

**Distributional and Behavioral Effects of Basic Income –
A Linked Micro-Macro Model for Germany**

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Abstract

This paper provides results from a combined Microsimulation-CGE model that uses micro data from the German Socio-Economic Panel. We describe the method of the linkage and show result for three different scenarios of a Basic Income (BI) Reform. First we consider the radical and very generous tax-benefit reform proposed by Dieter Althaus and show that the introduction yields a very high budgetary deficit. Hence two budget neutral alternatives are analyzed. We demonstrate the impact on the national budget, labor supply and income distribution, using the behavioral microsimulation model. In addition we simulate the effects in general equilibrium using the linked Micro-CGE-Model imposing a balanced budget rule. Results show that an adjusted BI is financially feasible and leads to a more equal income distribution, but comes along with negative effects on labor supply and negative effects on macro level.

1. Introduction

The Concept of a Basic Income emerged already with the ideas on a negative income tax of Rhys-Williams (1953) and Milton Friedman (1962). Nevertheless, so far, only Brasil and Alaska have introduced a Basic Income as part of their Social Policy. Starting in January 2008 Namibia introduced a project called “Basic Income Grant” with a testing phase of 2 years.¹

In Germany the idea of a Basic Income Reform was widespread during the 1980’s (Opielka/Vobruba 1986, Schmid 1984) and is currently again in the public discussion. At present the unemployment rates for persons with a low level of education are very high and due to e.g. globalization the labor market situation for this group is not expected to change fundamentally in future. Therefore full-employment especially for low-skilled persons seems not to be very likely within the next years. Advocates of a basic income (BI) try to overcome this development by promoting the disentanglement of labor and income and see this as a main aspect of the concept. Citizens are not any longer dependent on their labor income and thus can choose an alternative, like caring for children or engaging in other socially important voluntary activities. Moreover many jobs nowadays do not guarantee an income, which enables employees to decent living conditions. This leads to a discussion about minimum wages versus a guaranteed minimum income. One way the state could support employees with a low incomes is a minimum wage legislation, which makes the employers responsible of paying reasonable wages. Another strategy is to keep the wages flexible but support low-income earners with additional state payments. BI follows latter strategy by introducing a negative income tax. The second major motivation for a BI is the current problem of the German welfare state. Due to demographic changes the pension scheme needs to be reorganized. Contributions to the pension scheme as well as to the other social security insurances increase, while benefits decrease. By introducing a BI all social security payments would be abolished and a tax financed basic rent would substitute the current pension scheme. But this substitution is not possible at once, as claims of the old system will remain. Moreover proponents always mention the simplification of Germany’s tax and transfer system and bureaucracy dismantling as main advantages (see Althaus 2007).

Many political parties in Germany like the Conservatives, the Liberals and the Green Party have their own Basic Income Concept (for an overview see Wilke 2007). They all combine

¹ More information on the “Basic Income Grant” can be found here: <http://www.bignam.org/>.

the main ideas but differ in some crucial design elements. This study focuses on the concepts of the Conservatives, which is promoted by the prime minister of Thuringia, namely Dieter Althaus. In the next section we will discuss the reform elements of his concept before providing insights into the structure of the linked Micro-Macro Model in section 3. Section 4 includes results of the microsimulation model, whereas section 5 deals with the macroeconomic effects. Section 6 concludes.

2. Basic Income Concept

The BI reform proposal by Dieter Althaus combines several separately discussed instruments like a negative income tax, a flat tax system, a basic rent system and the abolishment of e.g. unemployment benefits and unemployment assistance.

The concept details are as follows: Every citizen² earning less than 1.600 Euro gross receives an unconditional Basic Income payment of 800 Euro (Large Basic Income). Persons with a gross income above the threshold of 1.600 Euro receive a tax relief amounting to 400 Euro (Small Basic Income). The BI payment as well as the tax relief includes a 200 Euro lump sum health premium. These 200 Euros need to be transferred to the health insurance and hence are not part of the disposable income. For Children the Basic Income amounts to 500 Euro again including the 200 Euro lump sum payments for health insurance. Pensioners of 67 years and older qualify for an additional basic rent, which amounts to 600 Euro at its maximum. The exact payment depends on their earlier incomes and their duration of employment.

The financing part of this generous reform contains a two-stage flat tax system. Persons with an income lower than 1.600 Euro are paying a 50% tax (withdrawal rate), whereas incomes over 1.600 Euro are taxed with a rate of only 25%. The rents are financed by a 12% payroll tax for the employers. Another important aspect is the abolishment of many social benefits like unemployment assistance, unemployment benefits, the current pension scheme and e.g. benefits for housing, children and education. The Basic Income is supposed to substitute all these welfare state payments. Regarding the current pension scheme there needs to be a transition period, as claims must be fulfilled. For this transition period an extra financing is

² The definition of being a citizen is not very clearly defined by the Althaus Concept. As our data (SOEP) has the character of a panel survey, only persons who have lived in Germany for many years are considered in the data. Therefore this aspect of the Basic Income Reform is neglected for this study.

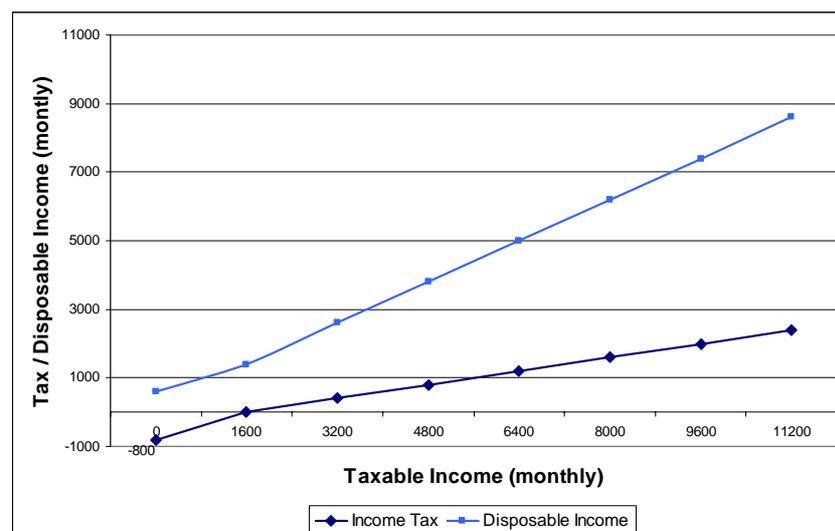
necessary, but is not considered in our analysis. Here we only provide a long run analysis of the Basic Income Reform. A very important part of the BI reform is a shift from Germany's joint taxation system to one with individual taxation. This needs to be considered when interpreting labor supply reactions of couple households.

