Basic Income Reform in Germany: A Microsimulation-AGE Analysis

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Abstract. This paper quantifies the economic effects of a basic income reform in Germany. We analyse two potential revenue neutral reforms implementing a flat tax including a negative income tax. The scenarios differ in the effective marginal tax rates and the tax allowance. The analysis is carried out using a consistent microsimulation-AGE framework that employs a general equilibrium model in combination with a microsimulation module based on individual household data. In both scenarios, the results are dominated by negative labour supply responses. While overall effects on GDP are negligible in the first scenario, GDP slightly decreases in the second scenario.

JEL Classification: D58, J22, J51

Keywords: Applied General Equilibrium, Microsimulation, Negative Income Tax, Flat Tax, Basic Income.

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1 Introduction

The German welfare state provides for social security comprising different pillars: the statutory unemployment, health and pension insurance supported by state-related institutions. According to the equivalence principle, both pensions and unemployment benefits depend on the contributions paid by the insured person. Furthermore, social assistance guarantees cash transfers of the government at a minimum existence level in the case of need. While social assistance is financed out of taxes, contributions to the state-related institutions are levied as a percentage of gross earnings, and are formally shared between employer and employee. Frequently discussed basic income proposals aim to simplify the system by integrating all different kind of transfers as well as taxes and contributions. This includes, firstly, an adjustment in the income tax schedule. Secondly, this reform provides for unconditional claims to government transfers, which have to be sufficiently high to maintain the sociocultural subsistence minimum level in every condition of life.

This paper investigates the economic effects of the so-called basic income proposal. Our reform proposal comprises a guaranteed basic income of 800€ per month for everybody, which is reduced to a lower amount for those on higher incomes. This unconditional claim replaces the current system's transfers of the government and state-related institutions. The basic income is financed out of wage tax levied on the employers and income tax, since income earned on the market is liable for income tax from the first Euro. Combining taxes and transfers produces an integrated tax transfer schedule including negative income tax and tax allowance. Furthermore, the earnings-related contributions to the statutory health insurance are replaced by lump-sum payments, which is known as the citizen health premia model. We present two reform scenarios that differ in marginal tax rates. In the first scenario, people receiving negative income tax have a larger marginal tax rate than those who actually pay taxes. In the second scenario it is the other way round in favour of

people paying taxes.

We use an integrated CGE-microsimulation model that combines the advantages of both model types: On the one hand, we employ micro-data from the German Socio-Economic Panel (SOEP) wave 2004 and account for the heterogeneity of households in terms of preferences and budget constraints. This way, we are able to represent the German tax transfer regulations in detail. The use of a discrete-choice labour supply approach allows for a distinction between labour supply effects along the extensive and intensive margin. On the other hand, we account for indirect effects caused by participation and labour supply responses due to wage and price reactions. General equilibrium feedback effects are of particular relevance, since the major aspects of the proposal substantially affect the whole population. Furthermore, we are able to guarantee an equal yield reform by adjusting the income tax schedule.

The idea of a negative income tax (NIT) was initiated by Rhys-Williams (1953) and later developed by Friedman (1962). The NIT consists of a constant marginal income tax rate in combination with a tax allowance that can imply a guaranteed minimum income system. The proponents of a NIT believe that its implementation would simplify the current systems and solve several of their problems. Firstly, a NIT with a constant marginal tax rate would eliminate the welfare trap which occurs where the transfer withdrawal rate approaches 100%. Secondly, a negative income tax would also reduce the administrative overhead, since the large bureaucracies responsible for administering taxation and welfare systems could be reduced. The main drawback is that the NIT is asserted to reduce the incentive to work, if recipients of the NIT receive a guaranteed minimum income larger than status quo transfers.

The principal idea of a flat tax was reinforced by Hall and Rabushka (1996). The authors suggest to simplify the tax system of the United States. Using a dy-

namic general equilibrium model, Ventura (1999) quantifies dynamic effects of a flat tax reform in the United States. One of his main results is that the distribution of income becomes more concentrated. Altig et al. (2001) implement the idea of a flat tax into a dynamic life-cycle model to analyse macroeconomic effects. The authors show that simulations that protect the poor from welfare losses, yield only modest long-run output gains. However, these studies do not present allocative and distributional effects on a disaggregated level. Paulus and Peichl (2008) calculate budgetary and distributional effects arising from the introduction of a flat tax in Western European countries using the microsimulation model EUROMOD. However, their analysis lacks of both the macroeconomic and labour supply responses.

In Germany, the political discussion on basic income was recently pushed forward by Althaus (2007), whose proposal is similar to ours but differs in details, such as the marginal tax rates. Several studies analyse potential effects of the Althaus proposal as well as alternative reform scenarios. Hohenleitner and Straubhaar (2007) use a stylised model calculating employment effects for Germany. Microsimulation studies such as Fuest et al. (2007) and Bonin and Schneider (2007) produced different results in terms of employment arising from the reform. What all articles have in common is that they do not take into account labour demand and wage reactions given the partial equilibrium nature of their models. The main contribution of this paper is that it provides for the general equilibrium effects of a basic income reform in the German tax and transfer system ensuring the revenue neutrality of the reform.

The paper is structured as follows: The details of our reform proposals are given in Section 2. Section 3 outlines the methodological approach and provides a description of the integrated CGE-microsimulation model. We explain the expected economic effects of the reform in Section 4. Section 5 presents the simulation results. The final Section 6 concludes.

2 The Reform Scenarios

The core idea of the so-called basic income proposal is an unconditional claim to government transfers for everybody. This basic income amounts to 800€ for adults and 500€ for children per month. It is possible to top the basic income up by income earned on the market, which is liable to tax from the first Euro. Combining taxes and transfers results in an integrated tax transfer schedule including negative income tax and tax allowance. Marginal tax rates are stepwise constant representing an indirect progressive schedule. We define two reform scenarios that both grant a basic income of 800€ but differ in the marginal tax rate and tax allowance. The integrated tax-transfer schedules $T_{h,p}$ for scenarios 1 and 2 depend on person p's gross income $\tilde{y}_{j,p}$ of household j:

$$T^1_{h,p} = \begin{cases} 0,5 \cdot \tilde{y}_{j,p} - 800 & \text{if} \quad \tilde{y}_{j,p} \leq 1600€ \\ 0,613 \cdot \tilde{y}_{j,p} - 981 & \text{if} \quad 1600€ < \tilde{y}_{j,p} \end{cases} \tag{1}$$

