879
2016

SOEPpapers

on Multidisciplinary Panel Data Research

SOEP — The German Socio-Economic Panel study at DIW Berlin 879-2016

Why Has Income Inequality in Germany Increased from 2002 to 2011? A Behavioral Microsimulation Decomposition

Robin Jessen

ISSN: 1864-6689 (online)

German Socio-Economic Panel (SOEP)
DIW Berlin
Mohrenstrasse 58
10117 Berlin, Germany

Contact: soeppapers@diw.de

Why Has Income Inequality in Germany Increased from 2002 to 2011?

A Behavioral Microsimulation Decomposition *

Robin Jessen†

December 7, 2016

Abstract

I propose a method to decompose changes in income inequality into the contributions of policy changes, wage rate changes, and population changes while considering labor supply reactions. Using data from the Socio-Economic Panel (SOEP), I apply this method to decompose the increase in income inequality in Germany from 2002 to 2011, a period that saw tax reductions and a controversial overhaul of the transfer system. The simulations show that tax and transfer reforms have had an inequality reducing effect as measured by the Mean Log Deviation and the Gini coefficient. For the Gini, these effects are offset by labor supply reactions. In contrast, policy changes explain part of the increase in the ratio between the 90th and the 50th income percentile. Changes in wage rates have led to a decrease in income inequality. Thus, the increase in inequality was mainly due to changes in the population.

Keywords Inequality · Decomposition · Labor Supply · Microsimulation · Policy Reform

JEL Classification D31 · I38 · J31

*I thank Olivier Bargain, Martin Biewen, Giacomo Corneo, Jonas Jessen, Johannes König, Andreas Peichl, Sebastian Schmitz, Davud Rostam-Afschar, Viktor Steiner, and Maximilian Stockhausen as well as seminar participants at Freie Universität Berlin, the annual meeting of the Society of Labor Economists in Seattle, the SOEP User Conference, the conference Crises and the Distribution in Berlin, the Tagung des Vereins für Socialpolitik in Hamburg, and the Annual Meeting of the Austrian Economic Association in Vienna for helpful comments and suggestions. I thank the Hans-Böckler-Stiftung for financial support. The data used in this paper were made available by the German Socio-Economic Panel Study (SOEP) at the German Institute for Economic Research (DIW), Berlin.

†Department of Economics, Freie Universität Berlin, Boltzmannstr. 20, 14195 Berlin, Germany (e-mail: r.jessen@fu-berlin.de).

1 Introduction

Income inequality has increased considerably in Germany from 2002 to 2011. The Gini coefficient of net equivalized household income has increased from 28.5 to 29.5 (own calculation). From a policy perspective it is important to learn about the determinants of increasing income inequality, in order to take appropriate countermeasures. The time span from 2002 to 2011 is particularly interesting regarding the interaction of inequality and tax policy as it witnessed a strong increase in inequality as well as major reforms to the tax and transfer system: the controversial Hartz IV reforms of the transfer system as well as part of the phasing in of major tax reforms that started in 2001. Increasing wage dispersion due to skill-biased technological change is another potential explanation for the increase in income inequality. These potential factors in increasing inequality are described in detail in section 2.

To allow for the joint analysis of these two factors, I extend the decomposition framework by Bargain (2012a,b) to explicitly account for the effect of changes in conditional wage rates in the spirit of Bourguignon et al. (2008). The decomposition method combines microsimulation, a structural labor supply model, and the construction of counterfactual wage rates using Mincer-style wage regressions. The decomposition is done in an entirely disaggregated way that is not limited to a specific class of inequality indices. It allows for the graphical representation of counterfactual distributions. Marginal effects of particular factors on inequality are calculated by comparing actual and counterfactual distributions. The calculated marginal effects can be interpreted as ceteris paribus changes unconfounded by demographic or business cycle changes. The decomposition method is explained in section 3.

This study contributes to the literature on the decomposition of differences between two income distributions and in particular to the literature using microsimulation techniques. Bargain and Callan (2010), Bargain (2012b) , and Bargain et al. (2013) simulate counterfactual net incomes by applying the tax and transfer system of a given period to the population of another period using a detailed tax and transfer calculator to obtain intermediate distributions. Creedy and Herault (2011) and Bargain (2012a) expand the microsimulation approach by simulating counterfactual labor supply decisions. Bargain et al. (2015) simulate responses of taxable income. Herault and Azpitarte (2016) allow for the simulation of a wide range of additional determinants. In the study at hand, I combine the simulation of counterfactual labor supply with the prediction of counterfactual wages following Bourguignon et al. (2008) akin to the decomposition method introduced by Blinder (1973) and Oaxaca (1973). As pointed out by Bourguignon et al. (2008), the combination of strictly parametric techniques offers the advantage of a straight-forward economic interpretation (see also Brewer and Wren-Lewis (2015) and Herault and Azpitarte (2016)).

