

Chapter 4

Policy Simulations

4.1 Introduction

This chapter presents an application of the model that has been developed in the previous sections. I will show how it can be used to evaluate different family policy reforms with respect to their effects on maternal labor supply, the utilization of paid childcare, the income distribution and household welfare. The analysis will include four reforms, among them two reforms concerning childcare policy and two reforms in the field of family taxation.

The following analysis is undertaken in several steps. The first step consists of changing the parameters of the tax-benefit model and the structure of childcare costs according to the different reforms. This yields a new incentive structure for the households. At this stage, the so-called "first-round" fiscal effects (also called "mechanical" or "morning-after" effect) can be calculated. These are the costs or revenues generated by the reform before any behavioral adjustment has taken place. The behavioral adjustment is analyzed in a second step. As will be shown, the reactions in labor supply and the utilization of childcare lead to additional changes in the fiscal budget. These "second-round" effects, together with the "first-round" fiscal effects yield the costs or revenues of the different reforms scenarios.

Since the four reforms imply different fiscal costs or revenues, a balanced budget

has to be modeled for a meaningful comparison of the behavioral effects and changes in household welfare. Thus, in a third step, fiscal neutrality is obtained by adjusting the child benefit according to the fiscal costs or revenues. On the basis of the resulting disposable incomes, behavioral changes are predicted once more. These results, finally, are interpreted as the behavioral changes of the four reforms. In addition, I will compare the income distribution after this behavioral change with the pre-reform income distribution and identify "winners" and "losers" in terms of disposable income. These income changes are composed of the income changes induced by the new tax-transfer system as well as by the income changes resulting from the adjustment of labor supply. Thus, an increased income might go along with losses in the mothers' utility since mothers give up leisure. Moreover, an increase in paid childcare can imply an increase or a decrease of the mother's utility, depending on whether the first derivative of the utility function with respect to paid childcare is positive or negative. Therefore, I will complete the analysis with a breakdown of the changes in household welfare based on the measure of compensating variation.

4.2 Four Reform Scenarios

The focus of the ongoing debate about potential changes in family policy are childcare and family tax reforms. In the following empirical application, I will thus present simulations two reforms in the field of childcare and two reforms concerning family taxation. Before I will describe the results from each step of the simulation exercise in section 4.3, I give a more detailed motivation and description of the four family policy reforms in the following.

4.2.1 Two Childcare Policy Reforms

As far as childcare policy reforms are concerned, potential reforms or reform proposals differ with respect to the age group of children. For children under three years, increasing the availability of childcare is on top of the political agenda. For children from three to six years, reducing parents' fees to childcare centers is currently proposed.

Motivated by recent policy changes and ongoing discussions (see section 2.3.1), I will simulate two reforms in the context of childcare policy. The first reform will basically model the "TAG"-Reform: The availability of childcare slots for children under three years is set to 100% in the case that the mother is working, while the parents' fees are held constant. This reform will be implemented by setting the probability that a child has access to subsidized childcare, π in equation 3.1, equal to 1. The second reform is targeted at children in the age group between three and six years and consists of the free provision of childcare. That means that the parents' fees c^s in equation 3.1 are set to 0, while availability of slots is held constant at the current level.

4.2.2 Introducing Family Tax Splitting

As far as income taxation is concerned, there is an ongoing discussion about how to modify the existing joint taxation with income splitting such that the tax advantage could be more targeted to families with children. Joint taxation with income splitting for married spouses has been criticized and discussed since its introduction in the late 1950s. While in the past years, cutting the maximum "splitting advantage" has been proposed by means of an "Ehegattenrealsplitting", currently the concept of a "family tax splitting" ("Familiensplitting") such as practiced in France, is gaining more attention.¹

¹See Dell and Wrohlich (2006) for more details on and the evolution of the France family tax splitting.

The specific parameters for a German version of family tax splitting, such as the amount of the splitting factor per child or the question whether the tax gain will be limited by a ceiling, have not yet been specified by the proponents of this reform. I will thus simulate one version of this reform that closely follows the French example of family tax splitting. The splitting factors per child, α , will be taken from the French system: 0.5 for the first and the second and 1 for the third and every subsequent child. Moreover, the tax gain per child, M , will be limited at 2,500 Euro per year for the first and the second, and at 5,000 for the third and every subsequent child. This ceiling of the splitting gain is more generous than under the current French system (see section 2.3.2). The threshold of 2,500 Euro is chosen because this comes close to the maximum tax gain that results from the current German child tax allowance.

In general, a limited family tax splitting (see Equation 2.5) is far more likely to be introduced than a full family tax splitting (see Equation 2.4) given the high fiscal costs such a reform would imply.² Moreover, it seems safe to assume that the current child benefit is maintained, because cutting or abolishing the child benefit in order to finance a family tax splitting would imply a large-scale redistribution from low-income to high-income families. Granting the child benefit and the family tax splitting at the same time, however, would also lead to very high fiscal costs. Therefore, it seems plausible that the child tax allowance is abolished and substituted by the family tax splitting. The existing higher-yield test between the child benefit and the tax gain will thus be maintained. Formally, this reform is a combination of the current German and French systems as described in Equations 2.3 and 2.5, respectively, and can be formally stated as

²See Steiner and Wrohlich (2006c) for a detailed estimation of the costs of this sort of family tax splitting.

$$T(Y_M, Y_F) = \min \left\{ \begin{array}{l} \left(\max \left((2 + \alpha \cdot c) \cdot t \left(\frac{Y_M + Y_F}{2 + \alpha \cdot c} \right) \right), \left(2 \cdot t \left(\frac{Y_M + Y_F}{2} \right) - c \cdot M \right) \right), \\ \left(2 \cdot t \left(\frac{Y_M + Y_F}{2} \right) - CB \cdot c \right) \end{array} \right\} \quad (4.1)$$

Following the French example, single parents are granted an additional splitting factor of 0.5 on top of the child-related splitting factors. The single parents' tax allowance (see section 2.1.2) is abolished. The tax gain resulting from the single parents' additional splitting factor of 0.5 is limited to 2,500 Euro per year. Formally, the tax liability of single parents with income Y_F can thus be described as

$$T(Y_F) = \min \left\{ \begin{array}{l} \left(\max \left((1.5 + \alpha \cdot c) \cdot t \left(\frac{Y_F}{1.5 + \alpha \cdot c} \right) \right), \left(t \cdot (Y_F) - (0.5 + c) \cdot M \right) \right), \\ \left(1.5 \cdot t \left(\frac{Y_F}{1.5} \right) - CB \cdot c \right) \end{array} \right\} \quad (4.2)$$

Unmarried cohabiting parents are not eligible to the single parent's additional splitting factor. Unmarried spouses, who are taxed individually, are allowed to share the child-related splitting factors equally, following the current legislation that allows unmarried parents to share the child tax allowance.

In addition to the changes in the tax treatment of single parents, the fact that the third child is "subsidized" twice as much as the first and the second child is the greatest change under this reform as compared to the current German legislation.

4.2.3 Shifting from Joint to Individual Taxation

The fourth reform that will be simulated in the following analysis is a shift from joint to individual taxation. The child benefit and the child tax allowance is maintained in this simulation. Each parent is eligible to half of the child benefit or half of the child tax allowance, as it is currently practiced in the case of unmarried parents. Formally,

the tax liability of married and unmarried couples under individual taxation can be described as

$$T(Y_M, Y_F) = \min\left(t\left(Y_M - \frac{CTA}{2} \cdot c\right), \left(t(Y_M) - \frac{CB}{2} \cdot c\right)\right) + \min\left(t\left(Y_F - \frac{CTA}{2} \cdot c\right), \left(t(Y_F) - \frac{CB}{2} \cdot c\right)\right) \quad (4.3)$$

Although it does not seem plausible that this reform will be introduced in the near future, it can be seen as a benchmark scenario and reference point in order to assess the disincentives to work that are implied by the current system (see Wrede (2003)). Moreover, it is possible to analyze the effects on household welfare that a shift from joint to individual taxation would imply.

In the tax policy-oriented literature, the central issue concerning the definition of the tax unit has been the problem of avoiding tax bias in favor of or against getting married. Within this literature, it is argued that a married person with the same earnings as an unmarried person faces maintenance obligations, and thus horizontal equity as well as the “ability to pay principle” require a lower tax burden on a (married) couple than on a single individual with the same income (see, for example, Homburg (2000)). As Apps and Rees (2003) point out, the implicit picture of the two-person household in this literature is one in which there is a complete division of labor between spouses, with one specializing in labor supply on the market, the other in domestic production.

In the optimal tax literature the “conventional wisdom” has long been that the individual rather than the household should be the unit of taxation due to standard Ramsey rule considerations that hold for linear tax systems. Since female labor supply elasticities are higher than male labor supply elasticities, they should be taxed at lower marginal tax rates (see Boskin and Sheshinski (1983) and Apps and Rees (1999, 2003)). However, Piggott and Whalley (1996) have challenged this point

by arguing that once household production is introduced in a model of household time allocation, a shift from individual to joint taxation could be welfare improving because income taxation not only introduces a distortion in the allocation of consumption and leisure, but also between household and market production. If marginal tax rates are equalized, such as under a joint taxation regime, this distortion could be eliminated. Yet, as Apps and Rees (1999) point out, a second-best optimum involves a trade-off between the two distortions rather than the complete elimination of one of them. Thus, whether joint or individual taxation is more efficient depends on the magnitude and the relationship of male and female wage elasticities.

