption behaviour as well as on the intra-household distribution of resources. For the analysis of such intra-family effects, a model is needed that accounts for the presence of multiple decision makers within the household. In this respect, an appealing representation of the decision process of the household is the collective framework, introduced by Chiappori (1988, 1992), and Apps and Rees (1988). In contrast to the traditional, or unitary, approach this type of model considers several decision makers in the household with individual (and possibly conflicting) preferences. Therefore, drawing on the collective framework opens up the possibility to infer aspects of the within-household welfare implications of policy changes that can be crucial in determining household choices. In an extension of Chiappori's basic model Beninger (2000) and Donni (2003) allow for convex budget constraints. Beninger and Laisney (2002) provide an application with simulated data. In this paper we draw on Beninger, Laisney and Beblo (2003) who propose a further extension with non-convex budget sets.

Among the existing studies on the effects of family-related reforms of the tax-benefit system in Germany, Althammer (2000) and Wagenhals and Kraus (1998) have looked at the introduction of a family splitting. Their analyses are based on household utility maximization and thereby neglect any redistribution activities within the family that may be caused by the reform. In our study we would like to draw a comprehensive picture including also the intra-family labour supply and welfare effects of a tax reform that introduces family splitting. For this purpose we use simulated real world microdata that have been created by means of a 'deterministic' collective labour supply model (Beninger, Laisney and Beblo, 2003). Our real world collective data have been estimated and calibrated so as to reflect the characteristics (with respect to labour supply and disposable household income) of couples of the 1998 wave of the German Socio-Economic Panel (GSOEP).

The outline of the paper is as follows. In Section 2 we describe the simplified version of the 1998 German tax-benefit system with joint taxation of couples that will serve as the baseline of our analysis. Section 3 introduces the tax reform under consideration, that is, our adaptation of the French family splitting to the baseline tax-benefit system. In Section 4 the characteristics of our collective data set are described. The simulation results under family splitting are presented in Section 5. We compare labour supply and consumption of all decision makers in the household in the baseline situation with the simulated effects of the tax reform. Section 6 concludes.

2   The baseline German tax-benefit system

Germany has a personal income tax system administered at the federal level and regulated by the Personal Income Law (Einkommensteuergesetz). The German tax system is characterized by a comprehensive tax that covers labour earnings as well as income from other sources such as capital investment, housing rents etc. and by joint taxation for married couples. For our exercise we use a simplified form of the 1998 German tax and benefit system that is described in detail in Table 1.[1]

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[1] This simplification is an adaptation, to our particular sample and emphasis, of the microsimulation program developed at ZEW (for a description see Jacobebbinghaus 2003).

The function applied to the tax base is smoothly progressive. In Germany, as in France, the tax schedule used is the same for singles and for couples. However for couples, the "Ehegattensplitting" method (marital splitting) is used: the tax rate is applied to half of the joint taxable income, and the outcome is doubled in order to obtain the total income tax liability of the spouses. Tax rate progression and marital splitting lead to a relative advantage for married couples if spouses have unequal incomes.

The most important issue for this study is how children are considered in household taxation.[2] Parents can opt for either a child benefit (DM 220 for the first and the second child, DM 300 for the third and DM 350 from the fourth child on) or a child allowance, that is a lump-sum deduction of DM 6,912 for each child up to age 27, if still in education or doing military or civil service. Due to the progressive tax scheme the child benefit is less, and the tax deduction is more, favourable for high-income households.

Social benefits are means-tested and depend on the number of people in the household.[3] As a simplification, we assume that the maximum social benefit (including housing benefit and special payments) a person can receive is DM 1,000 a month and DM 700 for the partner.[4] In addition there are age-dependent supplementary payments for children. The amount of the transfer depends on the level of earned income ("anrechnungsfreies Erwerbseinkommen") and is degressive, depending on the relevant income measure. In addition, social benefits are related to the geographical location, since they are paid by the local governments and housing benefits depend on the average rent of the locality. We distinguish only between East- and West Germany, and approximate that social benefits are 10% lower in the East. The difference between East- and West Germany stems from the lower costs of living in the East: a substantial fraction of the social benefit is the housing benefit. Finally, social benefit payments depend on the wealth situation of the household, and child benefits are deducted from social benefit payments.

As a graphical illustration of the tax-benefit system described above, Figure 1 depicts a typical situation for a couple with two children. The husband has an hourly wage rate of 25 euro, the wife earns 18 euro per hour. The household does not dispose of any capital inflows or income from rental or leasing. It is therefore eligible for means-tested social benefits at low labour income. The parents receive child benefit for both children. From a yearly gross income of just above 80,000 euro they will opt for child allowance instead, as the tax relief exceeds the lump-sum benefit payment. Figure 1 also reveals the non-convexity of the resulting budget constraint when labour earnings are high enough for social benefit payments to cease.

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[2] For convenience, the tax rules, and also our tax program, are written in DM rather than in euro as the non-linear 1998 German tax scheme is only available in DM (1 euro = 1.95583 DM). All other nominal magnitudes in the paper will be given in euro.