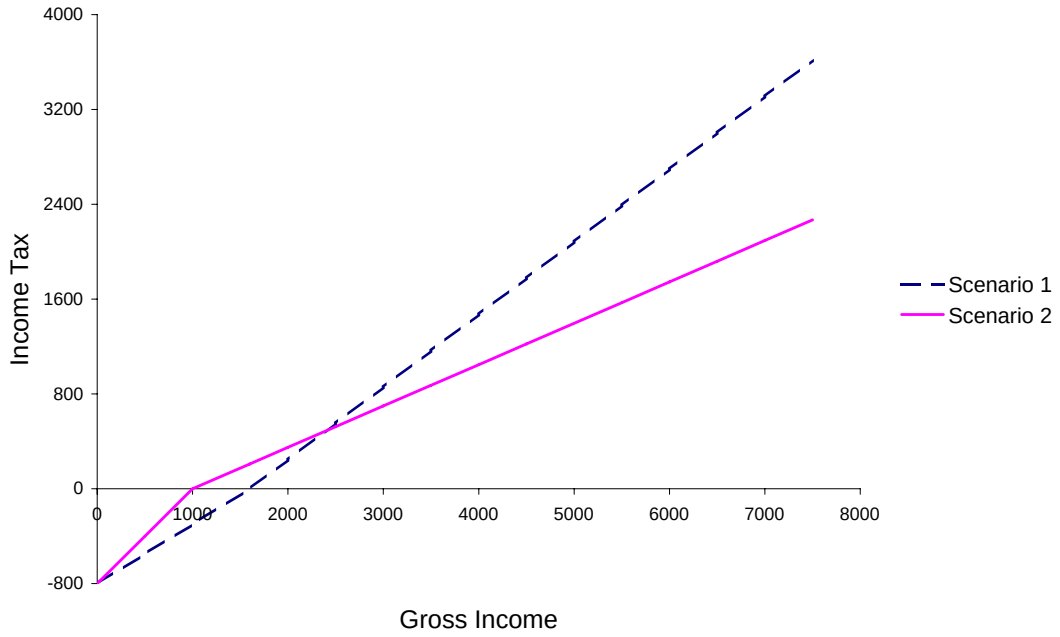
$$T^2_{h,p} = \begin{cases} 0,8 \cdot \tilde{y}_{j,p} - 800 & \text{if} \quad \tilde{y}_{j,p} \leq 1000€ \\ 0,349 \cdot \tilde{y}_{j,p} - 349 & \text{if} \quad 1000€ < \tilde{y}_{j,p} \end{cases} \tag{2}$$

In the first scenario, people receiving negative income tax have a larger marginal tax rate than those whose income exceed the income tax allowance. In the second scenario it is the other way round in favour of people paying taxes. As Figure 1 reveals, the tax allowance is larger in scenario 1 and therefore, a higher marginal tax rate for tax payers is necessary to finance the basic income.

A direct consequence of the individual-based tax liability is the abolition of joint taxation of couples. It is the single person that is liable to tax and in return has a claim to the basic income. However, the introduction of an unconditional claim to a basic income for everybody involves radical changes affecting not only the government but also state-related organisations such as the unemployment or pension insurance. First of all, the basic income replaces transfers provided by

the current system. Therefore, social assistance, unemployment benefits, children and housing benefits, student transfers or maternity leave transfers are cancelled. The same applies to pensions, but performance-related payments for pensioners may complement the transfer.[1] The unquestioning nature of the basic income means that recipients are not categorised into pensioners, unemployed or other persons any more. For sociopolitical reasons, nobody should be worse off than in the current system, which is guaranteed by the chosen amount of 800€. From this amount, everybody has to pay a per-capita health premia to the statutory health insurance replacing the status quo earnings-related contributions. This concept is known as the citizen premia model. The same applies to children, so that for a person (child) not receiving any income earned on the market, 600€ (300€) is left for living.

Figure 1: Integrated Tax-Transfer Schedule of the Reform Scenarios



[1]Pensioners, who receive monthly pensions larger than 800€, are entitled to additional transfers up to a maximum of 600€.

Two instruments are implemented to finance the transfers. This is the income tax schedule explained above. Furthermore, a wage tax paid by the employers is introduced. This tax replaces the employers social security contributions of the current system. The tax rate of 21% implies that the employers' wage-related costs stay the same. All tax rates are calculated so that the government's budget is balanced guaranteeing an equal yield reform ceteris paribus. Appendix A.1 summarises the details of the basic income scenario.

3 The Microsimulation-CGE Model

We use an integrated CGE-microsimulation model that links two separate models: A micro data-based microsimulation model and a static applied general equilibrium model for Germany (Arntz et al., 2008).

3.1 Microsimulation Model

The microsimulation model is based on individual household data taken from the German Socio-Economic Panel Study G-SOEP, a representative household survey for Germany. The data refer to the benchmark year 2004, with social assistance and unemployment assistance constituting the prevailing welfare system. The microsimulation model includes a discrete-choice model of labour supply covering all households with flexible time allocation and observable hours of work. Pensioners, students, women on maternity leave, civil servants and the self-employed are assumed to be inflexible and are excluded from our simulations, since they are not expected to change their labour supply behavior in response to the reforms considered here. We account for single and couple households, but labour supply of further household members is assumed to be constant.

3.1.1 Discrete Choice Model of Labour Supply

Following van Soest (1995), we use a discrete choice model of labour supply in which each individual chooses from a finite set of working-time categories: Underlying our simulations is a set of five working-time categories for singles (0, 15, 30, 38, or 47 hours per week), which results in 25 working hours combinations for couple households. Such a discrete choice approach has the advantage of allowing for a straightforward distinction between labour supply effects along the extensive and intensive margin. Moreover, it provides a more realistic description of labour supply options as we do not generally observe infinitesimal changes of working hours but rather a concentration of hours at particular working hours categories.

At the heart of the discrete choice approach is the assumption that a single household chooses the working-time category which maximises its individual utility. Similarly, a couple household chooses the labour supply combination maximising a joint utility function. Underlying this assumption is the so-called unitary approach of household behaviour (see Blundell and MaCurdy 1999). Choosing the zero-hours option is viewed as reflecting voluntary unemployment. Households' preferences are represented by a translog utility function U of household j depending on the number of hours h_k in category k. The category combination (k, l) represents the choice of couples with the woman selecting h_k^f and the man choosing h_l^m hours of work:

$$U_j(x_{jk}) = x'_{jk} \cdot A \cdot x_{jk} + \beta'_j \cdot x_{jk}. \tag{3}$$

The argument vector x_{jk} of the utility function includes the logs of disposable household income y_{jk} and weekly hours of leisure for men m and women f, respectively,

$$x_{jk} = (log(y_j(h_{jk}^f, h_{jl}^m)), log(T - h_{jk}^f), log(T - h_{jl}^m)), \tag{4}$$

where T denotes the time endowment which is taken to amount to 80 hours a week. A is a 3×3-matrix containing the coefficients of the quadratic terms, while β'_j represents the coefficients of the linear terms. Extending the utility function by an error term,

the parameters in equation (3) can be estimated using a conditional multinomial logit model. The error term is assumed to be independently standard extreme-value distributed. According to the seminal contribution of McFadden (1974), the probability for singles (couples) of preferring option k (combination (k,l))[2] over all other options $m \neq k$ is given by the following expression:

$$P(U_{jk} > U_{jm}) = \frac{\exp(U_j(x_{jk}))}{\sum_l \exp(U_j(x_{jl}))}, m \neq k. \tag{5}$$

The maximum likelihood estimation results based upon actual labour supply and disposable incomes in 2004 can be found in Appendix.[3] The parameters include interactions between leisure, income and a set of household characteristics. These interactions account for differences in the preferences of households for certain hours of work options. In addition, constant terms are included to capture fixed costs of working.