The formula for the two-stage flat tax system can be written as:

$$T = \begin{cases} 0,5 Y - 800 & \text{for } 0 < Y < 1600 \text{ Euro} \\ 0,25 Y - 400 & \text{for } Y \geq 1600 \text{ Euro} \end{cases}$$

The first stage shows the part of the Basic Income Payments. The tax (T) is always negative here. As an example you can look at an individual with no income at all (Y=0). Solving the equation yields a tax payment of T= -800, which is the monthly negative income tax (Basic Income). All income earned additionally is taxed with a tax rate of 50% thus reducing the Basic Income by half of the earned income. It is obvious that an individual with an income of 1 600 Euro monthly is neither receiving a Basic Income nor paying taxes. All persons earning more than 1 600 Euro are actually paying taxes to the state, although still receiving a tax relief. As one can see from this example and figure 2.1 the tax formula is continuous due to the special relation between the Large and the Small Basic Income.

Figure 2.1: Taxes and Disposable Income for the original BI reform



So far only few studies are available on Basic Income with respect to the German tax and transfer system. The most recent ones are Opielka/Strengmann-Kuhn (2007),

Straubhaar/Hohenleitner (2007), Bonin/Schneider (2007) and Fuest et al. (2007). Opielka / Strengmann-Kuhn focus on the question, if a BI reform, as described above, is financially feasible and how the tax parameters needs to be chosen to reach a budget neutral reform. They conclude that a BI is feasible when adjusting the tax parameters, because income tax is the main source of revenues for the state. The studies by Opielka/Strngmann-Kuhn and Straubhaar/Hohenleitner do not take dynamic labor supply reactions into account, while the two other analyses do. They find different results. Fuest et al. identify negative labor supply adjustment of about 800 000 full-time equivalents for the original proposed BI. Bonin and Schneider however find positive effects for labor supply. According to their simulation labor supply will increase by about 600 000 full-time equivalents. All simulations show clearly that a BI concept with the tax parameters suggested by Dieter Althaus yields a high financial deficit for the state. Studies on BI for other countries include Callan et al. (1999 and 2000) for Ireland, de Jaeger et al. (1994) for the Netherlands and Fortin et al. (1993) for Canada.

3. Data and Micro-Macro Model

The ZEW -tax- and benefit- microsimulation model uses the waves 2004 and 2005 of the German Socio-Economic Panel (GSOEP) to calculate the disposable household income. The data of the present model are based on the wave 2004. These are complemented with retrospective information from 2005 to have a more precise data position in the status quo. As the model simulates the regulation after October, 2005, the tax system applying to 2004 is used for the calculation of the household incomes, taking into account the transfer system of 2005. The essential data sources for the macro model are the input output tables of the economical calculation (VGR). The present year is 2002 considering up to 71 sectors. We use for our purposes, nevertheless, an aggregation to seven sectors. These data are likewise completed with data of the occupational statistics, the employment samples of the Institute of Employment Research, data of the Central Bank and the official tax statistics.

The ZEW micro simulation model uses an arithmetical model for the calculation of the disposable household incomes and its defining quantities. Calculations are based on a very detailed illustration of the German tax and transfer system. In a base simulation, the so-called status quo, the calculated results can be compared and validated with the actual outcome. Starting from the base simulation certain reform alternatives can be simulated ex-ante and therefore have prediction character. Distributional Analysis with respect to net incomes can be

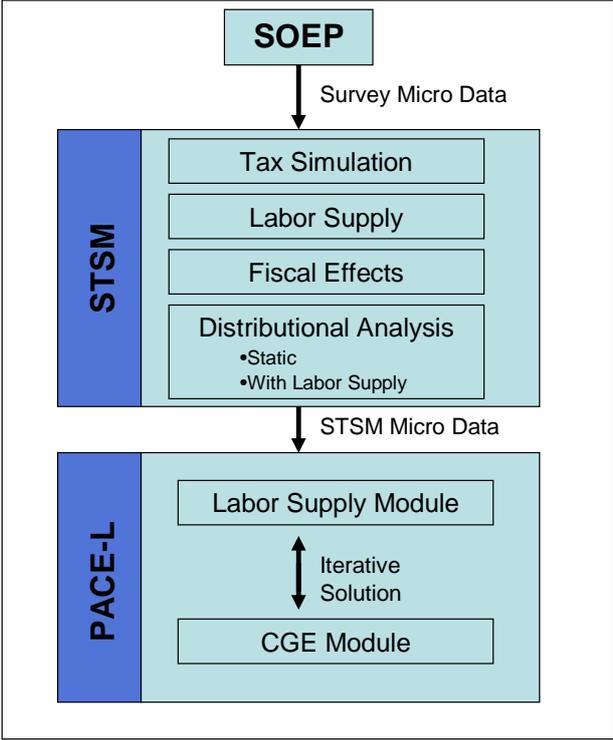
carried out by a comparison of the reform scenarios and status quo. In addition fiscal consequences the fiscal consequences can be forecasted with suitable weighting factors. Besides the arithmetical model a micro-econometric labor supply model exists. One distinguishes between the so-called "first round effects" ("morning after effects"), where we assume no behavioral response and the so-called "second round effects" with behavioral reactions. We define several working hour categories for the status quo as well as for the reform case. For each of these states the hypothetical available disposable income is stored. One hour category corresponds to the actual chosen one. On the basis of this information a discrete labor supply model (Van Soest 1995, Arntz et al. (2007), Clauss/Schnabel 2008) is estimated, which tries to explain the choice of the actual working hour category in the status quo. The estimation provides parameters to calculate the choice probabilities for the respective categories. With the help of these parameters and the available incomes in the reform case, the choice probabilities can also be calculated for the reform scenarios. By comparing the probabilities of the status quo with the ones of the reform scenario we calculate changes of the choice probabilities, which show the behavioral adjustments in the course of a reform. Thus effects on income distribution can be analyzed with and once without behavioral reactions.