While the above cited literature refers to linear tax systems, Brett (2005) comes to similar results for the case of nonlinear tax systems, showing that total family income is very unlikely to be the optimal income tax unit. Another theoretical analysis by Cigno (1991) is based on a comprehensive model of household behavior, including life-cycle labor supply, fertility, savings and bequests in the presence of direct non-linear taxes, subsidies and indirect taxes. He shows that if the labor supply elasticities of women are higher than those of men, and earnings of men are higher than those of women, then the optimal relationship of tax rates for men and women depends on the social welfare function. The more egalitarian the social welfare function, the more likely are lower marginal tax rates for women more efficient than equal tax rates for both marriage partners. Kleven et al. (2006) show on the basis of a household utility model that optimality of a tax system requires negative jointness, meaning that the higher the tax rate of the first earner, the lower should the tax rate on the secondary earner be. The authors perform several simulations, showing that this result holds for a large range of values of labor supply elasticities and a variety of values of the parameter reflecting redistributive taste within a social welfare function.

Overall, one can conclude from the theoretical literature that it remains an empirical question to find out whether the elasticities of female labor supply with respect to own wages and wages of the husband as well as the elasticity of the demand for the domestic good lead to welfare gains if a system of joint taxation is substituted by individual taxation. The model developed in the previous chapter is suitable to analyze the welfare effects of a shift from joint to individual taxation for the case of families with young children in Germany. Although the model does not treat the husbands' labor supply as an endogenous variable, it has been shown that the mothers' labor supply elasticities are consistently estimated. Household production is not taken into account as a whole, however, the most time-intensive part of household production for families with small children, namely domestic childcare, is treated as a choice variable. Based on parameter estimates of the mothers' utility function, it is possible to conduct a welfare analysis for different types of social welfare functions.

4.2.4 Modeling Revenue Neutrality

As will be seen later on, the first three reforms would lead to fiscal costs, whereas the shift to individual taxation would increase public revenues. For a meaningful comparison of the effects resulting from the four different reforms, revenue neutrality has to be modeled in all cases. Typically, reforms are proposed in the public debate without specifying in much detailed how they should be financed. It has been suggested several times that an increase in the availability of childcare centers could be financed by cutting the child benefit. Following this, I decide to model revenue neutrality by adjusting the child benefit in all four reforms. This implies a reduction of the child benefit under the two childcare reforms and the family tax splitting, and an increase of this benefit under individual taxation. The advantage of this procedure is - besides the simple handling - that it is basically a lump-sum tax or transfer per child and does not create any further distortions, as would be the case if the reforms were financed by increases in the income tax.

Note that I will adjust the child benefit only for children aged up to six years. This can be justified by the assumption that - in order to finance these reforms - no other group of the population can be asked for. In other words, the reforms simulated here do not imply any redistribution from other parts of the society towards families with young children. While this assumption is controversial from a policy perspective, it has the nice feature that the reforms are comparable when it comes to the welfare analysis. A comparison of changes in households' welfare is only meaningful if all reforms cost the same amount of money.

4.3 Simulation Results

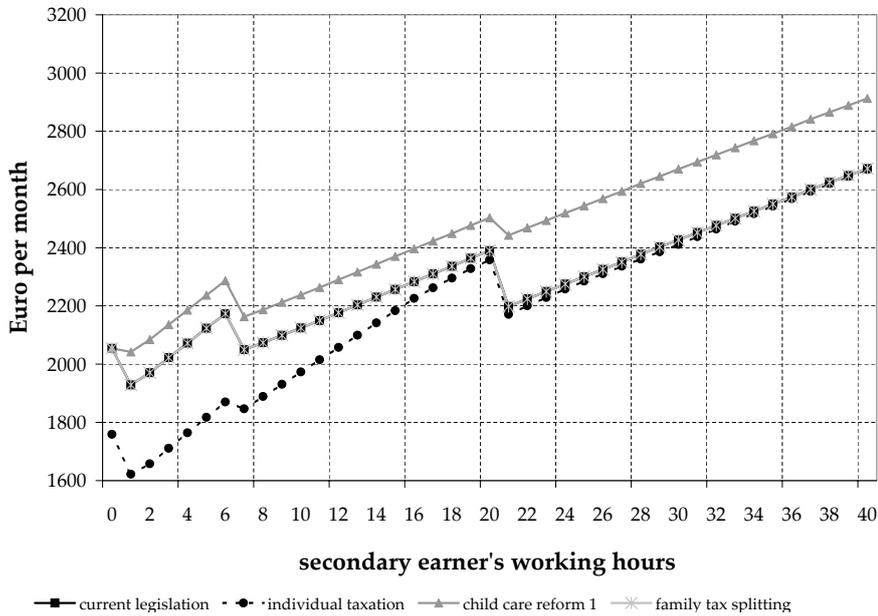
4.3.1 New Incentives and Behavioral Adjustment

As outlined above, the first step of the simulation analysis requires the adjustment of parameters of the tax-transfer system and childcare costs according to the four reforms in order to calculate the budget constraints under the different policy scenarios. Figures 4.1 to 4.5 show how the reforms change the budget line for several stylized households.

Figure 4.1 shows a married couple with a one-year old child. Both spouses are assumed to earn median wages, like in Figure 3.2. The budget line showing the current legislation has three kinks: The first at 1 hour of work of the secondary earner, this is where childcare costs come in. The second kink is at 7 hours, since this is where the threshold of marginal employment is exceeded, thus income taxation and social security contributions start. The third kink is at 21 hours, where full-time childcare has to be purchased, which is more expensive than part-time care.³

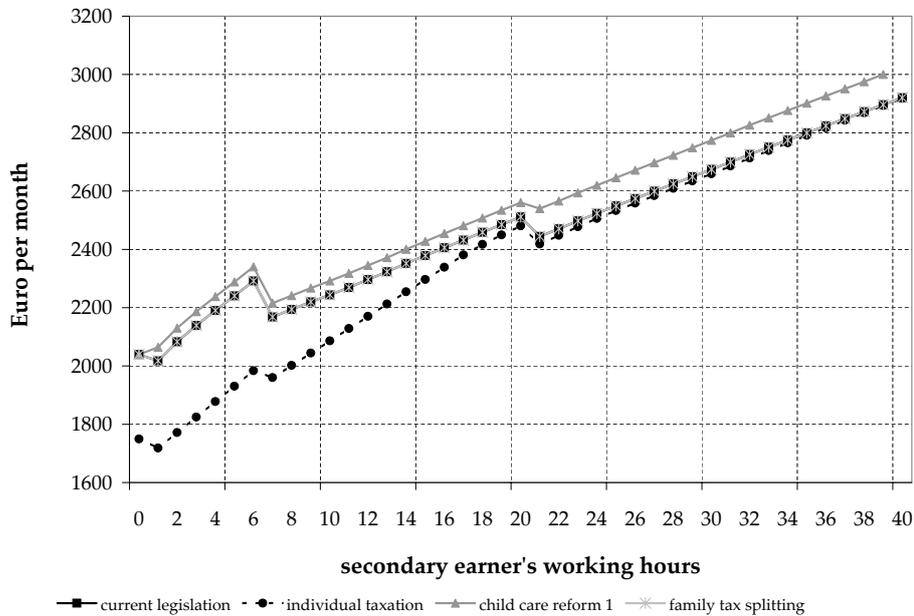
³Note that in Figures 4.1 to 4.4 it is assumed that the first earner is working 38.5 hours per week at a wage that corresponds to the median or to the 90th percentile of the male wage distribution, respectively. Disposable household income is thus depicted as a function of the secondary worker's working hours, as in Figures 3.2 to 3.6.

Figure 4.1: Budget lines of a married couple (median wages) with one child, 1 year old, under different reform scenarios



Source: Calculation based on STSM.