[3] In our static setting we ignore unemployment insurance and unemployment benefits which are both related to former earnings. Both transfers actually require the search of, and the willingness to take up, a job.

[4] The maximum social allowances we apply for both parts of Germany are based on the average effective maximum social benefits paid in 1998 (see Statistisches Bundesamt, 2001).

Table 1: Simplified tax-benefit system for household taxation, Germany 1998 (married couples)

Taxable income

earnings

capital income

income from rental and leasing

maintenance payments from ex-partner

Tax reliefs

DM 4,000 standard deduction for earnings[a]

DM 12,000 standard deduction for capital income

DM 216 standard special expense deduction

child allowance (or child benefit alternatively)

exemption for social security contribution ("Vorsorge")

maintenance payments to ex-partner

Tax base: Taxable income - Tax reliefs

Tax schedule: Tax rate applied to half the tax base:

Income (X) bracket	Income tax liability
0-12,365	0
12,366-58,643	$(91.19 \cdot Y + 2,590) \cdot Y$
58,644-120,041	$(151.96 \cdot Z + 3,343) \cdot Z + 13,938$
>120,041	$0.53 \cdot X - 22,843$

X=rounded taxable income, $Y=(X-12,312)/10,000$, $Z=(X-58,590/10,000)$

solidarity supplement: tax scaled up by a factor of 1.055 [b]

Net Income: gross income - twice the tax liability

Benefits

child benefit: DM 220 for 1st and 2nd child, DM 300 for 3rd,
   DM 350 from 4th child on (or child allowance alternatively)

means tested social benefits (incl. housing benefit and special payments):[c]
   DM 1,000 in the West, DM 900 in the East.[d]

means tested social benefits for partner and children, depending on age

Maintenance

maintenance payments to children, ex-partner

or parents outside the household

Disposable income: net income + benefits - maintenance[e]

Notes: *(a)* The tax scheme is given in DM because of the non-linearity of the tax function. Since 2000, the tax scheme is given in DM and euro by the Federal Government. 1 euro = 1.95583 DM. Time unit is the year. *(b)* The solidarity supplement for the reconstruction of East Germany ("Solidaritätszuschlag") is based on a measure of taxable income that includes the child allowance whether or not parents opt for it. *(c)* For lack of information on the stock of savings etc., we assume that couples having more than DM 600 capital income or more than DM 4,800 rental income per year are not eligible for social benefit payments. *(d)* These numbers are based on the average effective maximum social benefit paid in 1998. *(e)* Social security contributions, although largely compulsory, are taken as consumption expenditures and are not deducted from disposable income. Admittedly, the different types of social security contributions paid in Germany certainly have different consumptive aspects, and our assumption is probably more appropriate for payments to the pension system than for health insurance contributions.
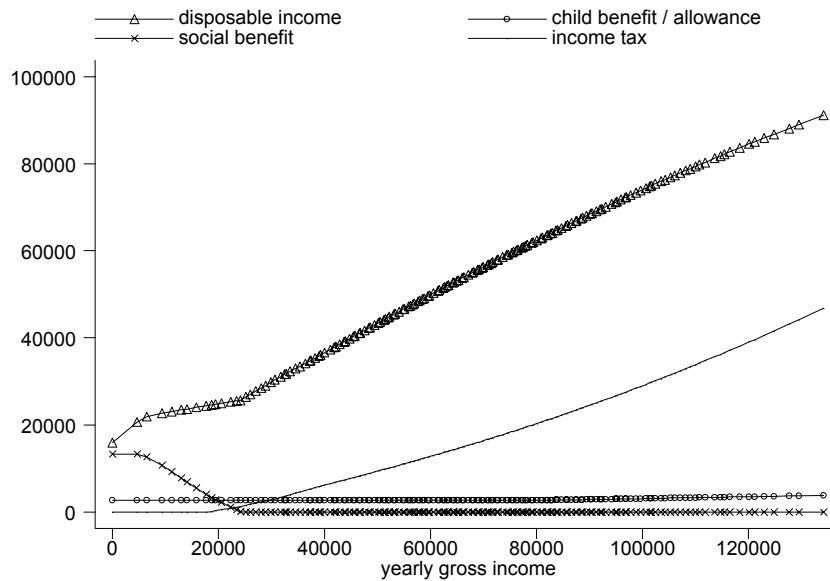
Figure 1: The 1998 German tax-benefit system.
This figure illlustrates the situation of a couple with two children. The wife and the husband earn 18 respectively 25 euro per hour. They potentially receive means tested social benefit.

3 Introducing family splitting

Based on the 1998 German tax scheme with joint taxation of couples, we now introduce a family splitting factor similar to the "quotient familial" of the French tax system while abolishing the existing child benefit/allowance.