3.1.2 The Budget Constraint

The tax-benefit calculator of our microsimulation model provides a detailed representation of the German tax-transfer system. The key advantage of the discrete choice set-up is that it considerably facilitates the incorporation of complex tax-transfer regulations since the latter are to be calculated for a finite set of hours only. In the context of our discrete choice set-up, the budget constraint needs to be determined for all hours categories in the status quo year 2004 and the reform scenarios. To obtain disposable incomes, each household's gross earnings are derived from multiplying individual gross hourly wages with hours. Since gross hourly wages are unobservable for those who are not employed, wages have to be estimated using a Mincer-type wage regression with education, experience and some further controls

[2] In what follows, hours categories and hours-combination categories are used synonymously.

[3] Individual labour supply *observed in the data* is matched to the working-hour categories used in our model as follows: $0 < h < 22.5$: 15 hours, $22.5 \leq h < 34$: 30 hours, $34 \leq h < 42.5$: 38 hours, and $h \geq 42.5$: 47 hours.

(e.g. nationality, marital status). We use Heckman's (1979) selectivity correction to account for the positive selection of employed individuals for whom wages are observed. Other sources of income, such as income from rents, are added to labour earnings. Net monthly incomes are calculated by deducting income taxes and social security contributions from gross monthly incomes according to the German tax system. Finally, disposable monthly incomes are obtained by adding transfer payments. When determining the entitlement to social assistance, unemployment assistance and ALG II, we further attempt to account for household wealth. Later, for the policy simulations, we use a first-order approximation of the tax-transfer system. This is done by disturbing the calculations of disposable income marginally at all relevant points to calculate numerically the local effective marginal burden of the total tax-transfer system.

3.1.3 Simulation Method

Given the individual parameters of the utility functions and expected disposable incomes for the pre and post-reform situation, we can proceed to simulate labour supply effects. We use the Duncan-Weeks (1998, see also Creedy and Kalb 2005) simulation method that exploits the fact that we have information about the choices of the households in the initial situation. This information can be used to transform the utility evaluations of the disposable incomes into conditional probabilities. To do so, we take independent random draws from an extreme-value distribution, which are added to the deterministic part of the utility function (3). We retain only those random numbers that maximise pre-reform utility at the observed working hours. For each household, we retain 100 random numbers for each working hours category (or combination). Doing so, we end up with households choosing exactly one option with a probability of one in the benchmark. Given the post-reform disposable income change, we then recalculate the new utility maximising choice for each realisation of the error terms yielding a genuine probability distribution over all working-time

categories.

3.2 The CGE-Module

The CGE-module is based on an applied static general equilibrium model. The general equilibrium approach allows for a quantification of direct and indirect effects arising from our policy measures. The distinctive feature of our model is the detailed modeling of the German labour market comprising sector-specific bargaining between trade unions and employers' associations. The model distinguishes between low and high-skilled labour. In each of the seven sectors, a representative firm produces a homogeneous output. Within a nested constant-elasticity-of-substitution (CES) production structure, each firm determines its optimal demand for intermediate and value added inputs. Value added inputs consist of low-skilled labour and a composite of high-skilled labour and capital, the HK-aggregate. This reflects the empirical evidence that low-skilled labour is a relatively good substitute for the HK-aggregate whereas capital and high-skilled labour are relatively poor substitutes for each other. In what follows, we only briefly sketch the main components of the CGE model which are most relevant to our analysis. A more detailed algebraic model presentation including a description of the calibration as well as subsequent developments of the model can be found in Böhringer et al. (2005), Boeters (2005, 2006) as well as Arntz et al. (2006 and 2008).

3.2.1 Labour Demand

Firms minimise costs at each production nest. The cost functions of the value added aggregate $c_{va,s}$ and the HK-aggregate $c_{hk,s}$ for each sector s can be written as:

$$c_{va,s} = \left[\beta_s^L \left(\frac{w_{L,s}\cdot(1+t_{l,s,L})}{\bar{w}_{L,s}\cdot(1+\bar{t}_{l,s,L})}\right)^{1-\sigma_s^L} + (1-\beta_s^L)c_{hk,s}^{1-\sigma_s^L}\right]^{\frac{1}{1-\sigma_s^L}} \quad (6)$$

$$c_{hk,s} = \left[\beta_s^H \left(\frac{w_{H,s}\cdot(1+t_{l,s,H})}{\bar{w}_{H,s}\cdot(1+\bar{t}_{l,s,H})}\right)^{1-\sigma_s^H} + (1-\beta_s^H)\left(\frac{r(1+t_{k,s})}{\bar{r}(1+\bar{t}_{k,s})}\right)^{1-\sigma_s^H}\right]^{\frac{1}{1-\sigma_s^H}}, \quad (7)$$

where β_s^L und β_s^H denote initial cost shares for low-skilled labour L within the value added aggregate and for high-skilled labour H within the HK-aggregate, respectively. σ_s^L and σ_s^H are elasticities of substitution for the value added and HK-aggregate. $w_{L,s}\cdot(1+t_{l,s,L})$ and $w_{H,s}\cdot(1+t_{l,s,H})$ represent the employer's labour costs including wage-related costs per hour for each skill type. $r(1+t_{k,s})$ stands for the gross price of capital. Variables with a bar refer to the benchmark situation. This yields the following demand functions for low-skilled labour $L_{L,s}$ and high-skilled labour $L_{H,s}$ at the sectoral level s depending on the output level Y_s:

$$L_{L,s} = Y_s\left(c_{va,s}\cdot\frac{\bar{w}_{L,s}\cdot(1+\bar{t}_{l,s,L})}{w_{L,s}\cdot(1+t_{l,s,L})}\right)^{\sigma_s^L} \quad (8)$$

$$L_{H,s} = Y_s\left(\frac{c_{va,s}}{c_{hk,s}}\right)^{\sigma_s^L}\left(c_{hk,s}\cdot\frac{\bar{w}_{H,s}\cdot(1+\bar{t}_{l,s,H})}{w_{H,s}\cdot(1+t_{l,s,H})}\right)^{\sigma_s^H}. \quad (9)$$

3.2.2 Wage Determination and Labour Market Equilibrium

In each sector, an employer's association and a trade union bargain over wages according to the "right-to-manage" approach: parties bargain over wages, and firms decide on labour demand taking the bargained wage as given (see e.g. Oswald 1985). The bargaining outcome results from the maximisation of a Nash function Ω_s that includes the objective functions of both parties and their respective fallback options. The objective function of the employer is given by its profit π_s, while the fallback

option implies zero profits:

$$ln\,\Omega_s = ln\,\pi_s + \rho_{H,s}\,ln\,\Gamma_{H,s} + \rho_{L,s}\,ln\,\Gamma_{L,s}. \tag{10}$$

$\rho_{r,s}$ denotes bargaining power of both skill types $r = L, H$ relative to the firm's bargaining power. For each skill type, the union's objective function $\Gamma_{r,s}$ is employment $L_{r,s}$ times the value of a job $V_{r,s}$ minus the value of unemployment $V_{U,r}$:

$$\Gamma_{r,s} = L_{r,s}\left(V_{r,s} - V_{U,r}\right). \tag{11}$$

Following the literature on search unemployment (e.g. Pissarides 1990), the values of the labour market states are recursively determined as weighted averages of the incomes in the case of employment and unemployment, where the weights are computed from the transition probabilities between the labour market states.[4] More specifically, the value of a job $V_{r,s,t}$ in period t can be expressed as:

$$V_{r,s,t} = \frac{1}{1+r}\big[I_{r,s}(1+npc_{r,s}) + (1-\mu_{r,s})V_{r,s,t+1} + \mu_{r,s}V_{U,r,t+1}\big]. \tag{12}$$