By suitable aggregation the results also establish the data input for a macroeconomic analysis with a general equilibrium model (see Arntz et al. forthcoming, Boeters/Gürtzgen/Schnabel 2006, Arntz/Boeters/Gürtzgen 2006, Boeters/Feil/Gürtzgen 2005). The microsimulation model provides the household information needed by the computable general equilibrium model (CGE). For example, the available disposable incomes or the individual marginal tax rates in the status quo and reform scenario for all different working time combinations of the discrete labor supply model. Since every individual can offer 0, 15, 30, 38 or 47 hours of work, 5 working hour combinations apply for single households and 25 for couple households.

The CGE model exists of two modules: the labor supply module and the general equilibrium module. A GE is reached by an iterative solution. For a partial simulation of a reform scenario the labor supply effects are calculated with the help of the labor supply module, while assuming constant wages and constant unemployment. The labor supply results are then handed over to the general equilibrium model. Hence, the wage reactions and changes of the unemployment rates are calculated on the basis of the labor supply effects. The macroeconomic effects calculated in the general equilibrium module are then transmitted

again to the labor supply module which quantifies the labor supply effects by taking into account the second round effects. This procedure is repeated so often, until the results converge. Convergence criteria are the changes of the rates of unemployment: the solution is reached if the change of the rates of unemployment of an additional iteration step amounts to less than 0.00001 (see Franz et al. 2007). For an illustrative description of the linked model see figure 3.1.

Figure 3.1: The linked Micro-Macro Model



4. Results for the Reform Scenarios - Microsimulation

In this section we discuss the simulation results of three different reform scenarios. Firstly the Original version proposed by Dieter Althaus, as described in section 2. The two other Reforms are alternatives to the original version. Alternative 1 is characteristics by a higher tax rate for people earning over 1 600 Euro per month, while for Alternative 2 we use a higher withdrawal rate, which is similar to the status quo. The following sections show the effects of all three reform scenarios with respect to the national budget, labor supply and income distribution.

4.1. Results for the Original Version

For the original version the withdrawal rate amounts to 50% and is applied for persons with a monthly income of less than 1 600 Euro. Higher incomes are taxed with a tax rate of 25%. Employers need to pay a payroll tax of 12%. This is only important when calculating the effects on the national budget, as all other effects are due to individual choices rather than the behavior of employers. Effects of the tax system change can be described by the following results.

4.1.1. Effects on the National Budget

One of the constraints for a potential tax reform is the national budget. Therefore we implicitly compare the national budget in the status quo with the budgetary effects of a hypothetical Basic Income concept (figure 4.1). At first stage the additional revenues are identified. The abolished social transfers yield 176.9 billion Euro for the states budget. Other revenues are the payments of the payroll tax by the employers (102 billion Euros) and the hypothetical income tax payments (116 billion Euro) in case of a change to the proposed tax system. The hypothetical tax payments are added to the revenues in total, as the status quo tax payments are part of the expenditures. By that we only account for the difference in tax payments. Our calculations show that the additional revenues sum up to 395.5 billion Euro. Compared with the sum of additional expenditures (-641.6 billion Euro), which consist of the status quo tax payments and the basic income transfers, a deficit of 246.1 billion Euros results. Considering the fairly low withdrawal / tax rate and the generous basic income, a high deficit like we identified seems totally plausible. Nevertheless we show the effects on labor supply and income distribution, although a basic income with the originally proposed parameters is not feasible.

Figure 4.1: Effects on National Budget

Revenues and Expenditures: Status Quo versus Basic Income	
	Billion Euro
Revenues	/ Year
Abolished Transfers	176.9
Income tax (Basic Income)	116.6
payroll tax (employers)	102.0
Sum of Revenues	395.5
Expenditures	
Basic Income	-273.1
Basic Income (children)	-86.1
Basic Rent	-98.4
Basic Rent (widows)	-20.1
Income tax (status Quo)	-163.9
Sum of Expenditures	-641.6
Balance	-246.1

4.1.2. Labor Supply

The output of our labor supply model can be displayed in two effects. For the participation effect it is calculated how many persons, who did not work in the status quo, decide to work at presence of the new tax system. Figure 4.2 displays, that in total 562 078 Persons begin to work. Out of these 470 986 persons are men. Women's participation in total rises as well but when looking at the labor supply of couples we can see that this is not the case for women living with a partner. In this group 141 748 women decide to stop working. The second measure of labor supply are the hours worked. Men and women no matter if living in a partnership extend their working time. The level of extension is measured in fulltime equivalents, which are calculated by detecting the overall additional hours and divide them by 38 hours, as this is assumed to be the amount of hours for a fulltime position. Regarding the proposed reform the effect of Working Hours is positive for men (271 011) and women (331 305). In contrast to the participation decision women extend their working time more than men. Once women decide to work, they tend to work longer hours with the basic income than under the current system. This observation holds even for couple women. Combining both effects, participation and working time, we receive the total change in labor supply again

measured in fulltime equivalents. All in all the labor supply adjustments sum up to 1.19 million fulltime equivalents. Due to the behavioral adjustments of women in a partnership, men increase their overall labor supply more than women.

A conclusion drawn from these results is that a change of the current tax legislation to a concept combining individual taxation and a negative income tax has a negative impact on the participation of couple women. Why that is the case can be shown in a simple example: A couple without kids has a joint income of 4 000 Euros per month. In scenario A husband and wife both work part-time with a gross income of 2 000 Euros and individual tax payments of 100 Euro ($2\,000 \times 0.25 = 500$). The household net income then is 3 800 Euro. For scenario B assume that the woman stops working and her partner extends his working time and is earning 4 000 Euros. The household thus has the same gross income. As the woman decides not to work she will receive the basic income of 800 Euro per month and the tax payment of her partner amounts to 600 Euro. In scenario B the household net income then is 4 200 Euro and hence for a rational acting household would always choose scenario B, as the monthly income is 400 Euros higher. As seen empirically and theoretically the combination of individual taxation and a negative income tax yields an incentive for couples to distribute income realization unequally. Usually women have a lower hourly wage than man and thus it is rational that the woman stops working. So this is a very interesting result especially when talking about gender inequality and the labor market.