3.1 Family splitting in France

France introduced a progressive income tax system in 1911. Family splitting has been applied since 1948, with the aim to adapt the fiscal contribution of the household to its financial ability, taking into account the total number of household members, including children. Thus, going beyond joint taxation of married couples, each child in the household adds to the tax quotient of the family.[5] Whereas the parents are each counted as one, the first and the second child both add one half to the quotient. From the third child on, the tax factor is increased by a full point to take account of the over-proportional increase in the costs of living of a large family (a point which is open for discussion) and the decreasing benefit of the splitting (see Table 2). Compared to international equivalence scales used in the literature on inequality measurement, the equivalent scales used by the French family splitting method is more favourable for families with a large number of children.

A main critique addressed to the French family splitting, e.g. by Atkinson et al. (1988), is that it mainly benefits the richest, thereby neglecting vertical

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[5] The system applies to cohabiting couples as well.

Table 2: Equivalence scale for the "quotient familial" in 1998

Number of children	Number of shares
0	2
1	2.5
2	3
For each child from the 3rd child on	+1

Note: Until 1982 the household gained a full point only for the third child.

equity.[6] In order to face these critiques, several additional measures have been applied. First there is a maximum tax saving of 1,677 euro per additional half-point to the family quotient in 1998. Second, poorer households may receive several complementary benefits (young child allowance - "allocation pour jeune enfant", - family supplement - "complément familial") which can potentially be added to the basic child benefit, depending on family income. Sterdyniak (1992) argues that the French family splitting provides a certain equity among families with comparable endowments. However the costs of children are not fully compensated by the lower tax liability resulting from the family quotient, so that among high-income households, horizontal equity is not fully respected.

The French tax system combines horizontal and vertical equity, up to the critiques mentioned above. With respect to vertical equity it is argued that the current system may encourage highly educated women with a high earnings potential to have children, as the cost of a child is lowered by the progressive benefit of the family splitting. Moreover, mothers are encouraged to continue working because the over-proportional tax loss due to the convexity of the tax function is smoothed by the application of the family quotient. Recent debates on tax policy in France revolve around the linearisation of the tax function, which would abolish the relative advantage of the family splitting factor.

3.2 Application to Germany

In our application of the family splitting factor to Germany, we consider that the minimum tax gain from family splitting must not be lower than the current child benefit received, because of acceptability reasons. The latter corresponds to the amount of child benefit the parents would receive only for those children living in the household, according to the 1998 benefit system. Hypothetically, parents have the choice either to receive child benefits - marital splitting is then applied when computing the family's tax liability - or to benefit from family splitting. The ceiling advantage of the family splitting is - somewhat arbitrarily - fixed at twice the potential child benefit.[7] Hence, under the reform, the total transfer a household can receive consists of social benefits only (plus maintenance payments), since the child benefit is already integrated in the tax liability. Note also that the reform is not designed to satisfy revenue neutrality.

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[6] Therefore Glaude (1991) e.g. proposed an alternative tax-benefit system, closer to those applied in other European countries. Family splitting would be replaced by a generous means-tested child benefit. Poor families would be further supported by revenue and household size dependent benefits.

[7] Variations of this ceiling advantage do not change the results, though.
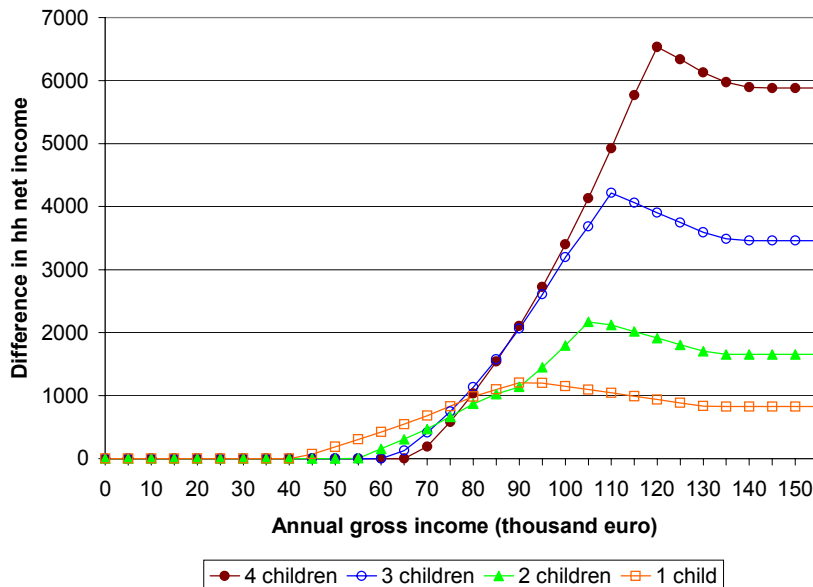
Figure 2: Change in disposable household income, family splitting versus 1998 German tax-benefit system (marital splitting + child benefit/allowance).