$\mu_{r,s}$ represents the sector-specific separation rate from employment to unemployment, $npc_{r,s}$ is a non-pecuniary pay component [5] and $I_{r,s}$ is the average disposable income of an employed worker. Under the steady-state assumption, the value of employment equals its value in the previous period. Thus, we can replace the difference between the value of employment and unemployment in equation (11) by:

$$V_{r,s} - V_{U,r} = \big[\frac{I_{r,s}(1+npc_{r,s}) - rV_{U,r}}{r+\mu_{r,s}}\big]. \tag{13}$$

The value of unemployment $V_{U,r}$ is assumed to be exogenously given. Trade unions take a utilitarian perspective with respect to individuals and labour supply options. In other words, an employed individual's average disposable income and the

[4]The transition probabilities from employment to unemployment result from the sector-specific separation rates and sectoral unemployment rates. While the separation rates are obtained from the IABS-Employment Subsample, the latter are calibrated within the model.

[5]Given the initial wage differentials, the non-pecuniary components are calibrated so as to render unemployed individuals indifferent between employment in the different sectors.

value of unemployment are calculated as weighted averages in case of employment and unemployment for all individuals and labour supply options, respectively. [6] In turn, the wage that results from bargaining in general equilibrium is used to derive the income positions of all households in employment. To calculate disposable incomes, we use the numerically approximated values of the marginal effective tax rates (see Section 3.1.2).

A reform of the tax-transfer system has two important implications for wage determination: First, the reforms affect the effective marginal tax rates either through an explicit change in tax rates or through lower transfer withdrawal rates. Trade unions account for these skill-specific marginal tax rates in the negotiations. A-priori, the net effect is not clear because the marginal burden increases for some individuals while it decreases for others. Koskela and Vilmunen (1996) show in this context that with a constant average tax rate, an increase in the effective marginal tax rate raises the degree of tax progression, which leads to wage moderation on behalf of unions. Second, a reform of the transfer system reduces the expected income when unemployed and, thus, the value of the fall-back position of unions. For given labour demand, this effect is further accentuated if the probability of becoming unemployed is raised due to increased labour market participation.

Outcomes of these sector-specific negotiations are the wages for low and high-skilled individuals. Firms determine their optimal labour demand according to equation (8) and (9), taking the bargained wages as given. Unions anticipate firms' labour

[6] For couple households, the average disposable income of an employed individual is calculated as a weighted expected value, taking into account different labour market states "employed" (e) and "unemployed" (n) of the spouse. The disposable income for positive labour supply options is linked to the labour market status "employed" (e). In contrast, for individuals who are "involuntarily unemployed" (n) we assign the disposable income for zero hours labour supply, which is strongly determined by the German transfer system - irrespective of the actual labour supply decision. As weights for the different labour market states, we use the probabilities $P_{e,j} = (1 - u_r)$ und $P_{n,j} = u_r$, where u_r represents the household-type specific unemployment rate. In our model, we distinguish 42 household types (see Table A1). For these categories we calibrate household-specific unemployment rates by splitting non-working individuals into voluntarily and involuntarily unemployed persons so as to match the skill-specific unemployment rates in the benchmark.

demand decisions, which influences the outcome indirectly. The difference between labour supply and demand endogenously determines unemployment. Individuals are mobile among sectors. In equilibrium, job-seekers must be indifferent between any two of the sectors.

3.2.3 Budget Neutrality

The scenarios are modeled as budget neutral reforms by fixing the budget T in real terms according to the benchmark level. Government revenues consist of taxes on capital K_s, labour, consumption C_z of commodity z, output Y_s and profits π_s:

$$T = \sum_s t_{k,s}\, r K_s + T_{MS} + \sum_z t_{c,z}\, p_{c,z} C_z + \sum_s t_{y,s}\, p_{y,s} Y_s + \sum_s t_\pi \pi_s, \qquad (14)$$

where $t_{k,s}$ is the capital tax rate, $t_{c,z}$ the consumption tax rate, $t_{y,s}$ the output tax rate, and t_π the profit tax rate. r, $w_{i,s}$, $p_{c,z}$ and $p_{y,s}$ denote the respective prices. All other taxes paid by firms, e.g. trade taxes, are subsumed under the profit tax. T_{MS} is the balance of labour income taxes plus social security contributions minus transfer payments to those households captured by the microsimulation module. The income tax contains a proportional adjustment parameter that is used for balancing the public budget in the counterfactual policy simulations. According to our comprehensive income tax, this refers to the tax rates $t_{k,s}, t_\pi$ and taxes on labour that are included in T_{MS}.

3.3 Linking the Microsimulation and CGE-Modules

The labour supply module and the CGE module are kept separate and iterated until we arrive at a global solution. Using the labour supply module, we first derive the labour supply reactions of our policy measures. Given the partial equilibrium nature of this analysis, wages and unemployment rates are held constant. The resulting labour supply is aggregated (by skill type) and transferred to the CGE

model. Running the CGE model, we derive wage reactions and changes in the unemployment rate resulting from the change in labour supply. The changes in wages and income taxes required to balance the public budget are fed back to the labour supply module for the next iteration, where the next round's labour supply effects are computed. This proceeds until the two modules converge. The convergence criterion is the change in the unemployment rates: if the change in unemployment rates between two subsequent iterations of less than 10e-5, the solution is found.

Transferring data from the labour supply module to the CGE module requires the aggregation of individual labour supply per skill type. To do so, labour supply in hours is weighted by the respective wage rate of the benchmark yielding skill-specific labour supply in efficiency units. We assume that the individual wages move in proportion to the average macroeconomic wage of the respective skill group. When transferring data from the CGE module to the labour supply module, it is therefore first necessary to adjust individual wages and, second, to account for the change in the income tax rate, which is used to balance the government's budget in the CGE module.

4 Expected Economic Effects

Both basic income scenarios strongly affect the whole population. Crucial for the decision whether to participate in the labour market or not is the comparison of the basic income with the transfers an individual receives in the current system. In the status quo, all transfers such as unemployment benefits and social assistance are means-tested. Therefore, all unemployed individuals that are not entitled to transfers in the status quo are better off in the scenarios where they receive the unconditional basic income. We expect these individuals not to react to the reform scenarios along the extensive margin and therefore not to participate in the

labour market. The participation decision might go either way for other individuals, depending on the wedge between net earnings and the basic income in case of unemployment.

For an individual receiving unemployment benefits in the status quo, this wedge is relatively low. In the first scenario, however, the labour supply decision along the extensive margin might be affected by the change in the transfer withdrawal rate: The transfer withdrawal rate for individuals with an income under 1,600€ is 50%, which is much lower than the withdrawal rate currently applied in the system (which is around 80%). This might lead to an increase in the participation for the individuals with a low qualification level and low wages.