Figure 4.2: Labor Supply adjustments

	Participation	Working Hours	Total
	Persons	Fulltime Equivalents	Fulltime Equivalents
Total	562,078	602,316	1,190,189
Men	470,986	271,011	750,325
Women	91,092	331,305	439,865
Couples	158,722	374,073	589,367
Men	300,470	181,637	490,014
Women	-141,748	192,436	99,353

4.1.3. Distributional Analysis

The distributional analysis evaluates the reform scenario with respect to the income distribution. We compute the per capita monthly gains and losses by deciles of net income related to the introduction of the basic income reform. By comparing the gains and losses before labor supply adjustments and after labor supply adjustments with the status quo, we implicitly measure the impact of behavioral adjustments for the income distribution. In figure 4.3 the results for the total population and two subgroups, couples without children and with one child, are shown.

For the basic income reform with the generous parameters as described in section 2 we identify very high monthly gains for the total population before and after labor supply reactions. The net income for persons in the lower deciles is rising, because the withdrawal rate of 50% is lower with respect to the status quo and employees can keep more of their labor income. Gains for persons in the upper tail of the income distribution are even higher. Reducing the tax rate to 25% for all incomes over 1 600 Euro leads up to 657.01 Euro monthly gains per capita. When taking labor supply decisions into account, the picture does not change a lot. To put it more precisely the already high gains before recalculating labor supply even increase slightly, due to a higher labor supply (see section 4.1.2).

Couples with one child have even higher gains. Before and after labor supply the gains rise with the net income. Thus the richest families would profit the most by the reduction of the tax rate. These high family gains are caused by the generous basic income payments for children, which are actually more or less double the amount of today's child benefits. In contrast to families couples with no children are worse off. Persons in the middle of the income distribution even loose income, while persons in the upper and lower part still profit from the reform but not as much as their counterparts with children. Losses are possible for this group, because of the change from a system of joint taxation to one with individual taxation. Hence couples suffer from the abolishment of the splitting advantage.

Figure 4.3: Results of the Distributional Analysis

	Total Population		Couples (no kids)		Couples (1 kid)	
	<i>Before LS</i>	<i>After LS</i>	<i>Before LS</i>	<i>After LS</i>	<i>Before LS</i>	<i>After LS</i>
1. Decile	146.12	191.09	252.04	262.28	267.42	307.91
2. Decile	144.44	189.47	171.68	188.49	364.98	393.75
3. Decile	197.57	225.59	92.42	97.03	459.28	449.38
4. Decile	190.55	214.27	3.34	12.77	469.06	478.60
5. Decile	230.39	235.16	-52.58	-19.14	500.27	515.42
6. Decile	294.35	284.89	-5.77	-6.34	547.08	525.41
7. Decile	320.28	327.25	12.47	28.64	580.32	584.96
8. Decile	423.66	411.76	221.14	228.91	624.35	645.18
9. Decile	466.67	474.95	317.14	259.97	664.43	685.16
10. Decile	657.01	669.07	418.62	468.21	826.23	880.38

The overall very high gains in net income for a very large share of the population are not surprising keeping in mind that a basic income with such generous tax and transfer parameters yields a deficit of about 246 billion Euro. Even less surprisingly is the fact that relative poverty³ is reduced by 7.71 percentage points, thus reducing relative poverty in Germany from 12.86% to 5.15%. Indeed relative poverty is lowered, but inequality in the income distribution increases. The Gini-Coefficient rises from 0.26 to 0.28. When calculating the Gini-Coefficient for the reform scenario, we already take into account the adjusted labor supply. Otherwise the inequality of income distribution would be even higher.

As the original basic income reform yields such a high deficit it is not meaningful to analyze any macroeconomic effects with our linked model. Instead we analyze two budget neutral alternatives in section 4.2 and 4.3.

4.2. Results for Reform with adjusted tax rate

A basic income reform with and adjusted tax rate is the first alternative of the originally proposed reform scenario we want to study. First of all we keep the basic income payments fixed as they are in the original reform proposal. Again persons earning less than 1 600 Euro per month receive a basic income of 800 Euro and are subject to a withdrawal rate of 50%. Thus the first branch of the tax formula is still the same (see xy). For financing this generous

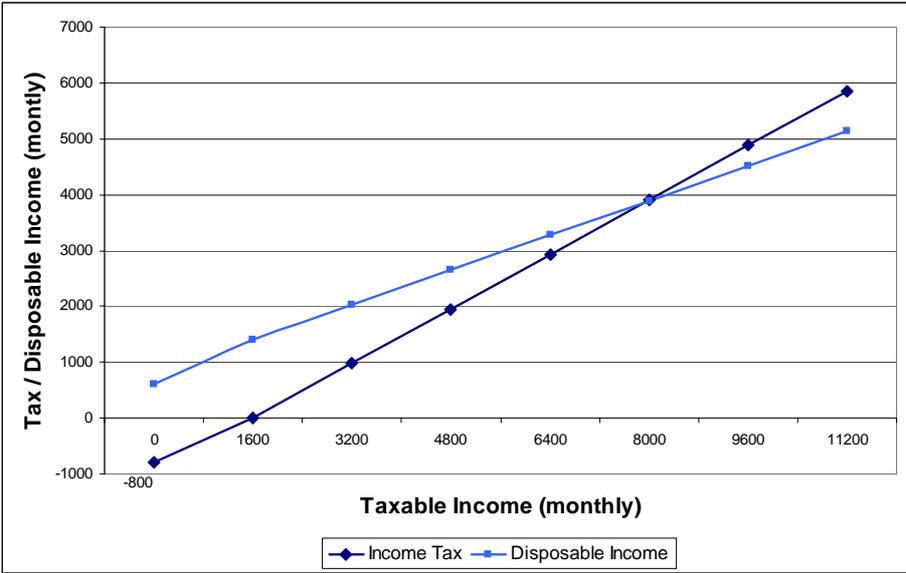
³ Relative poverty is measured as the percentage of persons earning less than 60% of the median income (see Foster / Greer / Thorbeeke 1984).

basic income without a deficit of the national budget it is necessary to increase the income tax for persons with an income of over 1 600 Euro to 61%. In order to keep the flat tax system continuous we also need to adapt the tax relief for these people. As the tax payments should be zero again at the threshold of 1 600 Euro, a tax relief of 981 Euro is necessary.

$$T = \begin{cases} 0,5 Y - 800 & \text{for } 0 < Y < 1600 \text{ Euro} \\ 0,613 Y - 981 & \text{for } Y \geq 1600 \text{ Euro} \end{cases}$$

In figure 4.4 we can observe that the part of the negative income tax has not changed. Persons with no income at all will receive 800 Euro per month. Then the basic income is reduced gradually as the income rises up to 1 600 Euro. The tax rate above 1 600 Euro has increased and so have the overall tax payments. The graph shows very nicely that the average tax rate is not 61% as the tax relief lowers the tax burden. Only persons earning more than 8 000 Euro per month have a tax rate over 50%, which can be seen very easily as their disposable income falls under their tax payments. The behavioral reactions to this adjusted tax parameters with respect to labor supply and income distribution are shown in the following sections.