Figure 4.2: Budget lines of a married couple (median wages) with one child, 4 years old, under different reform scenarios

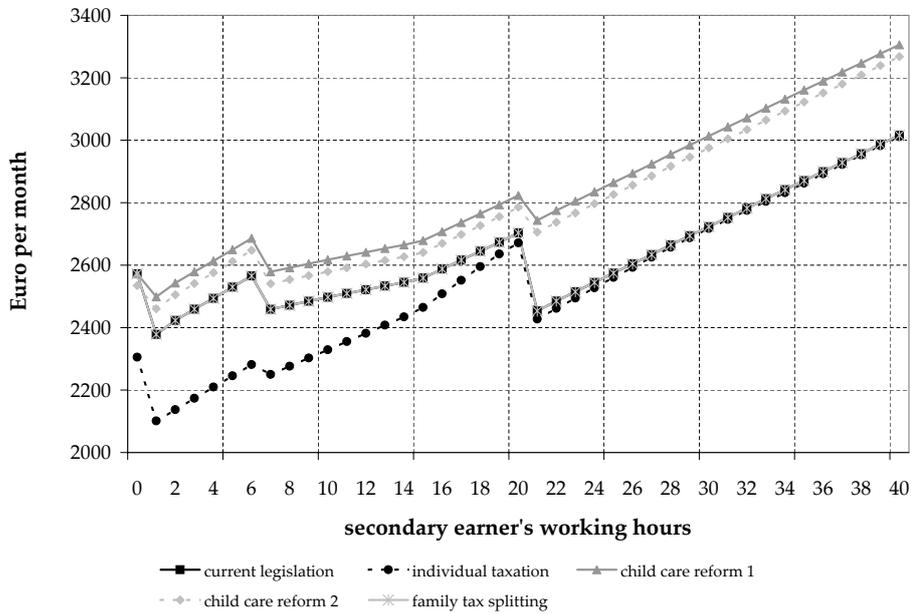


Source: Calculation based on STSM.

Childcare reform 1, which effectively reduces childcare costs of children under three years, implies that the kinks in the budget line at 1 and 21 hours become much smaller, as can be seen in Figure 4.1, 4.3 and 4.4. Childcare reform 2 has similar effects, although only children in the older age group are affected. Note also that one major characteristic of this reform is not depicted here: In contrast to childcare reform 1, which is conditioned on the mother being working, childcare reform 2 reduces childcare costs even for non-working mothers. We would thus expect that both reforms have a positive effect on both the extensive and the intensive margin of maternal labor supply, however the effect is expected to be stronger under reform 1.

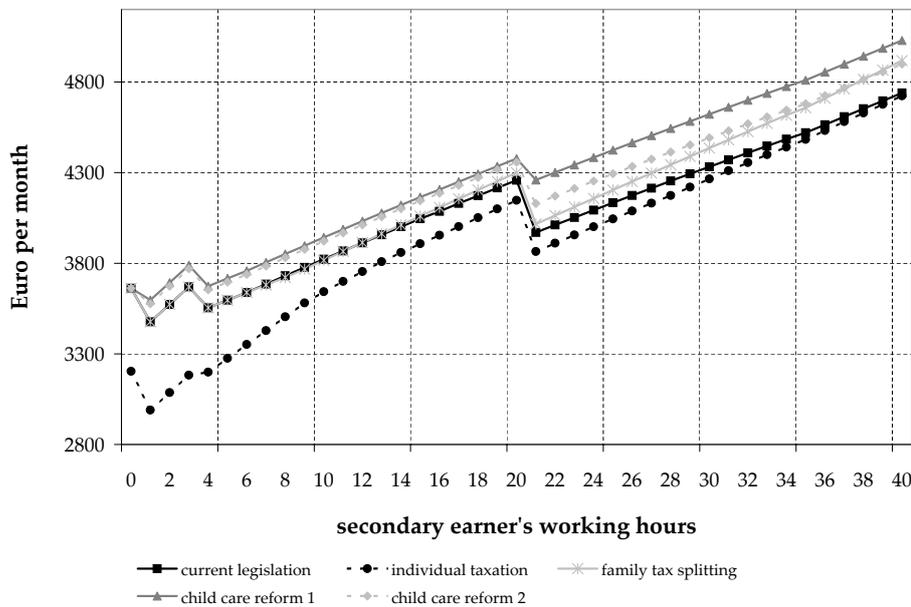
For married couples with median wages and one or two children, the family tax splitting reform does not change the budget line at all. The reason is that for these households the child benefit is higher than the tax gain resulting from the child splitting factors. For high-income couples with three children (see Figure 4.4), the family tax splitting increases household income if the secondary worker is working more than 22 hours. If both parents are working full-time, disposable income increases by 170 Euro per month. Figure 4.5 shows for the example of a single mother with 1 child, earning a wage that amounts to the median of the female wage distribution, that the family tax splitting leads to small increases in disposable income (13 Euro per month) if the mother is working full time. As has been explained above, this is due to the fact that a single parent's splitting factor of 0.5 is more generous in terms of the resulting tax relief than the current single parent's tax allowance.

Figure 4.3: Budget lines of a married couple (median wages) with two children, 1 and 4 years old, under different reform scenarios



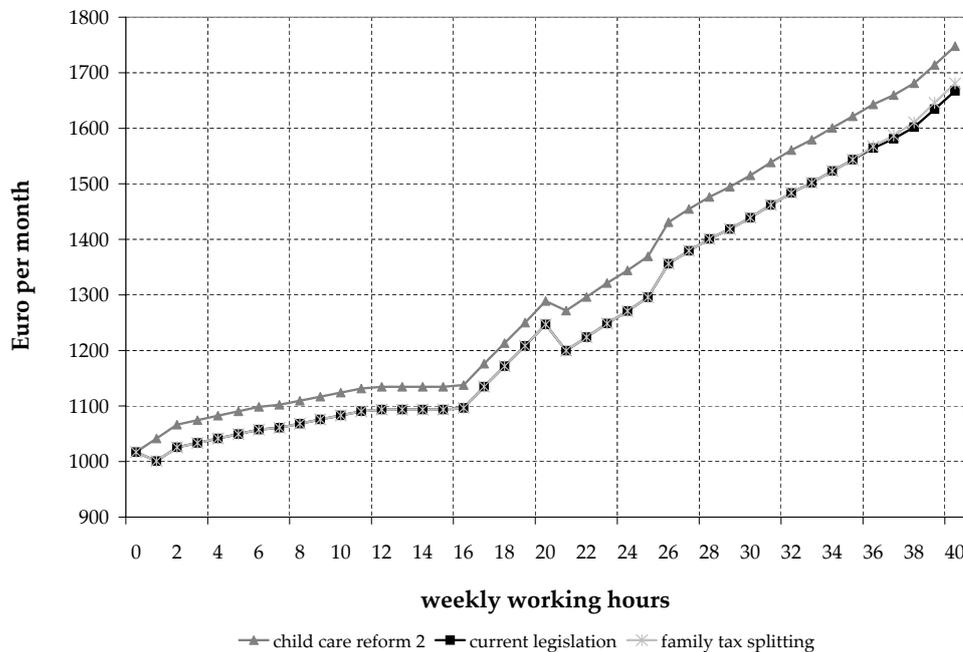
Source: Calculation based on STSM.

Figure 4.4: Married couple (wages at the 90th percentile) with three children, 1, 3 and 5 years old, under different reform scenarios



Source: Calculation based on STSM.

Figure 4.5: Single mother (median wage) with one child, 4 years old, under different reform scenarios



Source: Calculation based on STSM.

The shift from joint to individual taxation has a great effect on the shape of the budget line for all married couples. First of all, families in which the secondary earner is working only few hours and income is unequally distributed between spouses, loose a large amount of disposable income because the tax gain from the income splitting is removed. The income loss amounts to 290 Euro per month in the case of a single-earner couple where the first earner works full-time and earns median wage (see Figures 4.1 to 4.3). This effect is even more pronounced if the first earner has a wage amounting to the 90th percentile of the male wage distribution. For these households, the income loss even amounts to 459 Euro per month (see Figure 4.4).

Moreover, the *slope* of the budget line is strongly affected by this reform. Individual taxation implies that the marginal tax rate for the secondary earner decreases. Thus, the slope of the budget line becomes steeper from 6 hours on in the case of median wages (Figures 4.1 to 4.3) and from 3 hours on in the case of higher wages (see Figure 4.4). This is the point at which the threshold of exemption from social

security contributions and income taxation is exceeded. Obviously, this reform does not affect single and non-married parents, at least as long as fiscal balance is not modeled.

These budget lines, even though shown for several stylized households only, illustrate that a shift to individual taxation can be expected to cause the largest labor supply effects, at least for the population of married mothers. Family tax splitting, that has been shown to be only a minor reform in the version simulated here, is not expected to affect labor supply of married mothers, except for those with very high incomes and more than two children. In addition, there might be some small effects for single and cohabiting mothers.

Table 4.1 summarizes the behavioral effects of the four reform scenarios for the average of all households and disaggregated by the age of the youngest child. On average, all four reforms lead to an increase of mother's labor force participation and their working hours, although the magnitude of the effect varies considerably among the four policy reforms. Childcare reform 1, increasing the availability of childcare slots for children under three years with working parents, leads to higher labor supply increases than reform 2, under which parents' fees for children aged three to six years are abolished. The families' response to child care utilization is similar under both reforms, although different age groups of children are affected.

The family tax splitting reform leads to minor changes in labor supply and practically zero effects in childcare utilization. However, a shift to individual taxation leads to large positive labor supply effects. Mothers' participation rate would increase by as much as 5 percentage points on average. There is also an effect on total working hours, which would increase by more than 20 percent. The increase in mothers' labor supply furthermore causes an increase in the utilization of childcare that is even higher than the effect caused by the two childcare reforms.