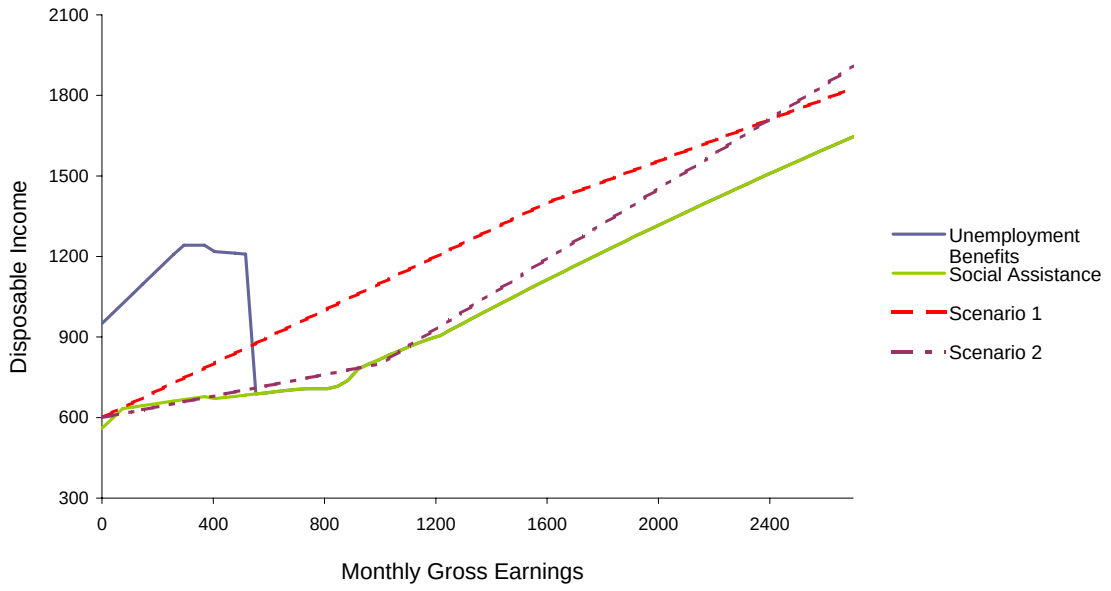
Moreover, in the second reform scenario, an unintended participation effect might arise for couples: As it is commonly the case in the status quo, the male spouse works full-time while the woman supplements household earnings having a part-time job. We expect for these women that the switch from joint to individual taxation discourages labour supply along the extensive margin: While the full-time working spouse faces a marginal tax rate of 34.9%, the wife's withdrawal rate in case of part-time employment is 80% (assuming that with a part-time job one's earnings remain under the 1,600€ threshold). Female spouses are likely to choose not to participate in the labour market and to receive the basic income instead. We would therefore expect the participation rate of women in couples to fall but the man, who faces a lower marginal tax rate, to compensate for the woman's decrease in labour supply.

For what concerns the reactions at the intensive margin, there is no clear answer a priori. The effect on the intensive margin will depend on which effect between the income effect due to the large tax allowance and the substitution effect due to the change in the marginal tax rate is prevailing. We expect both the income and substitution effects to go in the same direction of discouraging work in the first

scenario, while for the second scenario it is not clear a priori whether one or the other will prevail, since they go in opposite directions: a lower marginal tax rate is together with a smaller tax allowance.

We use the example of single persons without children to show the expected economic effects of the scenarios: Figure 2 displays the disposable income as a function of gross income of the status quo and the two scenarios. The first scenario has a clear income effect on individuals receiving social assistance and on those with low earnings: the income effect is gradually decreasing with the increase of earnings after the kink of the income function at 1,600€ so that we expect a positive labour supply response from these individuals. The second scenario instead is expected to have positive income effects only on those with an income above the 1,000€ threshold, and the effect is increasing with the increase of earnings, while almost no effect is expected for those under the 1,000€ threshold.

Figure 2: Disposable Income of a Single Person Without Children



5 Results

In this section, we first look at the partial equilibrium model. These results allow us to focus on the changes in the relative attractiveness of the labour supply options that directly result from the policy measure. Then, accounting for overall effects within the general equilibrium model shows whether labour supply reactions translate into higher supplied hours or not. In the general equilibrium model, we account for wage and labour demand reactions as well as the adjustment of the marginal income tax rate to balance the public budget.

5.1 Partial Equilibrium Results

In the first reform scenario, imposing a marginal tax rate of 50% below and of 61.3% above the tax allowance threshold, the average working time decreases for all households, as the higher marginal tax rate on incomes exceeding the threshold of 1,600€ produces a disincentive to work more hours. The results of scenario 1 are presented in the left panels of Tables 2 and 1. While the labour supply decision is uniform

Table 1: Marginal Tax Rates and Income Effects – Partial Equilibrium

	Scenario 1	Scenario 2
Marginal tax rate (low skilled)*	6.47	-13.77
Marginal tax rate (high skilled)*	10.91	-14.18
Average income (low skilled)	16.32	19.90
Average income (high skilled)	9.81	16.45
Average disposable income (low skilled)	11.53	14.52
Average disposable income (high skilled)	5.08	14.55

* Change in percentage points.

across households, the participation decisions diverge: The participation rate increases for men and decreases for women in partnership. Indeed, the introduction of a negative income tax induces couples to move towards a model where the man

is working full time while the woman does not participate in the labour market and receives the basic income. This shift of women towards non participation is generated by the income effect arising with the basic income reform when the person is unemployed. On average, a positive income effect, which is given in Table 1 by the increase in disposable income, reduces labour supply participation[7]. For women in couple the average increase in disposable income when working is lower than the increase in income when not working. [8]. For women in couples there is a high positive income effect when they do not participate in the labour market, due to the high amount of basic income received in the non working option. For low skilled in general instead the income effect is positive in the working hours options, thanks to the lower tax rate they face when they are under the 1,600€ income threshold. As a result, the low skilled increase their participation in the labour market. For the low skilled a reduced withdrawal rate (50% instead of the current 80%) plays a major role in giving an incentive to participate in the labour market. The opposite is true for the high skilled, and this is due to the high tax rate they face when they earn more than 1,600€.

Since the average working time of low skilled remains basically unchanged after the reform (-0.3%), the net effect on total labour supply of the low skilled is positive. For high-skilled workers instead the total labour supply decreases. Thus, the overall percentage change in labour supply for the whole economy is negative. The disposable income of both an unemployed and an employed person increases due to the higher amount of benefits received with the basic income reform.

In the second scenario, where a lower marginal tax rate on income above the tax allowance threshold is applied, we observe an increase in the average working

[7]Appendix A.2 gives details of the changes in disposable income for the five hour categories for different household types.

[8]This difference is higher for women without children, due to the higher amount of benefits received for children. In the current system indeed children benefit amounts to 150€ per child, while with the basic income reform each child receives 300€(500€ of basic incomes net of the health premium of 200€).