Figure 4.4: Taxes and Disposable Income Alternative 1 (50/61.3)



4.2.1. Labor Supply

Labor supply reactions in the case of a higher tax rate differ a lot from the results of the original BI reform. Rising taxes up to 61.3% reverses the effect. Instead of an additional labor supply of about 1 million fulltime equivalents, the alternative reform scenario yields a by 189

thousand fulltime equivalents lower labor supply (see figure 4.5). This total effect can be split into a negative participation effect of 119 thousand persons and a negative working time effect of 135 thousand full-time equivalents. Men decide to participate more often, but reduce their working time. In contrast to that the participation rate for women decreases. About 208 000 women do not participate in the labor market any longer. Looking at the subgroup of women living with a partner the result is even more negative. Working time for women shortens similar to men by about 63 000 full-time equivalents. The reduction in working time for men and women is driven by the high tax rate, which makes it more attractive to substitute working time with leisure time. The participation decision, especially within a couple household, needs to be analyzed in more detail. As the withdrawal rate is lower than the tax rate the effect of being in favor of the traditional role allocation is not valid for this reform scenario. So the decreasing participation of couple women must be due to the change from a system of joint taxation to one with basic income (negative income tax) and individual taxation. Thus the negative incentives present for a second earner when joint taxation is applied increase.

Figure 4.5: Labor Supply Adjustments (Alternative 1)

	Participation Persons	Working Hours Fulltime Equivalents	Total Fulltime Equivalents
Total	-119,199	-135,882	-188,886
Men	88,392	-72,598	11,527
Women	-207,591	-63,284	-200,413
Couples	-290,149	-145,800	-344,655
Men	45,001	-67,230	-23,766
Women	-335,150	-78,570	-320,889

4.2.2. Distributional Analysis

When interpreting the distributional effects of the first alternative reform scenario, we need to keep in mind, that the basic income part of the tax system remains unchanged compared to the original version discussed in section 4.1. Hence the gains within the lower deciles are more or less the same. Again families profit the most with gains in the lowest deciles of 265 Euro per month and head before labor supply and of 305 Euro after labor supply. Considering the total population the raised income tax becomes noticeable from the 3rd deciles onwards. Still

people in this area of the income distribution profit of the modified BI reform, but not as much as under the original reform proposal. Persons in the 9th and 10th deciles are facing losses now. The same happens to couples without children from the 4th deciles upwards. This is not the case for couples with one child. They profit a lot of the high basic income for children, thus only the two top deciles of this subgroup loses. For families with more children the results are similar.

Looking at the measure for relative poverty, we find a reduction of poverty by 10.07 percentage points. This is again due to the increased income of persons in the lowest part of the income distribution. For the inequality of income distribution the scenario with a higher tax rate yields different results, when compared with the effect shown in section 4.1.3. The high tax rate causes redistribution from top to bottom and thus compresses the income distribution. This effect is captured in the Gini-Coefficient, which decreases from 0.26 to 0.22 and indicates a more equal income distribution.

Summarizing we can show with this modified version that an increase of the tax rate leads to a stronger redistribution from top to bottom and from couples without children to families. Moreover the reform lowers poverty considerably and yields a more equal income distribution.

Figure 4.6: Distributional Analysis (Alternative 1)

	Total Population		Couples (no kids)		Couples (1 kid)	
	<i>Before LS</i>	<i>After LS</i>	<i>Before LS</i>	<i>After LS</i>	<i>Before LS</i>	<i>After LS</i>
1. Decile	148.31	195.86	252.04	264.37	264.95	304.45
2. Decile	142.54	183.15	170.63	194.25	307.75	329.41
3. Decile	171.60	197.35	85.28	95.65	302.86	314.45
4. Decile	126.35	147.34	-14.61	0.16	270.73	278.64
5. Decile	112.73	118.88	-85.84	-56.43	241.53	251.62
6. Decile	105.50	97.36	-97.67	-89.47	215.88	206.32
7. Decile	57.84	57.68	-132.87	-125.65	172.73	159.87
8. Decile	39.15	24.99	-74.71	-73.67	94.35	106.89
9. Decile	-69.88	-86.63	-146.68	-216.49	-24.72	-36.28
10. Decile	-451.78	-494.59	-672.24	-697.40	-344.76	-351.82

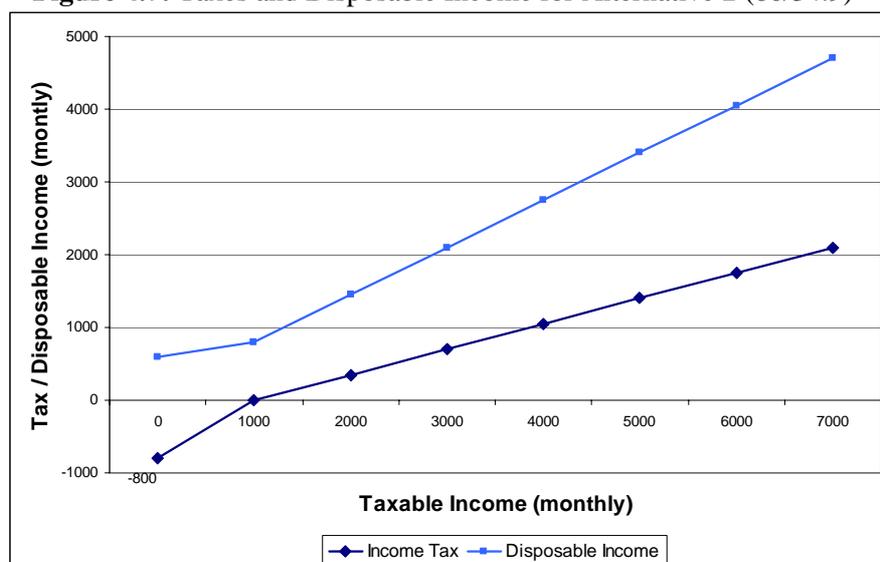
4.3. Results for an alternative Reform with an adjusted withdrawal rate