Table 4.1: First-round behavioural effects

	Childcare policy reforms	
	Reform 1 increasing slots	Reform 2 abolishing fees
	<i>Change in participation rates (in percentage points)</i>	
All mothers	1.39 (1.22 - 1.64)	0.77 (0.66 - 0.89)
Mothers whose youngest child is <3	2.53 (2.20 - 2.96)	0.29 (0.23 - 0.39)
Mothers whose youngest child is ≥ 3	–	1.37 (1.21 - 1.53)
	<i>Change in working hours (in percent)</i>	
All mothers	5.58 (4.84 - 6.59)	2.33 (2.02 - 2.72)
Mothers whose youngest child is <3	10.07 (8.74 - 11.88)	1.83 (1.57 - 2.18)
Mothers whose youngest child is ≥ 3	–	2.97 (2.54 - 3.43)
	<i>Change in childcare “participation” (in percentage points)</i>	
All children	1.31 (1.08 - 1.63)	1.32 (1.17 - 1.54)
Children <3	2.38 (1.96 - 2.95)	0.51 (0.39 - 0.70)
Children ≥ 3	–	2.34 (2.09 - 2.66)
	Income Tax Reforms	
	Reform 3 Family Tax Splitting	Reform 4 Individual Taxation
	<i>Change in participation rates (in percentage points)</i>	
All mothers	0.13 (0.12 - 0.14)	5.35 (4.75 - 5.96)
Mothers whose youngest child is <3	0.12 (0.11 - 0.13)	4.87 (4.30 - 5.50)
Mothers whose youngest child is ≥ 3	0.14 (0.13 - 0.16)	5.95 (5.40 - 6.58)
	<i>Change in working hours (in percent)</i>	
All mothers	0.55 (0.50 - 0.61)	20.82 (18.47 - 23.42)
Mothers whose youngest child is <3	0.61 (0.54 - 0.68)	23.60 (20.81 - 26.66)
Mothers whose youngest child is ≥ 3	0.49 (0.43 - 0.54)	17.28 (15.52 - 19.34)
	<i>Change in child care “participation” (in percentage points)</i>	
All children	0.05 (0.04 - 0.06)	2.43 (2.00 - 2.90)
Children <3	0.03 (0.02 - 0.04)	2.01 (1.45 - 2.70)
Children ≥ 3	0.07 (0.06 - 0.09)	2.97 (2.54 - 3.40)

Note: Numbers in parentheses show 95%-confidence intervals obtained by the bootstrap method (100 repetitions).

Source: Estimations based on SOEP, waves 2001-2003.

In absolute numbers, the two childcare reforms would lead to an increase of mothers participating in the labor market of about 42,000 (reform 1) and 21,000 (reform 2). The additional number of working mothers under the family tax splitting reform is negligible, amounting to 2,400. A shift from individual taxation would increase the number of working mothers by more than 135,000.

As has already been pointed out above, the interpretation of the comparison of the behavioral effects at this stage is limited since the four reforms lead to very different fiscal costs or revenues. A solid comparison must be based on revenue-neutral reforms. In order to model revenue neutrality, however, the fiscal costs or revenues have to be computed first.

4.3.2 Fiscal Effects

Fiscal effects are composed of two parts. First, there is the “morning-after” (or “mechanical”) effect, i.e. the costs or revenues that arise due to the mere change of the childcare or tax parameters of the legislation. Second, the behavioral adjustment leads to changes in the income tax revenue and social security contributions. These effects are summarized in Table 4.2.

Table 4.2: Fiscal effects in million Euro

	Reform 1	Reform 2	Reform 3	Reform 4
“Mechanical” effect	-864	-1,250	-332	+8,630
Changes due to behavioural adjustment:				
Changes in income tax revenue	+109	+148	+4	+420
Changes in social security contributions	+206	+192	+12	+1,502
Changes in expenditures for childcare	-276	–	–	–
Total effect	-825	-910	-316	+10,552

Source: Estimations based on SOEP, waves 2001-2003.

As this table shows, the fiscal costs of the two childcare reforms are very similar, although composed of different effects. The “morning-after” effect of offering those children with working mothers who already are in paid childcare a subsidized slot (reform 1) costs about 860 million Euro per year. Moreover, the behavioral

adjustment leads to an increased demand for childcare slots for 50,400 children (2.4 percent of all children aged under three years). The calculation of the costs of providing 50,400 new childcare slots for children under three years requires some more assumptions. As Schilling (2004) shows, the costs for childcare slots differ considerably by federal states. The average costs for a childcare slot for children under three years range from 4,840 Euro per year in Mecklenburg-Western Pomerania to 16,801 Euro per year in Hamburg.⁴ In the largest state, North Rhine-Westphalia, a childcare slot for children in this age group costs 7,000 Euro per year. I decided to take this as a baseline for the calculations in this analysis. Deducting average parents' fees of 1,520 Euro per year from these costs, the total public expenditures per year amount to 5,480 Euro. This number multiplied by 50,400 children yields a total amount of 276 million Euro per year. All in all, this reform would thus lead to costs of 825 million Euro per year.

Since - by assumption - reform 2 does not imply offering more than the existing slots, the behavioral adjustment does not cause more fiscal costs than resulting from the "morning-after" effect. After deducting the increase in income taxes and social security contributions resulting from an increased labor supply of the mothers, reform 2 costs about 910 million Euro per year.

The two reforms of family taxation affect the fiscal budget in very different ways. The family tax splitting constitutes a minor reform and leads to fiscal costs of about 330 million Euro per year. In contrast, individual taxation implies large fiscal gains due to the abolishment of the income splitting. Without taking behavioral adjustment into account, this reform yields additional income tax revenues of almost 9 billion Euro per year.⁵ Adding the income tax and social security contributions

⁴Schilling (2004) explains these large differences by differences in wages between east and west Germany, differences in material costs, in particular rents, as well as differences in child-staff ratios.

⁵ Bach et al. (2003) have calculated the revenues of this reform for the whole population. Without behavioral adjustment, the revenues amount to 22 billion Euro per year. As the calculation presented here shows, about 40 percent of this come from the group of families with children up to six years. This seems plausible, since among this group of families, the income distribution within the families is much more unequal than in families with older children or without children.

that result from the increased labor supply of mothers, this reform would lead to an increase of the fiscal budget by 10.5 billion Euro.

Note that the fiscal costs calculated and presented in Table 4.2 refer only to families with at least one child up to six years. Under the two childcare policy reforms simulated here, this is the only group of households who face changes in disposable income anyway. However, in the case of the tax reforms analyzed here, all families with children - or in the case of individual taxation - all married couples in Germany would be affected. The fiscal costs of these reforms for the whole population have been calculated by Steiner and Wrohlich (2004) and Steiner and Wrohlich (2006c), respectively. Since the purpose of this analysis is not a comprehensive assessment of the fiscal effects of these reforms, but a comparison of the labor supply effects and welfare changes under various reform scenarios, I restrict the analysis to the group defined above.

Based on the numbers presented in Table 4.2 and on the fact that there are 4.6 million children up to six years, the child benefit has to be reduced by 15 Euro per month under reform 1 and by 16.5 Euro under reform 2. In the case of reform 3, the child benefit has to be decreased by 5.7 Euro per month only, whereas under reform 4, the child benefit could be increased by 191 Euro per child per month.

4.3.3 Second-Round Behavioral Effects

After disposable household incomes have been changed by adjusting the child benefit in order to model revenue neutrality, behavioral changes are predicted again using the estimated parameters of the utility function. I skip a graphic illustration of how budget lines change compared to Figures 4.1 to 4.5, since all budget constraints after adjustment of child benefits have the same slope as shown earlier but are shifted in parallel either downwards (in case of the two childcare reforms and family tax splitting) or upwards (under individual taxation). The amount of the parallel shift depends on the number of children. A married couple earning median wages having

one child is better off under individual taxation if the secondary earner works 8 hours or more. Below this threshold, the loss of the splitting gain exceeds the increase of the child benefit. In the case of a married couple with two children and median wages, the increase in the child benefit exceeds the loss of the splitting gain even if the secondary earner is not working at all. For all non-married parents, this reform leads to an increase in disposable income since these families are not affected by the change of the tax system but - by assumption - profit from the increase of the child benefit.

Second-round behavioral effects can be expected to be similar to the first-round behavioral effects because fiscal balance is modeled by a lump-sum adjustment of the child benefit. In the first three reforms, labor supply effects are higher, in reform 4, they are lower, which is in line with what is expected as a result of the income effect. As can be seen from Table 4.3, however, the differences between first-round and second-round behavioral effects are not statistically significant. This shows that the income effect is relatively small compared to the substitution effect.

Among the two childcare reforms, reform 1 leads to higher labor supply responses than reform 2, while the responses of childcare utilization are similar. Under reform scenario 1, labor force participation of all mothers with children up to six years would increase by 1.4 percentage points, which is about twice the amount of the effect that would result under reform 2. This effect is solely driven by the labor supply response of mothers with a child under three years. In this group, the labor force participation rate would increase by 2.5 percentage points (starting from a labor force participation rate of 35%), working hours of this group would increase by 10 percent (starting from 7 hours per week on average). The higher labor supply effects under reform 1 are obviously caused by the fact that the subsidies in the form of access to subsidized childcare slots are only granted to working mothers, while in the case of reform 2, the free provision of childcare is granted to all mothers, whether working or not.