Table 2: Labour Supply Effects – Partial Equilibrium

	Scenario 1			Scenario 2		
	PR	AWT	TLS	PR	AWT	TLS
All	-0.50	-0.72	-1.37	-2.41	2.18	-1.06
Men in couple	0.76	-1.03	-0.19	0.50	0.78	1.34
Women in couple	-2.63	-1.11	-5.17	-6.37	2.96	-7.26
Singles	1.01	-0.97	0.31	-0.29	1.36	0.98
Low skilled	0.53	-0.03	0.83	-2.95	2.01	-2.85
High skilled	-0.68	-0.80	-1.65	-2.32	2.18	-0.83

PR: participation rate (change in percentage points), AWT: average working time (change in per cent), TLS: total labour supply in hours (change in per cent)

time for all groups of individuals, who have an incentive to work more hours (the substitution effect dominates the income effect in this case).

The participation rate of women in couple decreases dramatically in this scenario, due to the large income effect which is generated by the simultaneous implementation of the basic income together with a higher marginal withdrawal rate below the tax allowance threshold, compared to the marginal tax rate applied above it. In this case, the incentives for the second earner to participate in the labour market are very low, due to the generous amount of transfers they receive, combined with the high withdrawal rate. For women in couples, indeed, the relative attractiveness of non participation is now higher with respect to the status quo, and the consequence is a decrease in the participation rate of married women. In this scenario the moving of couple households toward the model "man working full-time and woman not working" is even stronger.

For all singles the hour categories of part time jobs (15 and 30 hours), which are chosen in the status quo more frequently by women, lose their attractiveness relatively to the non participation decision (in terms of relative change of disposable income)[9]. For men in couples instead there is an incentive to work caused by income

[9]In Appendix A.3, we report the changes in average disposable income after the reform.

effects (the average income change of the participation options is generally higher than the change in income in the non participation option), and so we observe a slight increase in their participation rate. However, both responses are relatively small compared to the one given by women in couple. In both low and high skilled workers the negative response in participation by women prevails, and we observe a general decrease both in the participation rate and in the total labour supply for high and low skilled workers. The overall effect on total labour supply is also negative (-1%), but less pronounced than in the first scenario. The disposable income for both an unemployed and an employed person increases more than in the first scenario, due to the lower tax rates on income above the tax allowance threshold.

5.2 General Equilibrium Results

Table 3 reports the labour supply responses in the general equilibrium, while Table 5 shows the change in other macroeconomic variables. Labour supply changes observed are in general qualitative the same as in the partial version but the general equilibrium mitigates most effects. In the first alternative, the average working time decreases for all the categories, while in the second scenario it increases. This effect is always due to the change in the tax rate on income above the tax allowance threshold. Participation rates for women in partnership fall in both scenarios.

The changes in the participation rates of men in couples and singles are in general equilibrium slightly higher than in partial equilibrium due to the reaction of wages. The change in the participation is driven by income effects, while the fall in the average working time, which is observed for all groups, is due to the increase of the tax rate on income above the tax allowance threshold. Labour supply of low skilled increases (Table 3), thus generating a reduction in their wage (Table 5). This decrease in the wage for low skilled can be understood considering the role played by trade unions in bargaining the wage levels with firms. This bargaining process

Table 3: Labour Supply Effects – General Equilibrium

	Scenario 1			Scenario 2		
	PR	AWT	TLS	PR	AWT	TLS
All	-0.22	-0.66	-0.95	-2.51	2.18	-1.18
Men in couple	0.85	-1.01	-0.08	0.64	0.82	1.53
Women in couple	-2.17	-0.88	-4.24	-6.76	2.76	-8.07
Singles	1.25	-0.87	0.72	-0.24	1.34	1.02
Low skilled	0.54	-0.07	0.80	-2.83	2.23	-2.44
High skilled	-0.36	-0.72	-1.17	-2.45	2.16	-1.02

PR: participation rate (change in percentage points), AWT: average working time (change in per cent), TLS: total labour supply in hours (change in per cent)

affects wages through three main channels: the value of unemployment (and thus the general level of transfers), the change in the participation rate (which affects the transition rate from unemployment to work), and the marginal tax rates. In our case, for low skilled, we observe that the value of unemployment, the participation rate and the marginal tax rate increase. The first force works giving an upward pressure on wages, while the other two forces have a downward pressure on the wage level. In the case of the low skilled, the last two forces are dominating the first one, and we observe a reduction in their wage level. For high skilled, instead, again we have an improvement of the fallback option, and an increase in the marginal tax rates on incomes. However, the participation rate for this group is decreasing, and the overall effect of these three forces on the wage level is a contained upward pressure. The effect of a wage reduction is a raise in the labour demand for the low skilled, for which the unemployment level is reduced (the increase in the employment level overcomes the one observed in labour supply, thanks to the sensitive reduction in the wage level). For high skilled we have exactly the opposite: the wage for them raises, and their employment level decreases. Unemployment is observed to fall for high skilled because their labour supply has decreased more than what employment does. Indeed, owing to the rather small increase in the wage level (0.3%), the fall in the employment level is contained (-0.12%). The overall effect on aggregate employment

is slightly positive. [10]

In the second scenario, the labour supply results also go in the same direction that was observed in the partial equilibrium analysis. The participation decision is mainly driven by the income effects brought about by the reform, while the increase in the average worked time for all categories is due to the lower tax rate on income above the tax allowance threshold. For some groups, such as persons in partnership and singles, the responses to the reform, both in the participation rates and in the average working time, are in the same direction but more accentuated with the general equilibrium effects. This is mainly due to the change in the wage level implied by the general equilibrium adjustment.

Table 4: Skill-Specific General Equilibrium Results

	Scenario 1		Scenario 2	
	Low Skilled	High Skilled	Low Skilled	High Skilled
Employment	2.09%	-0.12%	-3.73%	-1.03%
Unemployment rate (in hours)*	-2.05	-1.31	2.22	0.92
Unemployment rate (in persons)*	-2.53	-1.59	2.60	0.98
Gross wage	-2.91%	0.34%	5.27%	2.47%
Marginal tax rate*	6.51	10.99	-13.11	-13.22
Average income, unemployment	15.48%	10.42%	21.28%	17.36%
Average disposable income, employment	10.66%	5.56%	16.93%	14.98%
Average gross income, employment	-3.88%	-0.85%	5.85%	3.67%

* Change in percentage points.

However, the overall general equilibrium results on total labour supply are smaller in magnitude than the partial equilibrium ones. Basically, what we observe both for high and low skilled is that their labour supply decreases, thus generating an increase in their wage level. Again, this effect must be read through the wage

[10] Even if the increase in the employment level of low skilled is relatively big in percentage points (2.1%), we recall the fact that the high skilled are much more numerous than the low skilled ones, so that the net effect is only slightly positive (0.06%), and this causes a rather small increase in the GDP.

bargaining process of the unions. What we observe is an improvement of the fallback option for both skill groups, and a reduction in their participation and in the marginal tax rates they face. All these forces give an upward pressure onto wages, and especially for the low skilled, due to the large improvement in their fallback option (especially due to the larger increase in the disposable income of both employed and unemployed persons of skill low). The raise of the wage level causes a decline in employment for both skill groups. This results in an increase of the unemployment levels of both high and low skilled. This process is stronger for the low skilled, since their negative labour supply response is more accentuated (-2.4%). The decrease in the employment level causes a fall in GDP. In this scenario, the relative price for capital decreases (-5.1%). The reduction in investments (-5.6%) is more pronounced than in the first scenario. Since the reform is initially designed to be revenue neutral, the change observed in the endogenous income tax is relatively small in the two scenarios.