Another budget neutral BI reform can be achieved by adjusting the withdrawal rate. So we increase the withdrawal rate from 50% to 80% which is similar to the current withdrawal rate in Germany. The basic income is kept fix at 800 Euro, which determines a shift of the threshold from 1 600 Euro per month to 1 000 Euro. Reducing the threshold causes less basic income payments, because fewer citizens are eligible to BI. In order to reach a budget neutral reform with a fixed withdrawal rate of 80% a tax rate of 34.9% is necessary. For the reason of continuity of the tax system the tax relief amounts to 349 Euro.

$$T = \begin{cases} 0,8 Y - 800 & \text{for } 0 < Y < 1000 \text{ Euro} \\ 0,349 Y - 349 & \text{for } Y \geq 1000 \text{ Euro} \end{cases}$$

In figure 4.7 the properties of the second alternative Scenario with an adjusted withdrawal rate are visualized. Tax payments now are negative at a taxable income of 1 000 Euro monthly. As a consequence only persons earning less than 1 000 Euro will receive a negative income tax. With an income above 1 000 Euro per month one needs to pay income taxes with a rate of 34.9%. As the average tax rate is always less than 50% there is no intersection between tax payments and disposable income.

Figure 4.7: Taxes and Disposable Income for Alternative 2 (80/34.9)



4.3.1. Labor Supply

Labor supply reactions to a BI reform with an adjusted withdrawal rate in total are negative but close to zero. Interestingly this results out of two totally different reactions regarding participation and working time. Participation goes down by 706 000 persons. This effect is again twofold. While men extend their participation slightly, women and especially couple women stop participating very often. This is partly due to the intra household working decision, the effect which we described already in section 4.1. When the withdrawal rate is higher than the tax rate, it is always optimal for a couple if one person does not work at all. Due to the basic income payments and individual taxation the net household income is maximized in a situation like this. Hence participation is decreasing. On the other hand people decide to work more hours. This can be part of the effect described above. When women stop working the partner needs to work more in case to earn the same net household income. But as also women extend their working time there is a second effect at work. Appendix A shows the average tax rates which are quite low compared to Germany's current tax system. Hence working additional hours is more attractive. This matters especially for singles as they do not face the intra household considerations. These two opposite effects yield in total a slightly negative labor supply. Eliminating the disincentives for couple women could improve the labor supply reactions of a BI reform with a high withdrawal rate.

Figure 4.8: Labor supply adjustments (Alternative 2)

	Participation Persons	Working Hours Fulltime Equivalents	Total Fulltime Equivalents
Total	-705,493	447,862	-3,749
Men	89,457	185,428	282,201
Women	-794,950	262,434	-285,949
Couples	-770,617	279,212	-240,389
Men	46,759	124,986	177,245
Women	-817,376	154,226	-417,634

4.3.2. Distributional Analysis

Looking at the results for the total population before labor supply reaction, we observe gains in almost all deciles. In the highest deciles the net income increases the most by 119.31 Euro per month. All in all the upper and lower deciles gain more than persons in the 4th and 5th deciles. This is due to the comparatively high average tax rates for people in the middle of the income distribution (see Appendix A). Indeed the tax rate of 34.9% is not as high as in the first alternative version, but the average tax rate is higher in this area of the income distribution. Hence persons in the 4th deciles experience very little losses. These losses are reversed into gains of monthly 28.11 Euro by their labor supply reactions. But the structure of high gains for persons in the top and the bottom of the income distribution does not change after labor supply adjustments. In contrast to the average effects of the total population, figure 4.9 depicts high losses for couples without children before and after labor supply adjustment, whereas couples with one child have gains above average. This is again the effect of the very high basic income for children, which is basically twice as much as the today's child benefit. Moreover the change from joint taxation to individual taxation removes the splitting advantage for this group. Thus the income of couples with no children decreases although we calculate gains in average for the total population.

Figure 4.9: Distributional Analysis (Alternative 2)

	Total Population		Couples (no kids)		Couples (1 kid)	
	Before LS	After LS	Before LS	After LS	Before LS	After LS
1. Decile	85.82	126.09	153.90	162.01	169.42	198.98
2. Decile	11.87	71.11	15.88	35.23	187.26	228.60
3. Decile	36.75	68.83	-93.34	-78.76	234.26	237.90
4. Decile	-0.78	28.11	-205.06	-183.69	209.92	239.34
5. Decile	6.34	16.64	-288.93	-249.38	216.57	244.27
6. Decile	42.72	36.79	-278.94	-277.20	236.49	223.13
7. Decile	31.81	39.55	-295.35	-277.26	239.71	257.11
8. Decile	97.47	83.27	-127.87	-129.37	259.60	272.44
9. Decile	91.04	90.58	-95.71	-157.13	243.81	265.99
10. Decile	119.31	116.44	-154.63	-121.66	273.06	312.74

For the second alternative scenario the measures on relative poverty and equality of income distribution are as follows. As expected, relative poverty is reduced again by 6.29 percentage points. Hence an introduction of BI on a adequate level always reduces poverty, no matter

how the tax parameters are chosen. Household gains and losses show, that the winners of a BI with a high withdrawal rate are the lower but also the upper deciles. This leads to an increasing Gini-Coefficient from 0.26 to 0.29. In comparison with the original BI proposal the coefficient indicates even more inequality in the income distribution.

5. Macroeconomic Effects for Alternative Scenarios

For the two alternative BI scenarios discussed in section 4.2 and 4.3 we calculated general equilibrium effects. Therefore we transferred the micro data for each scenario to a CGE Model, which adjusts the macroeconomic variables and by doing this finds an iterative solution. The detailed procedure has been described already in section 2.