In a static comparison, Figure 2 illustrates the increase in disposable household income, given gross income and number of children, if a family splitting system as described replaced the baseline 1998 system with marital splitting and complementary child benefits or allowances. The family splitting tax gain increases with household income and number of children. In the middle-income range from 40 to 75 thousand euro annual income, few-children households would benefit most from the reform since the child benefit in the baseline is increasing (higher child benefit for the third, fourth... child than for the first and second) while the marginal tax gain through family splitting is decreasing with the number of children. The pictures reverses for high-income households. The graph underlines substantial gains for multi-children and high-income households (from 80,000 euro annual income) who would be eligible for child benefits otherwise. The difference in net household income reaches a maximum of up to 6,500 euro per year for an annual income of 90,000 to 120,000 depending on the number of children. This maximum is as high as the annual sum of child benefits and refers to the ceiling advantage of family splitting applied. For those families who would opt for child allowances in the base system, the tax gain decreases with rising income and levels out at the difference between the ceiling advantage from family splitting and the maximum tax advantage through child allowances.

4 Collective microdata for Germany

There exists no data set for Germany that contains, at the same time, information on family members' individual labour supplies, wage incomes and consumption levels. In order to analyze intra-household time allocation and resource distribution we therefore have to "adjust" existing data to our needs. To obtain a data set that represents collectively behaving households in Germany, we proceed according to Beninger, Laisney and Beblo (2003). We start from the 1998 wave of the German Socio-Economic Panel (GSOEP), a representative panel data set of households and individuals living in Germany. The panel gives a wealth of information on the labour market status of individuals and on the various income sources of families. We select German nationals aged 25 to 55. All are employees with contractual working hours of at least 10 hours per week or voluntarily out of employment. The restriction on hours is introduced to avoid extraordinary high wage rates obtained as the ratio of earnings over hours for people with less than 10 hours. We exclude those self-employed, recipients of pension payments, as well as individuals in parental leave, or in education, or registered as unemployed. We thus select 1332 families living in a one- or two-generation household composed of a married couple and (possibly) dependent children who may also live outside the household.

Beninger et al. estimate preference parameters for single men and women and then predict their labour supply and the corresponding consumption level. This involves a calibration method to determine the partners' relative weights in the household, also called the sharing rule or the *power index*, as well as a leisure interaction coefficient describing the effect of the leisure of the spouse on each individual's utility. The calibration is done by optimising the fit of predicted to observed hours of work. The introduction of the cross leisure term relaxes the strong assumption of separability of individual preferences in the pairs (c_f, l_f), (c_m, l_m) which is usually made in the empirical literature on collective models. Apart from this cross leisure term, married individuals are assumed to have the same preferences as singles with the same characteristics. Beyond the calibration of the power index, an estimation step allows to obtain the expected value of the power index given a set of variables which includes characteristics of the tax-benefit system: this step allows predictions of the changes induced by a reform for the power index in each household. For completeness, we summarize the procedure in the Appendix.

This compound procedure of calibration and estimation yields a microdata set very similar to the GSOEP sample (in terms of individual labour supply choices), but generated according to collective rationality in household behaviour. That is, with our knowledge about individual preferences, and the partners' weights in the household as a function of the tax system, we are now able to predict reactions induced by a reform not only in household behaviour, but also of individual family members regarding their labour supply and consumption decisions.

5 Simulation results

Simulation results are presented for changes of the power index, that is the spouses' weights in the household, changes in labour supply and intra-household

Table 3: Power index pre- and post-reform

	West		East
Number of children	1998 tax	family splitting	1998 tax
1	.50768	.50755	.4454
2	52292	.52289	.4790
≥ 3	.53199	.53215	.5090

Notes: Means of the pre- and post reform power index by number of children for West Germany. For East Germany, the power index is the same after the reform since the variable y_d is not significant in the Eastern part of the country.

welfare.

5.1 Changes in the power index

The predicted power index depends on a variable which reflects the wife's *relative net earning power*. The wife's net earning potential y_f measures the *expected* increase in household disposable income if the wife switches from 0 to 40 hours, the expectation being taken over the male hours distribution (see the Appendix for a formal definition). The variable y_m, giving the male's net earning potential, is computed similarly. We then define the 'relative net earning power of the wife's, y_d, as:

$$y_d = y_f/y_m. \tag{1}$$

Naturally, this ratio depends on the tax-benefit system. As documented in the Appendix, the man's power index is significantly negatively affected by this variable, for West German households, but no effect was found in the East. Thus, for West German households the power index will be affected by changes in the tax system that alter the spouses' earning capacities, such as the introduction of a family splitting factor.

The relevance of the power index in intra-household decision making is illustrated in Figure 3. If the reform expands the utility set of the couple, due to lower tax liabilities for instance, the Pareto frontier will move outward. This improvement at the household level does not tell us much about the effect on the individual utilities of the spouses, though. In the collective world, the effect of a change in the budget constraint can be decomposed in two components: the first one is a standard income effect due to the increase of household wealth (shift of the Pareto frontier, dark arrow). The second one is the redistribution effect, accounted for only in the collective framework and reflecting the change of the spouses' relative weights that are affected by the variable y_d (move on the Pareto frontier, light arrow). If a tax reform increases the wife's relative earning potential, she will gain weight in the intra-household distribution of resources (move to the left on the Pareto frontier), as depicted in Figure 3.