Table 4.3: Behavioural effects of revenue-neutral policy reforms (“Second-round behavioral effects”)

Childcare policy reforms		
	Reform 1 increasing slots	Reform 2 abolishing fees
	<i>Change in participation rates (in percentage points)</i>	
All mothers	1.41 (1.21 - 1.63)	0.78 (0.69 - 0.88)
Mothers whose youngest child is <3	2.53 (2.19 - 2.92)	0.30 (0.23 - 0.39)
Mothers whose youngest child is ≥ 3	–	1.39 (1.24 - 1.56)
	<i>Change in working hours (in percent)</i>	
All mothers	5.65 (4.98 - 6.52)	2.40 (2.10 - 2.74)
Mothers whose youngest child is <3	10.14 (8.98 - 11.68)	1.89 (1.62 - 2.22)
Mothers whose youngest child is ≥ 3	–	3.06 (2.67 - 3.51)
	<i>Change in childcare “participation” (in percentage points)</i>	
All children	1.31 (1.08 - 1.58)	1.32 (1.16 - 1.49)
Children <3	2.38 (1.97 - 2.85)	0.51 (0.40 - 0.66)
Children ≥ 3	–	2.35 (2.10 - 2.61)
Income tax reforms		
	Reform 3 Family tax splitting	Reform 4 Individual taxation
	<i>Change in participation rates (in percentage points)</i>	
All mothers	0.13 (0.12 - 0.15)	5.20 (4.63 - 5.74)
Mothers whose youngest child is <3	0.12 (0.11 - 0.14)	4.79 (4.29 - 5.41)
Mothers whose youngest child is ≥ 3	0.15 (0.13 - 0.16)	5.71 (5.13 - 6.20)
	<i>Change in working hours (in percent)</i>	
All mothers	0.58 (0.51 - 0.64)	20.00 (17.63 - 22.61)
Mothers whose youngest child is <3	0.63 (0.57 - 0.71)	22.85 (20.07 - 25.79)
Mothers whose youngest child is ≥ 3	0.51 (0.46 - 0.56)	16.38 (14.46 - 18.47)
	<i>Change in childcare “participation” (in percentage points)</i>	
All children	0.05 (0.04 - 0.06)	2.38 (1.98 - 2.78)
Children <3	0.03 (0.02 - 0.04)	1.96 (1.57 - 2.43)
Children ≥ 3	0.07 (0.06 - 0.09)	2.91 (2.49 - 3.25)

Note: Numbers in parentheses show 95%-confidence intervals obtained by the bootstrap-method (100 repetitions).

Source: Estimations based on SOEP, waves 2001-2003.

Under both reforms, the number of families using paid childcare for their youngest child will increase by about 1.3 percentage points. In case of reform 1, this effect is driven by the increase in childcare utilization for children under three years (increase by 2.4 percentage points), while under reform 2, that only affects families with children from three to six years, the effect is largely driven by families with children in the older age group. However, families with at least one child under three years adjust their demand for childcare for their youngest child under reform 2 as well. Many of these families have children in both age groups, and reform 2 makes childcare on the whole cheaper for them.

The reforms of income taxation lead to very different behavioral effects. As has already been pointed out above, the family tax splitting as simulated here is only a very minor reform, basically substituting the current child tax allowance by a limited splitting gain for children. Because the higher-yield test of the tax gain against the child benefit is kept in place, the share of families who are affected by the reform is very small. Moreover, the negative work incentive resulting from the joint taxation under the current legislation is not changed under family tax splitting. Secondary earners in married couples still face the same marginal tax rate as first earners, even though for high-income families, the tax rate is reduced under the family tax splitting. Thus, it is not surprising that the labor supply effect of this reform is very small - amounting to an increase in the participation rate of mothers by 0.2 percentage points and an increase in the working hours by about 0.8 percent.

A similar reform has been analyzed by Steiner and Wrohlich (2006c), however not for the fiscal years 2000 - 2002, but for 2005. Their results show even smaller labor supply effects than the ones presented here: The labor force participation of all women with dependent children would increase by less than 0.1 percentage points and average working hours of this group would increase by 0.3 percent. The reason why these effects are smaller is that Steiner and Wrohlich (2006c) investigate the effects of the whole population, while in this analysis, the focus is on families with

young children. Althammer (2000) has also analyzed the effects of a family tax splitting reform, however, with different parameters than chosen here. The most important difference is that he assumes that the splitting factor for the second adult person is decreased to 0.5. As in the reform simulated here, the child tax allowance is abolished. Fiscal balance is modeled by an adjustment of the child benefit. For such a reform, Althammer (2000) finds an increase in mothers' participation rate by 0.4 percentage points. Note, however, that the labor supply model on which this analysis is based differs from the one used here in that the "marginal net wage" is used as an explanatory variable in the hours and participation equation, rather than disposable household income as used here.⁶ Labor supply reactions of the same amount as reported by Althammer are also found in a study by Beblo et al. (2004) who analyze a similar family tax splitting reform based on a collective model of labor supply.

In contrast to the relatively small labor supply effects that would result from the introduction of a family tax splitting in Germany, a change to individual taxation with an adjustment of the child benefit would lead to large positive labor supply responses of mothers with young children. The participation rate would rise by about 5 percentage points, average working hours would increase by about 20 percent. These numbers are in line with the results found by Steiner and Wrohlich (2004). In an earlier study, Strom and Wagenhals (1991) find an increase of 8 percentage points in the female labor force participation rate for data from 1984. Gustafsson (1992) finds even higher labor supply effects, namely an increase in the labor force participation rate of 10 percentage points. The data on which this study is based are from 1984 and stem only from West Germany. Moreover, the discrete choice model includes the wife's net wage as an explanatory variable rather than household income as used here. An effect of similar magnitude as the one reported by Gustafsson (1992) has also been found by Althammer (2000), however also his model uses net

⁶This is a problematic assumption because the net wage is endogenous in an estimation of working hours.

wages as explanatory variables in the participation equation.

The larger effects found by earlier studies, however, cannot only be explained by different specifications of the labor supply model. Another reason is that in the 1980s, marginal tax rates were much higher than in 2000-2003 (see Corneo (2005a)). Thus, the tax gain from income splitting was higher than today.

The absolute numbers of the behavioral effects are similar to the first round effects reported in section 4.3.1. Under childcare reform 1, 42,000 additional mothers would enter the labor force, while under reform 2, the number amounts to 21,000. Family tax splitting would lead to an increase of the labor force by 2,400. Only the effects resulting from a shift to individual taxation are affected by modeling the fiscal balance. The number of participating mothers would increase by 131,000 instead of 133,000 in the simulation without the adjustment of the child benefit.

4.3.4 Changes in the Distribution of Household Income

Post-reform incomes differ from pre-reform incomes for two reasons. First, household incomes change because of the modifications in the tax-transfer system including the adjustment of the child benefit. Second, mothers adjust their labor supply and choice of child care, which in turn leads to additional changes of household income. The following table presents the income changes in disposable household income after behavioral adjustment by deciles of the distribution of net household income.

As Table 4.4 shows, families in the lower half of the income distribution profit more from childcare reform 1 than families in the upper half. This is due to the fact that household income increases with the age of the youngest child in the family. Since under childcare reform 1 only families with a child under three years benefit, the “winners” of this reform are more likely to be found in the lower income deciles. The same argument explains why childcare reform 2 leads to larger increases in household income for families in the upper deciles. In addition, high-income parents profit more from the provision of free childcare in absolute terms since the parents’

fees increase by household income, as has been shown in section 3.4.2.

On average, the income changes under childcare reform 1 and 2 are positive. Childcare reform 2 leads to a higher average income gain (8.7 Euro per month) than childcare reform 1 (4.9 Euro per month). If behavioral changes were not taken into account, the average income changes should be equal to zero, since the reforms are modeled to be revenue-neutral. Thus, the deviation of the average income change from zero must be explained by behavioral adjustment, i.e. by the increase in labor supply. Although maternal labor supply increases more under reform 1 than under reform 2, the additional working hours of mothers with children under three years result in lower gains in disposable household income since childcare costs of this group are higher (even after the reform) than for children in the older age group.

The income change under the family tax splitting reform depends on taxable income, number of children and family status. Single mothers profit most from the reform since they are granted a single parent's splitting factor of 0.5 in addition to the child splitting factors. For married couples, the family tax splitting is beneficial if they have high taxable incomes and/or three or more children. Thus, I find small positive income changes in the lower and the upper part of the income distribution. All in all, the income changes under this reform are very small and amount to 1.3 Euro per month on average.

A shift from joint to individual taxation is more beneficial for low income than high income families. In the first decile, families gain on average 219 Euro per month, while in the uppermost decile, families face an income loss of 71 Euro per month. The first reason for this distribution of income changes is that single parents, who are more likely to be found in the lower part of the income distribution, profit from the increase of the child benefit. Second, the income loss of married couples for a given distribution of market income between the spouses increases with taxable income.