Table 5: General Equilibrium Results

	Scenario 1	Scenario 2
GDP (producer prices)	0.04%	-0.87%
GDP (consumer prices)	0.04%	-0.64%
National Income	0.07%	-0.16%
Aggregate employment	0.06%	-1.26%
Gross wage all	-1.17%	3.77%
Rental rate of capital	-0.22%	-5.11%
Investment	-0.26%	-5.64%
Consumption	0.16%	0.30%
Labour share in value added*	0.04	1.01
Capital share in value added*	-0.04	-0.94
Profit share*	0.00	-0.08
Unemployment rate all (persons)*	-1.69	1.16
Endogenous income tax*	0.12	1.18

* Change in percentage points.

6 Conclusion

This paper investigates the economic effects of the so-called basic income proposal granting 800€ per month as an unconditional transfer, which is reduced to a lower amount for those on higher incomes. This transfer replaces the current system's transfers of the government and state-related institutions by an integrated tax transfer schedule including negative income tax and tax allowance. The basic income is financed out of wage tax levied on the employers and income tax, since income earned on the market is liable to income tax from the first Euro.

We use an integrated CGE-microsimulation model that combines the advantages of both model types: On the one hand, we employ micro-data of the SOEP wave 2004 and account for the heterogeneity of households in terms of preferences and budget constraints. Therefore, we are able to represent the German tax transfer regulations in detail. Using a discrete-choice labour supply approach allows for a distinction between labour supply effects along the extensive and intensive margin. On the other hand, we account for indirect effects caused by participation and labour supply responses due to wage and price reactions. General equilibrium feedback effects are of particular relevance for our reform scenarios, since the major aspects of the proposal substantially affect the whole population. Furthermore, we are able to guarantee an equal yield reform by adjusting the income tax schedule.

Differing in marginal tax rates, we present two reform scenarios: In the first (second) scenario, people receiving negative income tax face a marginal tax rate of 50% (61.3%), while those individuals whose gross income exceed the respective tax allowance threshold face a marginal tax rate of 80% (34.9%). We show that introducing a flax tax including negative income tax, while keeping up the generous transfer level of the status quo, requires these relatively high marginal tax rates in order to make the reform proposal financeable. Due to these tax rates, an overall decrease in labour supply results in both scenarios. The only exception arises in

the first scenario, in which we observe an increase in low-skilled labour supply due to the low withdrawal rate. While it does not show significant effects on the gross domestic product in the first scenario, it translates into lower employment and a gross domestic product in the second scenario.

Assuming that wages represent the individual's productivity while capital income is kept constant, we can compare our results to the Mirrlees (1971) theory: Mirrlees found that if taxpayers only differ in their ability, the welfare maximising tax scheme includes a low marginal tax rate for those at the top of the income scale, while low-income individuals should face a higher marginal tax rate. The intuition behind this result is that the most productive individuals may increase their effort stimulating the economy. Our results for single households confirm the findings of Mirrlees. However, for couple households, this effect is dominated by the effect resulting from the introduction of the negative income tax, which gives a negative incentive to participate for the second earner in the couple.

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A Appendix

A.1 Details of the Basic Income Scenario

Basic Income Scenarios	Status Quo System
Flat income tax including negative income tax	Step-wise defined income tax function
Individual taxation	Joint taxation of couples
Unconditional basic income	Different transfers, such as unemployment benefits, social assistance and pensions.
Per-capita health premia to the statutory health insurance. No other contributions.	Earnings-related social security contributions: Contributions to the statutory health insurance, long-term care insurance, pension insurance, unemployment insurance

A.2 Simulation Results Scenario I

Table A1: Household Disposable Income, Hours Alternative for Men in Low-Skilled Couples, Scenario 1*

	No Children			Two Children		
Hours	Status Quo	Scenario	Change in %	Status Quo	Scenario	Change in %
0	1074	1234	14.8%	1492	1702	14.1%
15	1210	1576	30.2%	1554	2107	35.5%
30	1507	1895	25.8%	1949	2478	27.1%
38	1713	2050	19.7%	2181	2657	21.8%
47	1939	2216	14.3%	2438	2851	17.0%

*Woman not working

Table A2: Household Disposable Income, Hours Alternative for Men in High-Skilled Couples, Scenario 1*

	No Children			Two Children		
Hours	Status Quo	Scenario	Change in %	Status Quo	Scenario	Change in %
0	1098	1268	15.5%	1403	1738	23.9%
15	1414	1809	27.9%	1695	2408	42.1%
30	1937	2286	18.0%	2520	2988	18.6%
38	2230	2522	13.1%	2938	3284	11.8%
47	2597	2787	7.3%	3418	3618	5.9%

*Woman not working

Table A3: Household Disposable Income, Hours Alternative for Women in High-Skilled Couples, Scenario 1*

	No Children			Two Children		
Hours	Status Quo	Scenario	Change in %	Status Quo	Scenario	Change in %
0	2230	2522	13.1%	2938	3284	11.8%
15	2714	2951	8.7%	3294	3634	10.3%
30	3131	3339	6.6%	3621	3959	9.3%
38	3351	3530	5.3%	3796	4115	8.4%
47	3601	3739	3.9%	3998	4285	7.2%

*Man working 38 hours

A.3 Simulation Results Scenario II

Table A4: Household Disposable Income, Hours Alternative for Men in Low-Skilled Couples, Scenario 2*

	No Children			Two Children		
Hours	Status Quo	Scenario	Change in %	Status Quo	Scenario	Change in %
0	1074	1213	13.0%	1492	1682	12.7%
15	1210	1400	15.7%	1554	1902	22.4%
30	1507	1800	19.5%	1949	2381	22.1%
38	1713	2045	19.4%	2181	2669	22.3%
47	1939	2323	19.8%	2438	2994	22.8%

*Woman not working

Table A5: Household Disposable Income, Hours Alternative for Men in High-Skilled Couples, Scenario 2*

	No Children			Two Children		
Hours	Status Quo	Scenario	Change in %	Status Quo	Scenario	Change in %
0	1098	1249	13.7%	1403	1717	22.4%
15	1414	1611	13.9%	1695	2223	31.2%
30	1937	2306	19.0%	2520	3121	23.9%
38	2230	2698	21.0%	2938	3615	23.1%
47	2597	3143	21.0%	3418	4176	22.2%

*Woman not working

Table A6: Household Disposable Income, Hours Alternative for Women in High-Skilled Couples, Scenario 2*

	No Children			Two Children		
Hours	Status Quo	Scenario	Change in %	Status Quo	Scenario	Change in %
0	2230	2698	21.0%	2938	3615	23.1%
15	2714	2945	8.5%	3294	3794	15.2%
30	3131	3456	10.4%	3621	4191	15.8%
38	3351	3756	12.1%	3796	4436	16.8%
47	3601	4102	13.9%	3998	4715	17.9%

*Man working 38 hours

A.4 Estimation Results

Table A7: Maximum Likelihood Estimation Results Single Men

	Coeff.	SE	z	P>z
Disposable Income	10.11	2.71	3.73	0.00
Disposable Income^2	0.06	0.04	1.37	0.17
Disposable Income X Leisure	-2.41	0.59	-4.10	0.00
Leisure	74.05	21.47	3.45	0.00
Leisure^2	-6.80	2.51	-2.70	0.01
Leisure X High-skilled	1.77	2.16	0.82	0.41
Leisure X Low-skilled	2.36	2.21	1.07	0.29
Leisure X East	0.49	0.37	1.30	0.19
Leisure X Nationality	0.75	0.85	0.88	0.38
Leisure X Age	-0.80	0.47	-1.71	0.09
Leisure X Age^2	0.00	0.00	0.82	0.41
Leisure^2 X Age	0.09	0.06	1.64	0.10
Leisure X Disabled	0.95	0.88	1.07	0.28
Dummy Full time Employment	3.91	0.27	14.64	0.00
Observations		3,000		
Log Likelihood		-669		

CConditional Multinomial Logit with 5 working hours categories. (0, 15, 30, 38, 49). SOEP 2004.