From Table 3 we see that the husband's power index increases with the number of children in the household. This is true for East and West Germany. The introduction of family splitting, however, affects only the West German households in our sample. Nonetheless, the relative weights of wife and husband hardly vary, meaning that the intra-family allocation and distribution of
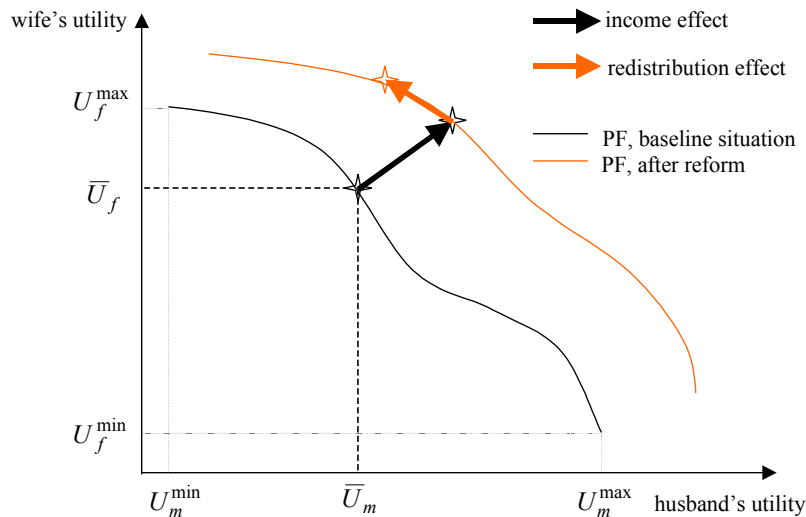
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Figure 3: Shift of, and move on the Pareto frontier due to a reform

resources are not altered very much under the proposed reform. For East Germany we do not expect any pure collective effect, since the only variable sensitive to the tax system, the wife's relative net earning power, is not significantly related to the power index (see Table 9 in the Appendix).

5.2 Changes in participation and working hours

Table 4 compares the working hours of women with children before and after the reform, aggregated in 10-hours categories. The introduction of the family splitting does not seem to have a large impact on the labour supply of married women (and affects men even less). The majority of women is still concentrated at zero, 20 or 40 work hours, with not much variation among these categories after the reform.[8]

Small changes in hours, however, do occur as becomes evident when looking at more disaggregate numbers. Table 5 documents joint changes in the labour supply of wives and husbands, distinguishing a decrease of working time by more than 5 hours, 1 to 5 hours and the symmetric increases. We see that the reform leads to an hours adjustment of only one of the spouses in most cases. Relatively more adjustments are made by wives than by husbands and most changes are fewer than 6 hours. Nevertheless, a salient feature also of this table is that the most frequent cell is (0,0), with about 93 percent of the households where neither husband nor wive change labour supply due to the adoption of the family tax splitting system.

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[8] We allow for a change in working time by ± 0,1,2,5,10 or 20 hours.

Table 4: Wives' working hours pre- and post-reform

	0	10	20	30	40	50	60	total
0	**33.98**	0.48	0.10					31.95
10	0.29	**13.80**	0.10					9.94
20		0.19	**18.15**	0.58				19.02
30			0.10	**13.03**	0.19			12.55
40			0.10	0.10	**16.99**	0.10		26.06
50					0.19	**1.35**		0.39
60							**0.19**	0.10
total	31.76	10.33	19.31	12.55	25.39	0.58	0.10	n=1036

Notes: Rows: pre-reform, Columns: post-reform. Working hours are aggregated in 10-hours categories. Entries in the body of the table and in the margins give percentages, the last cell contains the number of observations.

Table 5: Change in working hours of couples: wife vs. husband

	-5 to -1	0	1 to 5	> 5	total
< -5	0.10	0.19	0.10	0	0.39
-5 to -1	0.10	1.16	0.10	0	1.35
0	0.10	**93.05**	0.19	0.10	93.44
1 to 5	0.10	3.38	0.48	0	3.96
> 5	0.10	0.39	0.39	0	0.87
total	0.48	98.17	1.25	0.10	n=1036

Notes: Rows (columns) give the percent change in the working hours of wives (husbands).

Table 6: Aggregate effects by number of children

	1 child		2 children		≥ 3 children	
Average change in	wife	husband	wife	husband	wife	husband
Consumption (%)	0.42	0.10	0.23	0.35	0.17	0.50
Participation (%)	0.61	0.00	0.31	0.00	2.63	0.00
Working time, all (%)	0.47	0.04	0.32	0.05	2.29	0.17
Work. time, participants (%)	0.34	0.04	0.18	0.05	-0.71	0.17

Notes: 1036 observations: 410 households with 1 child, 478 households with two children and 148 households with at least three children.