Table 4.4: Income changes under four policy reforms by deciles (in Euro per month)

Deciles (Household income) ^a	Child Care reform 1	Child Care reform 2	Family tax splitting	Individual taxation
1	8.1	2.3	1.8	218.7
2	21.0	7.2	1.5	210.3
3	18.8	5.8	1.7	141.1
4	10.2	5.0	1.0	102.2
5	8.7	9.2	1.1	84.4
6	5.3	1.6	0.4	95.2
7	8.4	7.0	0.2	81.3
8	0.5	15.2	0.1	59.8
9	-1.1	14.0	1.0	69.9
10	-16.6	21.6	2.4	-70.6
Overall average	4.9	8.7	1.3	104.7

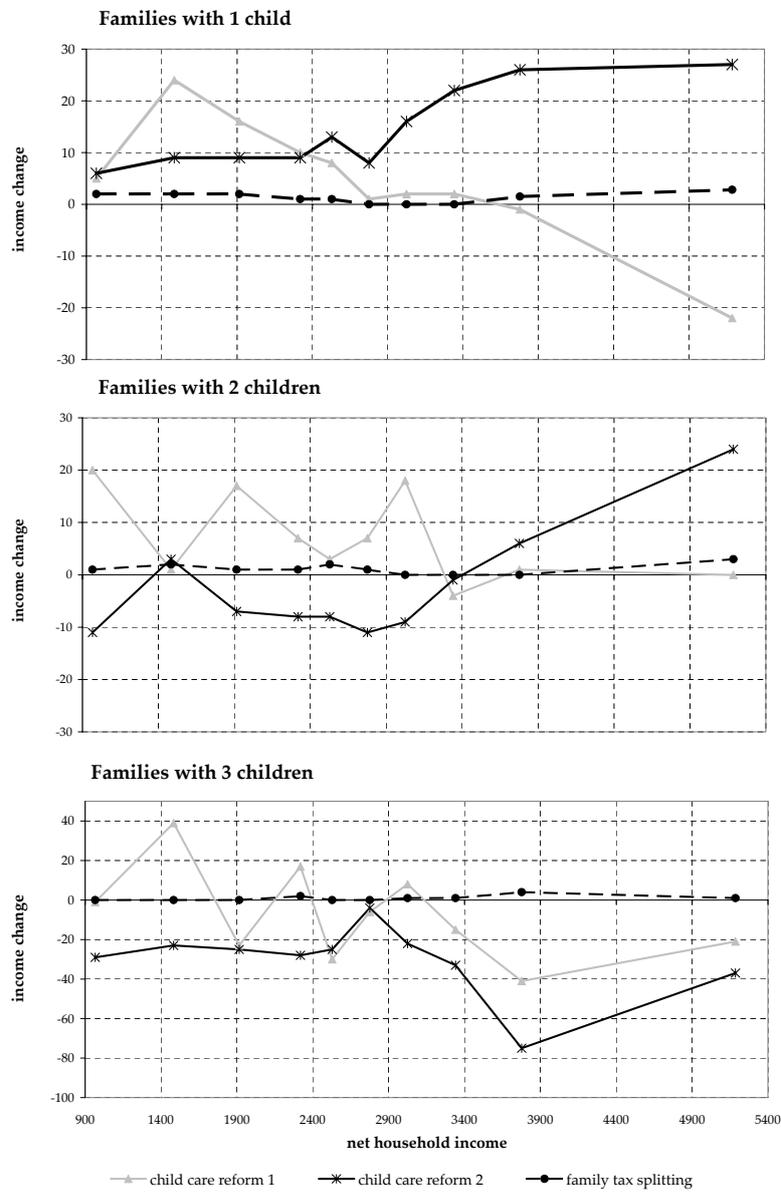
^a “Household income” is calculated as the expected value of disposable household income before the reform.

Source: Calculations based on SOEP, waves 2001-2003.

Note that the income deciles used in Table 4.4 are based on net household income rather than on per-capita income that could have been calculated using one of the common equivalence scales. Since the income changes induced by the different reforms depend on taxable income and on the number of children, a definition of income deciles based on equivalence income would not clarify how households of different size are affected by the reform. In order to analyze the income changes according to the two dimensions income and household size separately, I present a graphical illustration of how the income changes are related to household income for different household types. Figure 4.6 shows income changes by deciles of household incomes for families of different size for the two childcare policy reforms and family tax splitting.

As has already become clear from Table 4.4, family tax splitting has almost no effect on disposable household income. This can be seen from the dashed line in Figure 4.6, that hardly exceeds or falls below the zero line. The uppermost panel of Figure 4.6 shows that for families with one child, the income gains resulting from childcare reform 1 decrease as household income increases, while under childcare reform 2, the opposite is true. For families with more than one child, this pattern

Figure 4.6: Income changes under childcare policy reforms and family tax splitting by deciles for different household types

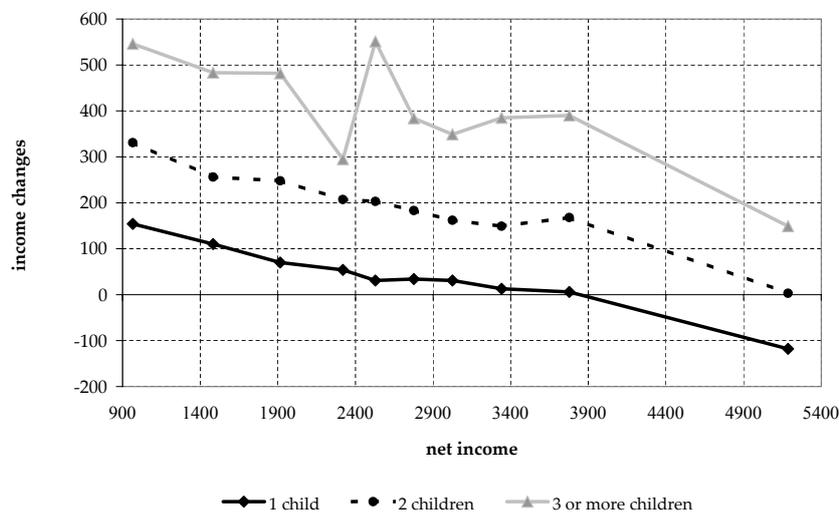


Dots refer to the average income change within each decile.

Source: Calculations based on SOEP, waves 2001-2003.

is not so clear. What can be seen from this illustration, however, is that families with more than one child contribute more to the financing of these three reforms and thus may face losses in household income. This is a logical consequence of the assumption that the tax revenues are redistributed by increasing the child benefit for every child up to six years.

Figure 4.7: Income changes under a shift to individual taxation by deciles for different household types



Dots refer to the average income change within each decile.

Note that the calculations for families with three or more children up to 6 years are based on a limited number of observations only (70 observations). The very high income gains in the 5th decile is explained by the fact that in this decile, the number of children up to six years (3.33) is well above the average in the other deciles (3.06).

Source: Calculations based on SOEP, waves 2001-2003.

Income changes resulting from a shift to individual taxation are depicted in a separate figure (Figure 4.7) because the magnitude of these effects requires a different scale than the effects resulting from the first three reforms. Under a shift to individual taxation and an adjustment of the child benefit in the way explained above, the income gain increases with the number of children. For families with

two or three children, the income changes never become negative. Families with one child in the highest decile are the only ones who face income losses. Moreover, for households with one or two children there is a clear relationship between household income and the income change under this reform: The lower the pre-reform household income, the higher the gain from this policy change. For married couples with three children, this relationship is not so clear-cut, since families in the 5th decile profit even more from this reform than families in the first decile. Couples who are in the highest decile of the income distribution, however, have the lowest gain.

Table 4.5 shows income changes by other socio-economic characteristics. It is clear that income changes under the two childcare policy reforms are driven by the age of the youngest child in the family. This is the reason why for example cohabiting couples are - on average - “winners” of childcare reform 1 but “losers” of childcare reform 2. The average age of the youngest child in this group is 1.8 years, while among married couples and singles the average age of the youngest child is 2.4 and 2.9, respectively. Singles and cohabiting couples are - on average - benefiting more from the family tax splitting reform than married couples. This reform therefore implies a redistribution of incomes towards these family types, although the extent of the redistribution is very small. As already pointed out above, singles and cohabiting couples are also those who benefit most from the introduction of individual taxation. Their tax liability does not change, however, they profit from the increased child benefit just like married couples. Thus, such as the family tax splitting reform individual taxation would imply a redistribution from married couples to unmarried parents, yet to a much larger extent.

Table 4.5: Income changes by household characteristics (in Euro per month)

	Childcare Reform 1	Childcare Reform 2	Family tax splitting	Individual taxation
<i>Marital status</i>				
Married couples	2.6	10.8	0.8	70.4
Cohabiting couples	30.2	-11.5	1.7	217.6
Singles	2.6	8.6	3.5	222.5
<i>Age of youngest child</i>				
0-2	25.7	-15.0	1.0	119.2
3-6	-19.1	36.0	1.7	88.0
<i>Number of children^a</i>				
1	7.8	12.4	1.5	72.7
2	1.5	6.0	0.7	150.5
3 or more	-18.3	-34.3	2.2	280.3

^a Number of children up to six years.