Apart from the methodology, the analysis conducted in this study adds to a developing literature on the causes of increases in income inequality in Germany in recent years. A few studies decompose the overall change in income inequality in Germany between two periods into a number of factors. Biewen and Juhasz (2012) apply a reweighing technique (DiNardo et al. 1996) along with parametric techniques to study the rise of income inequality from 1999/2000 to 2005/2006. They find that changes in household structure and characteristics as well as changes in the transfer system have had a minor effect. Changes in labor market returns, conditional employment outcomes and changes in the tax system have led to an increase in income inequality. Their measure of conditional labor market returns is not limited to the effect of wage changes, but, given their broad definition of employment outcomes, includes hours adjustments. Bargain et al. (2013) focus on static policy effects for the period 2008 to 2010. Here, policy changes have had no effect on overall inequality and a positive effect on poverty measures. Peichl et al. (2012) use subgroup decomposition and a reweighting technique to quantify the impact of changes in household size and employment outcomes on the increase of income inequality from 1991 to 2007. They find that the decreasing average household size in Germany is associated with an increase in inequality and that this increase is mitigated by the tax and transfer system. Arntz et al. (2007) conduct an ex ante study of the distributional effect of the 2005 Hartz IV reform of the transfer system described in section 2.1. They find no direct effect of the reform on the Gini coefficient, while some other inequality measures decreased. For people directly affected by the reform the changes in the transfer system have led to a substantial decrease in the Gini coefficient.

The results are presented in section 4. I find that changes of the tax and transfer system have had a negative impact on inequality as measured through the Gini index and the Mean Log Deviation (MLD), which confirms these previous findings. The negative effect of policy changes on the Gini is offset by labour supply reactions. In contrast, policy changes have led to an increase in the ratio between the 90th and the 50th income percentile (Q90/50). The overall effect of changes in the wage rates on inequality is found to be negative. Thus, the overall increase in income inequality was caused by changes in characteristics of the population.

Figure 1: Budget constraint of a single household eligible to Social Assistance (2002) or Unemployment Benefit II (2011) in 2011 Euro.

Source: Own calculation based on the STSM

2 Factors in Increasing Inequality

2.1 Policy Changes

The period spanning from 2002 to 2011 has been marked by several important changes to the German tax and transfer system. Most prominently, the transfer system has been radically overhauled in the course of the Hartz IV reform. Before the reform, two kinds of means-tested transfers existed for the unemployed: Unemployment Assistance, which amounted to 53% of previous labor income (57% if a child lived in the household) and Social Assistance covering the social existence minimum. In 2005, these transfers were replaced with the so-called Unemployment Benefit II, which only ensures the social existence minimum. Individuals deemed able to participate in the labor market were subject to these changes. Former recipients of Unemployment Assistance experienced a potentially severe reduction of income due to the introduction of Unemployment Benefit II. The aim of the reform in this regard was to improve incentives for the unemployed to accept job offers. However, the level of Unemployment Benefit II is slightly higher than Social Assistance, so that former recipients of the latter were better off. Overall, the Hartz IV reform has led to an increase in government spending (Biewen and Juhasz 2012) and an ex-post evaluation has shown that average net equivalized income of previous recipients of Unemployment Assistance was higher a year after the reform than before (Bruckmeier and Schnitzlein 2007).[1] As this reform of the transfer system implied lower transfers for some and higher transfers for others, the distributional effect is a priori ambiguous.

Several changes in the tax system occurred from 2002 to 2011. The initial marginal tax rate was decreased from 19.9 % to 14 %. In 2004, the top marginal tax rate applicable for incomes exceeding 55 000 Euro (year 2002) was decreased from 49 % to 42 % and the top marginal tax rate income threshold was decreased to 52 151 Euro (2004). In 2007 the so-called rich people's tax of 45 % for gross incomes exceeding 250 000 Euro per year came into force. Additionally, the size of the tax brackets were regularly adjusted slightly to account for inflation. Before 2009, capital income was part of the income tax base, the year 2009 saw the introduction of a capital income tax of 25 %, leading to a tax reduction for earners of capital income with a marginal income tax rate exceeding this figure.