Table 6 summarises the consumption and labour supply effects of the family splitting reform for mothers and fathers of one child, two children or three and more children. Under family taxation the participation rate of married women with one child decreases by 0.6 percent from 75 percent in the baseline situation. About the same percentage of mothers with two children is employed before and after the reform (60 percent). They hardly adjust to the new system, whereas those with three and more children show an increase in participation of 2.6 percent under family splitting. While the participation of husbands does not change at all, their relative change in consumption is slightly larger (for 2 and more children) than that of the wives. Work hours are also adjusted under family taxation. The largest change is observed in multi-children families where mothers increase their working time by 2.3 percent on average, while fathers add less. This change is due original non-participants. When we consider only those women working in the baseline, working hours even decrease with family splitting. Our overall conclusion therefore is that, while changes in consumption levels and hours of work do differ across household types, they are rather small on the whole.

It is important to note that our version of this tax reform is not revenue neutral. In fact, tax revenues are diminished in the family splitting system, since all childless singles and couples still pay the same tax amount, while households with children experience a tax gain on average. Hence, all effects also have to be evaluated in view of a shrinking fiscal budget. Total tax revenues amount to 734.6 million euro before the reform and 591 after the reform (projected for our population of German couples aged 25 to 55). Our results therefore represent an upper bound on behavioural adjustments rather.

5.3   Normative aspects of the reform: changes in welfare

We now look at the individual welfare effects of the reform measured for husbands and wives separately. These effects are illustrated by the distribution of percentage changes in individual utility for every decile of the pre-reform distribution of the household equivalent disposable income (in Figures 4 and 5).[9] The graphs show the mean, the median and the 10th and 90th percentiles of the change-in-utility distribution. The inter-decile and median curves reveal that

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[9] The equivalence scale for the household disposable income is a modified OECD scale: 1 for the first adult in the household (wife or husband), 0.7 for the second parent, 0.6 for children aged 16 or above, 0.5 for each child between 7 and 15, and 0.4 for each child under age 7.
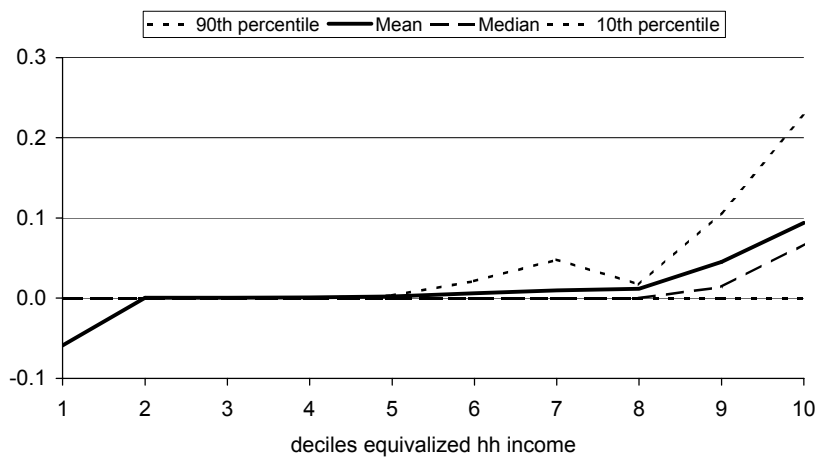
90th percentile —— Mean — — Median - - - 10th percentile

0.3
0.2
0.1
0.0
-0.1

1   2   3   4   5   6   7   8   9   10

deciles equivalized hh income

Figure 4: Relative welfare gain/loss for wives by decile of equivalized household income

90th percentile —— Mean — — Median - - - 10th percentile

0.3
0.2
0.1
0.0
-0.1

1   2   3   4   5   6   7   8   9   10
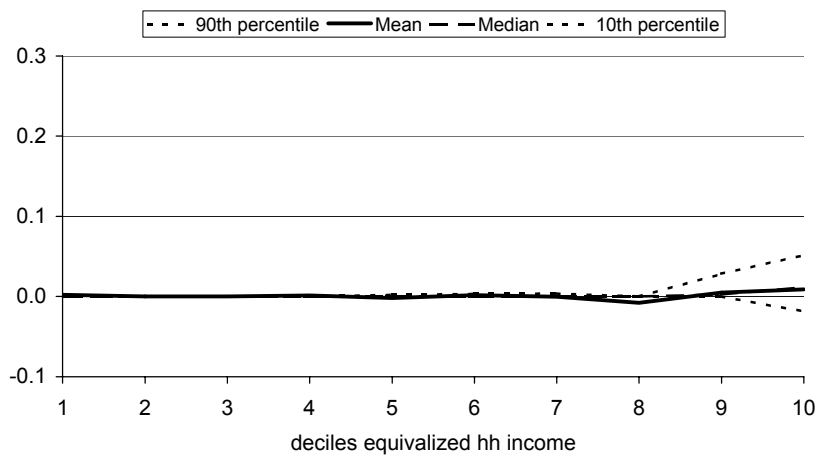
deciles equivalized hh income