First of all we are interested in the change of labor supply due to macroeconomic reactions. The labor supply module within the CGE model uses a different calibration method for the estimated probabilities of working hour categories than the microsimulation model. Hence results are slightly different. The extent of these discrepancies can be identified by comparing the participation reactions for the partial results. As seen in the previous discussion of behavioral adjustments, the microsimulation model estimates a participation effect of -119 000 (Alternative 1) respectively -706 000 (Alternative 2) full-time equivalents. Results of the CGE model differ, but are similar in amount and direction. For the first alternative a participation effect of -140 000 full-time equivalents is estimated and the effect of the second alternative amounts to -680 000 full-time equivalents. The difference of both models adds up to about 20 000 full-time equivalents for both scenarios. When looking at percentage changes (e.g. table from the status quo to BI this methodological difference does not matter at all. We only need to bear this in mind for the interpretation of the absolute numbers of participation and employment.

In figure 4.10 the labor supply reactions after reaching a general equilibrium (GE) are displayed as well as the net GE Effects regarding labor supply. The latter are calculated by deducting the partial labor supply effects from the general equilibrium effects. Reactions to these pure macroeconomic changes are all positive for Alternative 1 (see figure 4.10; column Net). Net GE effects for couple women and singles are higher than those for couple men. Comparing partial and GE changes we find that the partial effects are higher than the net GE effects. Hence the partial behavioral adjustments dominate the GE effect and the negative

adjustments in total of the partial results are mitigated but do still exist. Therefore effects after calculation of a GE (see figure 4.10; column GE) are in line with the results for the partial equilibrium. Again major labor supply reductions of over 4% are observed for couple women. The net GE effect is positive of about 1%, but is dominated by the negative partial effect.

Apart from the subgroup of couple women the net GE results for Alternative 2 are similar. Changes due to macroeconomic adjustments to the introduction of BI are slightly positive for total population. Only women living together with a partner shorten their labor supply even more if only by about 0.16%. The final behavioral effects again are very similar to the partial results. Negative incentives for women living in a couple household observed already in the partial results can still be identified after reaching a GE and moreover even increase.

Figure 4.10: Labor Supply in General Equilibrium

% Changes in Participation and Average Working Time: Status Quo vs. Basic Income								
Alternative 1: 50/61								
	Total		Couples (Men)		Couples (Women)		Singles	
	GE	Net	GE	Net	GE	Net	GE	Net
Participation	-0.22	0.28	0.85	0.08	-2.17	0.47	1.25	0.24
Working Time	-0.66	0.06	-1.01	0.03	-0.88	0.23	-0.87	0.10
Labor Supply (Total)	-0.94	0.43	-0.08	0.12	-4.23	0.94	0.72	0.41
Alternative 2: 80/35								
Participation	-2.34	0.08	0.67	0.17	-6.44	-0.07	-0.13	0.16
Working Time	2.22	0.05	0.85	0.06	2.90	-0.06	1.42	0.06
Labor Supply (Total)	-0.91	0.15	1.60	0.26	-7.42	-0.16	1.24	0.26

Figure 4.11 shows that participation measured in absolute terms thus is still negative for both BI alternatives, but not as negative as in the partial results. Here we need to pay attention to the fact that the two labor supply models differ a little bit. Nevertheless we can observe that the GE adjustments mitigate the reduction in participation for alternative one and two. Turning to the effect on employment, results are twofold. Alternative 1 shows a positive development of employment, while employment decreases when introducing Alternative 2. Estimated changes of wages are a key variable for interpreting employment developments. In theory the impact of wage changes on employment are very well described. If wages fall employers are more likely hiring new employees, whereas employment decreases with a rising wage rate. This is exactly what we observe. Wages in the case of a low withdrawal rate and a high tax rate decline by 1.18% and cause an increase in employment. For a reform

scenario with a higher withdrawal rate and lower tax rate employment decreases as wages increase by 3.34%.

An evaluation of the two BI reform scenarios with respect to other macroeconomic variables shows the following results. GDP stays constant for Alternative 1 (change of 0.04), rent on investments and investments itself decrease marginally. Results for the alternative with tax parameters 80/34.9 are quite different. GDP goes down by almost one percent and investments fall by 4% as rent on investments decrease by almost 4%.

Figure 4.11: Macroeconomic Changes

Changes in Macro Variables: Status Quo vs. Basic Income		
persons	50/61	80/35
Participation	-61 976	-658 588
Employment	305 515	-823 589
%		
Wage	-1.18	3.34
GDP	0.04	-0.71
rent on investments	-0.18	-3.66
investments	-0.22	-4.01

For a more detailed discussion on the macroeconomic effects see Colombo et al. 2008 (forthcoming).

6. Conclusions

Current policy discussions in Germany always face one main issue. For some years now the possibilities for low skilled persons performing on the labor market have worsened. The unemployment rates of this group is very high and especially long term unemployment seems to be a major problem of the German labor market, when comparing the situation with other European countries. One suggested solution discussed at the moment is the introduction of a Basic Income. Aims of BI proponent’s as discussed in the introduction are e.g. disentanglement of income and labor and a reduction of poverty by introducing a negative income tax for people with low or no income at all. Therefore Dieter Althaus proposed a special basic income design including a negative income tax, a flat tax system, a basic rent system and the abolishment of all other transfers. As the originally proposed reform scenario yields a deficit of 246.1 billion Euro for the national budget, we analyze two budget neutral