Table A8: Maximum Likelihood Estimation Results Single Women

	Coeff.	SE	z	P>z
Disposable Income	8.27	2.82	2.93	0.00
Disposable Income^2	0.26	0.07	3.90	0.00
Disposable Income X Leisure	-2.36	0.58	-4.08	0.00
Leisure	87.75	19.86	4.42	0.00
Leisure^ X 2	-8.99	2.37	-3.79	0.00
Leisure X High-skilled	1.79	1.31	1.36	0.17
Leisure X Low-skilled	2.67	1.37	1.95	0.05
Leisure X East	-0.25	0.38	-0.65	0.51
Leisure X Nationality	1.63	0.61	2.65	0.01
Leisure X Age	0.38	0.44	0.86	0.39
Leisure X Age^2	0.00	0.00	2.14	0.03
Leisure^2 X Age	-0.07	0.06	-1.20	0.23
Leisure X Disabled	-0.25	1.40	-0.18	0.86
Leisure X Children < 7	4.13	0.55	7.47	0.00
Leisure X Children 7-16	1.08	0.25	4.33	0.00
Leisure X Children >=17	0.57	0.31	1.85	0.06
Dummy Full time Employment	0.02	0.38	0.07	0.95
Dummy Part time*) Employment	-1.66	0.28	-5.86	0.00
Observations		3,890		
Log Likelihood		-974		

Conditional Multinomial Logit with 5 working hours categories (0, 15, 30, 38, 49). SOEP 2004.

*) 15 or 30 hours per week

Table A9: Maximum Likelihood Estimation Results Flexible Couples

	Coeff.	SE	z	P>z
Disposable Income	20.02	2.24	8.95	0.00
Dispsable Income^ 2	0.19	0.04	4.86	0.00
Leisure Husband X Leisure Wife	-2.88	0.54	-5.33	0.00
Disposable Income X Leisure Husband	-3.26	0.33	-9.94	0.00
Disposable Income X Leisure Wife	-1.63	0.28	-5.73	0.00
Leisure Husband	62.70	7.34	8.54	0.00
Leisure^2 Husband	-1.84	0.62	-2.96	0.00
Leisure Husband X East	-9.32	2.71	-3.44	0.00
Leisure Husband X Nationality	-0.46	0.42	-1.12	0.27
Leisure Husband X Leisure Wife X East	2.35	0.67	3.48	0.00
Leisure Husband X Leisure Wife X Nationality	-0.13	0.10	-1.26	0.21
Leisure Husband X High-skilled	2.14	1.30	1.65	0.10
Leisure Husband X Low-skilled	2.99	1.32	2.27	0.02
Leisure Husband X Age	-0.33	0.09	-3.48	0.00
Leisure Husband X Age^2	0.00	0.00	4.17	0.00
Leisure Husband X Disabled	0.55	0.77	0.72	0.47
Leisure Wife	101.12	7.06	14.33	0.00
Leisure^2 Wife	-8.74	0.62	-14.06	0.00
Leisure Wife X East	-11.25	2.57	-4.38	0.00
Leisure Wife X Nationality	0.13	0.39	0.34	0.73
Leisure Wife X High-skilled	1.76	0.78	2.27	0.02
Leisure Wife X Low-skilled	1.95	0.82	2.39	0.02
Leisure Wife X Age	-0.35	0.09	-3.68	0.00
Leisure Wife X Age^2	0.00	0.00	4.35	0.00
Leisure Wife X Disabled	0.20	1.42	0.14	0.89
Dummy Full time Employment Husband	4.96	0.20	24.88	0.00
Dummy Full time Employment Wife	0.70	0.24	2.93	0.00
Dummy Part time*) Employment Wife	-0.59	0.21	-2.81	0.01
Dummy Employment Both Spouses	-0.20	0.18	-1.09	0.28
Observations		65,075		
Log Likelihood		-5,867		

Conditional Multinomial Logit with 25 working hours categories
(0, 15, 30, 38, 49)× (0, 15, 30, 38, 49). SOEP 2004.
*) 15 or 30 hours per week.

Table A10: Maximum Likelihood Estimation Results Mixed Couples

	Coeff.	SE	z	P>z
Disposable Income	1.94	1.61	1.20	0.23
Disposable Income^2	0.46	0.07	6.92	0.00
Disposable Income X Leisure	-1.39	0.35	-4.00	0.00
Leisure	66.75	21.64	3.08	0.00
Leisure X Household Head Female	0.09	0.75	0.11	0.91
Leisure^2	-5.37	2.66	-2.02	0.04
Leisure X Leisure inflex. Spouse	-0.13	0.16	-0.79	0.43
Leisure X High-skilled X Female	0.71	1.15	0.62	0.54
Leisure X Low-skilled X Female	1.73	1.23	1.41	0.16
Leisure X High-skilled X Male	-0.79	1.20	-0.66	0.51
Leisure X Low-skilled X Male	-1.42	1.29	-1.10	0.27
Leisure X Age	-0.76	0.46	-1.67	0.09
Leisure X Age^2	0.01	0.00	3.56	0.00
Leisure^2 X Age	0.04	0.05	0.77	0.44
Leisure X East	1.60	0.65	2.48	0.01
Leisure X East X Household Head Female	-3.47	0.71	-4.87	0.00
Leisure X Nationality	-1.49	0.56	-2.65	0.01
Leisure X Children $<$ 7 years	1.27	0.69	1.85	0.06
Leisure X Children 7-16 years	0.93	0.27	3.43	0.00
Leisure X Children $>=$17 years	0.49	0.21	2.29	0.02
Leisure X Male X Disabled	0.66	1.14	0.58	0.56
Dummy Part time*) Employment Wife	-0.24	0.22	-1.12	0.27
Dummy Full time Employment Wife	0.69	0.34	2.06	0.04
Dummy Full time Employment Husband	3.76	0.37	10.29	0.00
Dummy Employment X Children $<$ 7 years	-0.41	0.40	-1.04	0.30
Dummy Employment X Children 7-16 years	0.21	0.16	1.32	0.19
Observations		4,745		
Log Likelihood		-1,215		

Conditional Multinomial Logit with 5 working hours categories
(0, 15, 30, 38, 49). SOEP 2004.

*) 15 or 30 hours per week.