Figure 5: Relative welfare gain/loss for husbands by decile of equivalized household income

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Table 7: Intra-household welfare effects (wife versus husband)

	loss	0	gain	total
loss	0.29	0	0.29	0.58
0	0	78.19	0	78.19
gain	2.41	0	18.82	21.24
total	2.70	78.19	19.11	n=1036

Notes: Rows (columns) give the loss or gain in welfare due to the tax reform of wives (husbands).

the spread of the distribution within income levels is higher for females. The expected result is that, the higher the equivalent household income, the larger the welfare impact of family splitting, if any. Well endowed women benefit most from the reform. Among the 10 percent richest households, for instance, the wives' average (mean) gain amounts to 9 percent. Their husbands' welfare, on the contrary, is hardly affected, with an average gain of close to zero percent. The inter-quantile range deviates from zero only for the 20 percent highest income households. Since some wives experience a relatively high gain, respectively loss, the mean effect runs off the median, for the lowest and highest deciles of the female income distribution.

A direct comparison of the welfare effects for both spouses is made in Table 7 where the positions of husbands (winner, indifferent, loser) are cross-tabulated with the positions of their wives. A cut-off of ± 1 percent change defines indifference. While the winners clearly outweigh the losers, the most pronounced result is that of no welfare effect: in 78 percent of the households, neither husband nor wife experiences any change in individual utility through family tax splitting. Almost 19 percent experience a mutual gain. The remaining families face conflicting outcomes: though the household as a whole is better off with the reform, in 2.4 percent of all cases the wife only benefits, while her husband is negatively affected or indifferent. The reverse happens for less than 1 percent of the couples.

6 Conclusion

The main result of our simulation study is that the introduction of a family splitting component within the German tax-benefit system cannot be expected to have a marked effect on households' behaviour, except for very well endowed families. Indeed the existing system of child benefits or allowances in Germany seems relatively generous for the majority of parents. Its effects are not so different from those of our family splitting reform with a guaranteed bottom transfer, at least for the average German household. A switch from marital to family splitting would have noticeable welfare effects only for high-income households, particularly for the women in these households. Aggregate labour supply effects would be close to zero. Only individual working hours would shift marginally. One reason for these small changes lies in the small number of children in German families. In particular, better-earning couples in Germany have only few or no children. Since noticeable welfare impacts were simulated for multi-children and high-income households only, the scope for changes seems

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particularly small, unless the demographic impact of such a reform turns out to be large.

First, these findings have to be interpreted in view of a shrinking fiscal budget due to a cut in tax revenues. Second, the treatment of families in the French tax-benefit system, which includes supplementary benefits for children, is much more comprehensive than the family splitting reform we implemented for German households. But as our adoption of the family splitting grants a minimum transfer as high as the current German child benefit, these income-dependent complementary payments would not apply, anyway. Also, the maximum tax saving in the French family splitting mechanism is much lower than in the German application. As a result, the behavioural adjustments and welfare changes of our microsimulation are in every sense an upper bound of what can be expected from the introduction of a family tax splitting system in Germany.

One drawback of our approach is that we do not distinguish between leisure and housework when modelling the labour supply decision. Especially housewives may be misleadingly assigned more leisure time, and thus more power in the household. In this case and if this applies to women of high-income households, our result of a welfare gain for these women will again represent an upper bound, meaning that the real effects may be even smaller.

Even if the overall effects can hardly be seen from the surface, it has become evident that the issue of intra-household reallocation and redistribution should not be neglected when analyzing reforms of the tax-benefit system. Our study underlines (for rich households) that a higher subsidy for children through family splitting would benefit, if any, primarily the poorer parent, that is, the wife in most families.

References

[1] Althammer, J. (2000), Familienbesteuerung - Reformen ohne Ende?, *DIW-Vierteljahrshefte zur Wirtschaftsforschung* 71(1), 67-82.

[2] Apps, P. and R. Rees (1988), Taxation and the Household, *Journal of Public Economics*, 35, 355-369.

[3] Atkinson, A.B., F. Bourguignon and P.-A. Chiappori (1988), Fiscalité et transferts : une comparaison franco-britannique, *Annales d'Économie et de Statistiques 11, 117-140.*

[4] Beninger, D. (2000), *Collective models: introduction of the taxation*, mimeo, ZEW Mannheim.

[5] Beninger, D. and F. Laisney (2002), Comparison Between Unitary and Collective Models of Household Labour Supply with Taxation, *Discussion Paper 02-64*, ZEW, Mannheim.

[6] Beninger, D., F. Laisney and M. Beblo (2003), Welfare Analysis of Fiscal Reforms: Does the Representation of the Family Process Matter? Evidence for Germany, *Discussion Paper 03-31*, ZEW, Mannheim.

[7] Chiappori, P.-A. (1988), Rational Household Labour Supply, *Econometrica*, 56, 63-89.