Source: Calculations based on SOEP, waves 2001-2003.

4.3.5 Changes in Household Welfare

As the analysis of the income changes has shown, families' income on average increases under all four reforms. The highest income gain is achieved under individual taxation, followed by the free provision of public childcare for children aged three to six (childcare reform 2), the increase of availability of public childcare for children under three years (childcare reform 1) and finally family tax splitting. However, the income changes are only an incomplete measure of changes in households' well-being. As explained above, the positive income changes are driven by the increased labor supply of mothers. This, however, implies that they have less time for leisure and maternal childcare. A comprehensive assessment of the benefits of the four reforms has to take the potential losses in utility due to increased labor supply into account.

Since utility comparisons of households under different reform scenarios cannot be meaningfully interpreted, we need to use a money-metric measure of utility changes. The compensating variation, for example, measures the amount of money a household has to be granted in order to compensate the loss in utility after the reform.⁷ If the difference between post-reform and pre-reform utility is positive, the

⁷This direct compensating function is used as a measure of welfare changes, for example, by

compensating variation measures the amount of money that would have to be withdrawn from the household such that it obtains the pre-reform level of utility. Tables 4.6 and 4.7 present the welfare changes measured by the compensating variation under the four reform scenarios according to income deciles and other household characteristics.

Averaging over the whole population of families with at least one child up to six years shows that the welfare change resulting from childcare reform 1 is negative. This means that families would have to be compensated by 7 Euro per month on average in order to obtain their pre-reform level of utility. Childcare reform 2, on the other hand, leads to an increase in average household welfare of about 6 Euro per month. There are several reasons for this difference of the change in household welfare. First, the income gain is smaller under child care reform 1 than under reform 2, as has been shown in Table 4.4. Second, childcare reform 2 - abolishing parents' fees to formal childcare for children aged three to six - is not conditional on the mothers' employment status and thus implies less distortions of household's choices than childcare reform 1, in which the subsidies are conditioned on the mothers participation in the labor market. In other words, under childcare reform 2, mothers can choose more formal childcare, for which they do not have to pay, and enjoy more leisure time. Third, the difference in welfare changes can also be explained by the fact that for almost 50 percent of families with children in the older age group, the first derivative of the utility function with respect to formal childcare is positive. Higher levels of formal childcare in this group thus lead to higher levels of utility. For families with children in the younger age group, however, the first derivative of utility with respect to formal childcare is negative in 99% of all cases.

The average welfare change of introducing a family tax splitting for the sub-population of families analyzed in this study is negligibly small, amounting to a loss

Aaberge, Dagsvik, and Strom (1995) and King (1983). See Preston and Walker (1999) for an overview of other money metrics of welfare changes in the context of discrete choice labor supply models.

of 10 cents per month. In sharp contrast to this, a shift to individual taxation would increase welfare by 60 Euro per month.

Table 4.6: Compensating variation by income deciles (in Euro per month)

Deciles (Household income) ^a	Childcare reform 1	Childcare reform 2	Family tax splitting	Individual taxation
1	-4.6	3.5	-0.4	220.0
2	1.5	5.5	0.0	207.0
3	3.2	4.7	-0.0	121.0
4	-4.3	3.8	-0.7	64.5
5	-5.2	5.1	-0.0	42.4
6	-9.6	-1.8	-0.0	32.4
7	-6.2	3.6	0.4	27.1
8	-7.4	10.2	0.3	9.6
9	-14.1	9.5	0.0	4.5
10	-22.2	17.1	-0.2	-128.7
Overall average	-6.9	6.2	-0.1	60.2

^a “Household income” is calculated as the expected value of disposable household income before the reform.

Source: Calculations based on SOEP, waves 2001-2003.

A more disaggregate analysis of the changes in household welfare shows that the pattern is similar to the changes in disposable income. Under childcare reform 1, high-income households face higher welfare losses than low-income households, whereas the opposite is true for childcare reform 2. In the case of family tax splitting, welfare changes are close to zero in all income deciles, whereas under individual taxation, the welfare gains decrease (and eventually get negative) as net income increases.

A disaggregation by socio-economic characteristics such as family status, number of children and age of the youngest child shows that welfare changes follow the same pattern as income changes. The breakdown of welfare changes by family status is most interesting for the case of individual taxation: Clearly, cohabiting couples and single parents experience the highest welfare gains in this scenario. Their welfare gains almost equal their income gains, because the labor supply adjustment of non-married parents is negligibly small. Recall that for these families, the slope of the

Table 4.7: Compensating variation by household characteristics (in Euro per month)

	Childcare reform 1	Childcare reform 2	Family tax splitting	Individual taxation
<i>Marital status</i>				
Married couples	-8.3	7.7	-0.1	12.7
Cohabiting couples	6.1	-14.3	-0.0	218.1
Singles	-6.6	9.0	0.1	222.5
<i>Age of youngest child</i>				
0-2	2.7	-17.3	-0.5	64.8
3-6	-17.5	33.4	0.3	54.7
<i>Number of children^a</i>				
1	-2.4	12.2	0.0	33.0
2	-11.8	-0.1	-0.1	96.4
3 or more	-44.2	-47.0	-1.3	230.3

^a Number of children up to six years.

Source: Calculations based on SOEP, waves 2001-2003.

budget constraint does not change at all, it is only shifted in parallel due to the adjustment of the child benefit. Thus, these families “consume” more leisure due to the income effect, but this effect is very small. More interesting is that even married couples on average receive a welfare gain amounting to 12 Euro per month. This welfare gain is considerably smaller than the increase in disposable income for this group, that amounts to 70 Euro per month. This difference is a measure of the disutility of the mothers that is associated with the loss in leisure and maternal childcare. However, it is noteworthy that even if the loss of leisure and maternal childcare is accounted for, there is still a *gain* in household welfare. This reveals the strong distortionary effects that result from the current system of joint taxation. For the German case, therefore, it can be concluded that the system of joint taxation is not optimal. Households’ welfare could be increased through a shift to individual taxation, confirming theoretical findings such as those by Apps and Rees (1999) and Kleven et al. (2006).

Summarizing welfare changes by age of the youngest child shows that on average, families with a child under three years benefit from childcare policy reform 1. Childcare reform 2 increases the welfare only for families with children aged three years or older. Families with more than three children face the highest welfare losses

under both childcare reforms, whereas they are the group who benefits most from the shift to individual taxation. As explained above, this is driven by the fact that the fiscal budget is balanced by an adjustment of the child benefit, thus introducing a lump-sum “child tax” in reforms 1 to 3 and a lump-sum “child bonus” under individual taxation.

If policy conclusions are to be drawn from the comparison of aggregate welfare changes induced by the four reforms, one has to keep in mind that the aggregation in Tables 4.6 and 4.7 sets an equal weight on all households, ignoring differences in household composition and income. The underlying social welfare function of this aggregation is a utilitarian one. Yet, it is much more plausible to assume a social welfare function in which households with less income are getting higher weights than households with higher income. In the following, I will show average welfare changes under alternative weighting schemes (see Blundell et al. (2007)). It is assumed that the weight w of household i is a function of household income y_i

$$w_i = \frac{1}{\exp(y_i)^v} \quad (4.4)$$

v is a parameter that expresses the “redistributive taste” of a society. The higher v , the higher is the weight put on low-income households. Table 4.8 shows the average welfare change under the four reform scenarios for the population of families with children up to six years for three different values of v , 0.5, reflecting a low redistributive taste, 1, suggesting a medium and 2 a high taste for redistribution.

Table 4.8: Average changes in household welfare under different weighting schemes (based on household income)

	Childcare reform 1	Childcare reform 2	Family tax splitting	Individual taxation
$v = 0.5$	0.6	4.3	-0.3	217
$v = 1$	-0.2	2.9	-0.4	221
$v = 2$	-0.6	1.3	-0.5	224

Source: Estimations based on SOEP, wave 2001-2003.

Childcare reform 1 leads to a very small average welfare change that is positive for low values of v and gets negative as v increases (see Table 4.8). In contrast, childcare reform 2 leads to an average welfare gain under all three weighting schemes. This gain, however, is decreasing as soon as more weight is put on low-income households. Family tax splitting leads to very small average losses in household welfare that increase as low-income households are given more weight. The welfare gains under a shift to individual taxation are very large under all three weighting schemes. The average welfare gain increases with higher weights on low-income households.

The weights proposed in equation 4.4 are a function of household income. However, it seems plausible that not only household income but also family size affects the weighting scheme of a social welfare function. One way to incorporate household size is to use equivalized income instead of household income in the denominator of the weighting function suggested in equation 4.4. One commonly used equivalence scale is the modified OECD scale that attributes a factor of 1 to the first adult person in the household, 0.5 to every subsequent adult person in the household and 0.3 to every child. Table 4.9 shows average welfare changes if the weighting factors are based on equivalized income instead of household income.