alternative designs. Alternative 1 for which we raise the income tax to 61.3 % shows desired results with regard to distributional analysis, but yields negative labor supply effects. While poverty is reduced by 10.07 percentage points and the Gini-Coefficient decreases from 0.26 to 0.22, the total labor supply drops by about 188 000 full-time equivalents. An even more striking result is, that women living with a partner reduce their participation dramatically. This effect is driven by the change from a joint taxation system to one where individual taxation is combined with a basic income (negative income tax). As known from literature joint taxation has negative incentives for second earners. Our results show that these negative effects even increase when individual taxation in combination with a BI / negative income tax is introduced. Women's participation in Alternative 2, where the withdrawal rate is raised for financing reasons, decreases by a substantial higher amount. About 817 000 couple women do not participate on the labor market any longer. For Alternative 2 this result is due to two effects. On the one hand yields the change of taxation system disincentives, as it is the case for alternative one. On the other hand the effect is strengthened because of the tax design of Alternative 2 itself. It has been shown that if the withdrawal rate is higher than the tax rate couples will yield the highest net incomes if only one partner is supplying labor, while the other one profits from basic income payments. With regard to distributional analysis Alternative 2 also reduces poverty but due to the high withdrawal rate and comparably low tax rate increases the distribution of incomes (Gini-Coefficient rises from 0.26 to 0.29). Distributional analysis for both Alternatives show clearly that families with children are the main winners of a basic income reform. When comparing today's child benefit which amounts to 154 Euro per child (179 Euro for fourth and any additional child) with the net basic income per child of 300 Euro this result appears obvious. Taking macroeconomic adjustments into account we can conclude that the microeconomic effects are dominating the total effect and macro variable only mitigate these effects. The tremendous change of women's labor supply remain but is slightly lower when considering macroeconomic effects of Alternative 1. For Alternative 2, macroeconomic changes even increase the disincentives for women. GDP reactions are twofold. We observe almost no change for Alternative 1 (+0.04 percentage points) and a decrease for the design of Alternative 2.

This emphasizes once more that the actual effects of a basic income reform depend a lot on the special design parameters like the amount of basic income payments, withdrawal and tax rate. But in any case negative implications are expected for labor supply. Especially the intra-

household labor supply decision with respect to the reactions of women in couple households need to be studied in more detail.

Appendix A

Average Tax Rates			
Monthly taxable income	50/25	50/61.3	80/34.9
1000	-	-	0.0
1200	-	-	5.8
1600	0.0	0.0	13.1
2000	5.0	12.3	17.5
3000	11.7	11.7	11.7
4000	15.0	36.8	26.2
5000	17.0	41.7	27.9
7000	19.3	47.3	29.9
8000	20.0	49.0	30.5
9000	20.6	50.4	31.0

References

- Althaus, Dieter (2007):** Das solidarische Bürgergeld, in: Michael Borchard (Hrsg.), Das solidarische Bürgergeld – Analysen einer Reformidee, Lucius & Lucius, Stuttgart, pp. 1-12.
- Arntz, Melanie / Stefan Boeters / Nicole Gürtzgen / Stefanie Schubert (forthcoming):** Analysing Welfare Reform in a Microsimulation-CGE Model - The Value of Disaggregation, Economic Modelling.
- Arntz, Melanie / Markus Clauss / Margit Kraus / Reinhold Schnabel / Alexander Spermann / Jürgen Wiemers (2007):** Arbeitsangebotseffekte und Verteilungswirkungen der Hartz-IV-Reform, IAB-Forschungsbericht, 10.
- Arntz, Melanie / Stefan Boeters / Nicole Gürtzgen (2006):** Alternative approaches to discrete working time choice in an AGE framework, Economic Modelling 23, 1008-1023.
- Bonin, Holger / Schneider, Hilmar (2007):** Beschäftigungswirkungen und fiskalische Effekte einer Einführung des Solidarischen Bürgergelds, IZA, Bonn.
- Callan, T. / Nolan, B. / Walsh, J. / McBride, J. / Nestor, R. (1999):** Basic Income in Ireland: A Study for the Working Group on Basic Income, mimeo, The Economic and Social Research Institute, Dublin.
- Callan, T./Boyle, G./McCarthy, T./Nolan, B./Walsh, J./Nestor, R./van de Gaer, D.(2000):** Dynamic Effects of a Basic Income: Phase 2 of a Study for the Working Group on Basic Income, mimeo, The Economic and Social Research Institute, Dublin.
- Clauss, Markus / Reinhold Schnabel (2008):** Distributional and Behavioural Effects of the German Labour Market Reform.

De Jaeger, N.E.M. / Graafland, J.J. / Gelauff, G.M.M. (1994): A Negative Income Tax in a Mini Welfare State: A Simulation with MIMIC, Research Memorandum No. 112, Central Planning Bureau, The Hague.

Fortin, B. / Truchon, M. (1993): On Reforming the Welfare State: Workfare Meets the Negative Income Tax, *Journal of Public Economics* 51, pp. 119-151.

Foster, James/ Joel Greer / Erik Thorbeeke (1984):

A Class of Decomposable Poverty Measures, *Econometrica* 52, 761-766.

Franz, Wolfgang / Nicole Gürtzgen / Stefanie Schubert / Markus Clauss (2007):

Reformen im Niedriglohnsektor – eine integrierte CGE-Mikrosimulationsstudie der Arbeitsangebots- und Beschäftigungseffekte, ZEW Discussion Paper No. 07-085, Mannheim.

Friedman, Milton (1962): Kapitalismus und Freiheit, Frankfurt: Ullstein.

Fuest, Clemens / Peichel, Andreas / Schaefer, Thilo (2007): Beschäftigungs- und Finanzierungswirkungen des Bürgergeldkonzepts von Dieter Althaus, ifo Schnelldienst 10/2007 – 60.Jahrgang.

Opielka, M. / Vobruba, G. (1986): Das Garantierte Grundeinkommen. Entwicklung und Perspektiven einer Forderung, Fischer, Frankfurt.

Opielka, Michael / Strengmann-Kuhn, Wolfgang (2007): Das Solidarische Bürgergeld – Finanz- und sozialpolitische Analyse eines Reformkonzepts, in: Michael Borchard (Hrsg.), Das solidarische Bürgergeld – Analysen einer Reformidee, Lucius & Lucius, Stuttgart, pp. 13-142.

Rhys-Williams, Juliet E. (1953): Taxation and Incentive. Oxford/New York: Oxford University Press.

Schmid, T. (1984): Befreiung von falscher Arbeit, Thesen zum garantierten Mindesteinkommen, Wagenbach, Berlin.

Straubhaar, T. / Hohenleitner, I. (2007): Bedingungsloses Grundeinkommen und
Solidarisches Bürgergeld – mehr als sozialutopische Konzepte, HWWI, Hamburg.

Wilke, Martin (2007): Finanzierungsmodelle für ein Bedingungsloses Grundeinkommen,
http://www.martinwilke.de/Finanzierung_Bedingungsloses_Grundeinkommen.pdf
(Stand: 18.02.2007).