[8] Chiappori, P.-A. (1992), Collective Labour Supply and Welfare, *Journal of Political Economy*, 100, 437-467.

[9] Dingeldey, I. (2002), Das deutsche System der Ehegattenbesteuerung im europäischen Vergleich, *WSI Mitteilungen 3/2002,* 154-160.

[10] Donni, O. (2003), Collective Household Labor Supply: Nonparticipation and Income Taxation, *Journal of Public Economics*, 87(5-6), 847-1334.

[11] Glaude, M. (1991), L'originalité du système du quotient familial, *Économie et Statistiques* 248.

[12] Jacobebbinghaus, P. (2003), Dokumentation des ZEW Steuer-Transfer-Mikrosimulationsmodells: ZEW-STM, *mimeo*, ZEW, Mannheim.

[13] OECD (2002), *OECD Employment Outlook*.

[14] OECD (2003), *Society at a Glance: OECD Social Indicators 2002*, Annex GE.

[15] Statistisches Bundesamt (2001): *Sozialhilfe in Deutschland: Entwicklung und Strukturen*, Internet:

http://www.bma.de/index.cfm?0ABBFEBE73044FF0B22DB5566697FD4B, Status 20/12/01.

[16] Sterdyniak, H. (1992), Pour défendre le quotient familial, *Économie et Statistiques,* 256, 5-27.

[17] Wagenhals, G. and M. Kraus (1998), *Neuansätze des Familienlastenausgleichs - Empirische Untersuchung, Mikroökonometrische Analysen*, Gutachten im Auftrag des Hessischen Ministeriums für Frauen, Arbeit und Sozialordnung, Wiesbaden.

Appendix

Definition of the net earning potential

The wife's net earning potential is defined as follows: let p_f^k and p_m^k denote the observed sample frequencies of the discretised weekly labour supplies h^k of wives and husbands, respectively. Denote $R_{mk}^{fk'}$ the household disposable income when the husband works h^k hours and the wife works $h^{k'}$ hours, where $k \in \{0, 10, 20, 30, 40, 50, 60\}$. The variable y_f is defined as:

$$y_f = \sum_{k=1}^{K} p_m^k \left(R_{mk}^{f40} - R_{mk}^{f0} \right).$$

(2)

Estimation of the power index

We first define an index k_m which parameterises the household's position on the Pareto frontier, and which is defined as:

$$k_m = \frac{\bar{U}_m - U_m^{\min}}{U_m^{\max} - U_m^{\min}},$$

(3)

where $\bar{U}_m$, $U_m^{\min}$ and $U_m^{\max}$ are the effective, minimum and maximum utility levels the husband can reach as illustrated in Figure 3. Equivalently, we can define an alternative parameterisation k_f with a similar formula for the wife's utility levels. In order to take account of the local curvature of the Pareto frontier, and to obtain power indices that add up to 1, we compute for each household a scalar α solving the equation $k_f^\alpha + k_m^\alpha = 1$, and we call $\omega_f = k_f^\alpha$ and $\omega_m = k_m^\alpha$ the wife's and the husband's power index, respectively. These numbers are both between 0 and 1. We then set up a logistic equation relating the calibrated power index of the husband, ω_m, to a set of explanatory variables. This equation of the type $\ln\left[\omega_m / (1 - \omega_m)\right] = x\gamma + \epsilon$ will allow us to obtain predicted values $\hat{\omega}_m$ for the male weight $\hat{\omega}_m$ between 0 and 1 given x. Important variables to include in x are variables capturing the way in which the tax benefit system influences the relative earning power of the spouses. If these turn out to contribute significantly to the prediction of ω_m, they will allow us to describe changes in the power index induced by tax reforms.

The list of explanatory variables x used to explain the male weight in the household includes, apart from variable y_d described in the text, the husband's age, the age difference between the spouses, the husband's schooling level and job status, as well as child-related variables. The estimation results, obtained separately for East and West Germany, are given in Table 8. The husband's power index is significantly negatively related to the wife's relative net earning potential in the West, but no significant impact was found in the East.

Table 8: Logistic regression results for the power index

$\ln\left[\omega_m/(1-\omega_m)\right]$	East Germany		West Germany	
Explanatory variables	Coeff.	T-value	Coeff.	T-value
Wife's relative net earning power			-.15	-5.95
Age	-.01	-4.10	-.00	-2.28
Age difference $(f-m)$			.01	3.50
Intermediate schooling (Realschule)	.09	2.59		
High school degree (Abitur)	.10	2.29		
No apprenticeship	-.33	-2.37		
Technical college (Fachschule)			.06	3.10
Number of children	.05	2.85		
Child age 0-3	-.40	-5.29	-.24	-10.06
Child age 3-6	-.20	-4.29	-.10	-5.15
Child age 7-12	-.08	-3.14		
Child under 16			-.05	-2.33
Constant	-.18	-.10	.18	2.73
Adj. R-squared	.1287		.1906	
Number of observations		378		954

Data source: Generated microdata based on GSOEP 1998.