Table 4.9: Average changes in household welfare under different weighting schemes (based on equivalized income)

	Child Care Reform 1	Child Care Reform 2	Family Tax Splitting	Individual Taxation
$v = 0.5$	-0.2	1.9	-0.4	205
$v = 1$	-0.4	-0.1	-0.5	240
$v = 2$	-0.6	-0.4	-0.4	253

Source: Estimations based on SOEP, wave 2001-2003.

The average amount of welfare changes under the four reforms does not differ greatly from the average obtained with social weights that base on household income. This is particularly true for the family tax splitting reform. Both childcare reforms, however, seem less favorable if the weights are based on equivalized income. This

is due to the fact that families with more children, who are getting higher weights with increasing v , are contributing more to financing the reform. The welfare gains resulting from a shift to individual taxation are higher if the weighting factors are based on equivalized income, because families with many children profit to a larger extent from the increase of the child benefit.

There are many more household characteristics that might influence the weights of a social welfare function. For example, it is a well-known fact that relative to other European countries, Germany spends a lot of money on families with *older* children, for example in the form of the child benefit that is granted until the 27th birthday, or the fact that university education is provided free of charge, while relatively less is spent on families with *younger* children. This would imply a higher weight for families with older children. Currently, there is a discussion on changing the policy towards a greater redistribution within the life-cycle and targeting public expenditures more towards families with young children. Another example is the importance of the legal family status. It is obvious that in Germany, married partners are favored compared to non-married spouses. This is not only specified in the Basic Constitutional Law of the Federal Republic of Germany, but is also reflected in the income splitting procedure that is only granted to married couples. This normative judgement, however, is currently challenged, as the discussion on including non-married parents in some sort of family tax splitting shows.

It should be clear from what has been explained above that if families with young children are getting more weight than families with older children, childcare reform 1 becomes more attractive. If both parents should be encouraged to work and thus two-earner families get more weight, this effect would be even larger. The same is true for the introduction of individual taxation. On the other hand, if the weighting scheme would depend on legal family status, in the way that married couples would be given higher weights than non-married couples, the average welfare change under this reform would be lower.

4.4 Conclusion

This chapter has shown how behavioral microsimulation models can be used to analyze different policy reforms from an ex-ante perspective, taking two child care and two family tax policy reforms as example. The choice of reform scenarios has been motivated by the ongoing discussion. First, I have analyzed a childcare reform that has been implemented recently and implies the provision of subsidized childcare for all children under three years who have working parents. The second reform, that is currently discussed and will be introduced soon in some federal states, is the free provision of childcare for children between three years and school entry age. The difference between these two reforms is not only the target age group of children, but also the fact that in the first reform subsidies are conditioned on the employment status of the parents, whereas under the second reform, the subsidies are granted no matter whether the parents are working or not. Moreover, I have simulated two family tax policy reforms. The first one is a family tax splitting that comes close to the system as practiced in France. The second tax reform consists of a shift from joint to individual taxation. The choice of this reform has not been motivated so much by the political discussion but more as a scientific exercise in order to show its effects on the income distribution, to point out the large amount of revenue that could be raised by such a reform and used to finance other policy reforms and to assess the distortionary effects resulting from joint taxation.

The first important finding, confirming previous studies such as those by Steiner and Wrohlich (2006c) and Beblo et al. (2004), is that a family tax splitting such as simulated here would not have a large effect on labor supply and on household incomes. For the large majority of the households, this reform would not change the budget constraint, since most families are better off choosing the child benefit rather than the tax gain resulting from the child splitting factors. Non-married parents and high-income families might benefit, although the increases in disposable income are lower than, for example, under the two childcare reforms. This finding is not

surprising, since a family tax splitting that limits the splitting gain at 2,500 Euro per year, such as simulated in this analysis, is very similar to the current German system of child tax allowances.

The two childcare reforms have been shown to increase work incentives for mothers with young children. This is particularly true for childcare reform 1, where subsidies are conditioned on the employment status of the parents. Under this reform, the labor force participation rate of mothers with children under three years would increase by 2.5 percentage points. The labor supply effect of providing free childcare for children aged three to six (childcare reform 2) leads to an increase of the labor force participation rate of mothers whose youngest child is in this age group by 1.4 percentage points. An analysis of the distribution of income gains and losses by deciles of household incomes reveals that childcare reform 1 is more beneficial for low-income families, whereas the opposite is true for childcare reform 2, under which the absolute income gains increase by family income.

The largest labor supply effects could be realized under the shift from joint to individual taxation. Under this scenario the labor force participation rate of mothers with children up to six years would increase by more than 5 percentage points. This is due to the fact that the secondary earner is taxed separately from the first earner and thus faces lower marginal tax rates, which makes the budget line steeper and thus increases work incentives. This reform would also lead to a large increase in income tax revenues and social security contributions, which could be used to increase the child benefit by as much as 190 Euro per month. Thus, single and cohabiting parents as well as all families with more than two children would have a higher disposable income even before mothers adjust their labor supply. Families with one child, however, in which the income is unequally distributed, may face income losses depending on the taxable income of the first earner. The analysis of income changes by deciles of net household income shows that the income gains decrease as net income increases. Thus, this reform - apart

from removing the negative work incentives induced by the joint taxation - would also imply a redistribution from high- to low-income families. If the additional revenues are redistributed in the way proposed here, this reform moreover implies a redistribution from households with one child to families with more children.

An analysis of changes in household welfare, measured by compensating variation, shows that childcare reform 1 leads to a small loss in average household welfare, that increases as more weight is put on low-income households. Childcare reform 2 has less distortionary effects because the subsidies are not conditioned on the mothers' working status. Under this reform, the welfare change is positive, but decreases the more weight is put on low-income households. Family tax splitting leads to very small welfare losses that increase as the weights for low-income households are raised. The largest increases in household welfare could be actually realized in the case of a shift from joint to individual taxation. This reveals the strong distortions that are induced by the current system.

The policy implications, in particular the decision about which reform should be chosen, depends on the weights that political majorities attribute to some groups of families. For example, if two-earner families with young children should be given a larger weight than families with older children, childcare reform 1 might look more favorable than if the age of children does not affect the weights within the social welfare function. If one-earner married couples with one child, however, are given higher weights than families with more children or unmarried parents, the shift to individual taxation is less attractive.

Finally, several shortcomings of the analysis shall be mentioned. First of all, labor supply reactions of fathers have not been taken into account. Though it has been shown in Chapter 4, that this does not bias the estimation of labor supply reactions of women, it ignores the fathers' reactions to the policy reforms. As the study by Steiner and Wrohlich (2004) shows, at least in the case of a shift to individual taxation, the labor supply reactions of married men are not negligible:

Under this policy scenario, married men are predicted to reduce their participation rate by about 1 percentage point and average working hours by almost 2 percent. Clearly, these behavioral adjustments negatively affect the increases in income tax revenues and social security contributions. Moreover, a decline in father's working hours negatively influences household utility because household income decreases. Yet, it might increase welfare due to higher levels of fathers' leisure and time with the children. Thus, the overall effect of ignoring the fathers' behavioral changes is ambiguous.

Another shortcoming of the analysis presented here is the assumption that all mothers who wish to start working or increase their working hours after one of these reforms, are actually able to find a job. In other words, the possibility of involuntary unemployment is ignored. There is empirical evidence that ignoring involuntary unemployment in a model setting as the one used here is in fact a problem for the case of prime-age men, however not for married women (see Bargain, Caliendo, Haan, and Orsini (2006)). Yet, even if we presume that under such a major reform as the shift to individual taxation, all women who want to increase their labor supply find the opportunity to do so, it is unlikely that wages will stay constant. For a comprehensive analysis of potential *employment effects*, rather than mere *labor supply effects*, the reaction of wages would have to be considered.⁸ The results presented here therefore have to be interpreted as an upper bound to the true effects that are to be expected, at least in the case of individual taxation. In the case of the two childcare reforms and the family tax splitting, this restriction is probably not much of a problem. The two childcare policy reforms only affect a small share of the population and result in a total of 20,000 - 40,000 additional mothers who wish to take up a job. The family tax splitting has been shown lead to very minor labor supply reactions. However, a full assessment of economic effects of a potential shift to individual taxation, that would increase the number of mothers who want to

⁸See Haan and Steiner (2006) for an analysis of employment effects of the German tax reform 2000. In this study, wages have been adjusted and employment effects have been found to be significantly lower than initial labor supply effects.

joint the labor force by 131,000 would have to go beyond this labor supply analysis.

The two childcare reforms and the shift to individual taxation not only affect mothers' labor supply decisions but would also increase the demand for non-relative childcare. As far as the welfare effects resulting from the increased utilization of this form of childcare are concerned, it should be mentioned that there are other potential effects that have not been considered here. These include possible long-term benefits of early stage education and childcare such as increased cognitive abilities that affect later schooling outcomes. (See OECD (2005a) and Heckman and Masterov (2007) for a detailed overview of the empirical literature on this issue.). Moreover, Spiess et al. (2003) have shown for the German context that integration of disadvantaged children is facilitated if these children attend childcare facilities from an early age on.