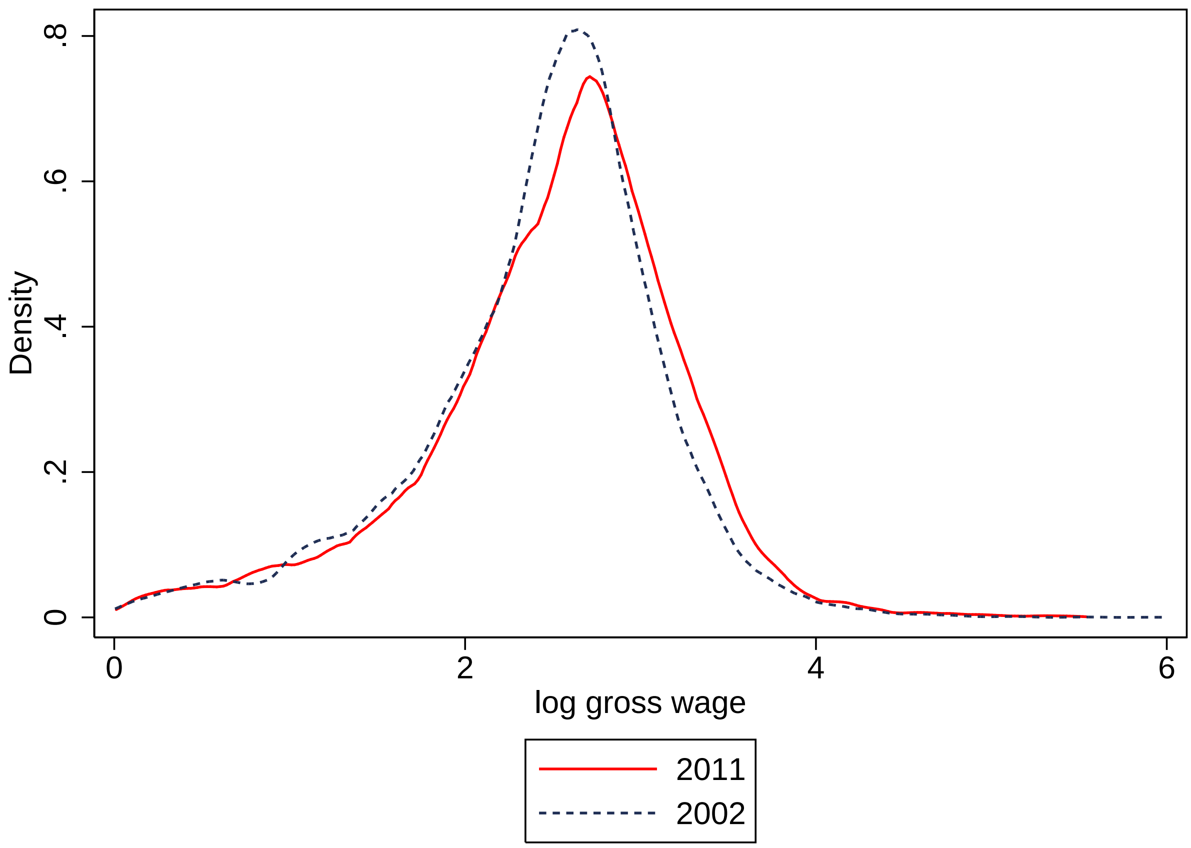
Finally, the Citizen Relief Act (Bürgerentlastungsgesetz) – in effect since July 2009 – brought about an increase in the possible tax allowances for insurance premia. Overall, tax reforms in the analyzed time-span produced lower marginal tax rates both at the upper and at the lower end of the income distribution, so the distributional effect is a priori unclear. The same holds for the labor supply effects of these reforms.

Figure 1 shows the change in the budget constraint for a single without children with an hourly wage rate of 20 Euro.[2] For low levels of gross labor income, the transfer received in the 2011

[1] Additionally, the period of entitlement to Unemployment Benefit (colloquially referred to as "Unemployment Benefit I"), was reduced from up to 36 months to 12 months and 18 months for individuals over 55 years of age. The entitlement period for the elderly was further increased in 2006 and in 2008. In 2011 the maximum entitlement period for individuals of at least 58 years of age was 24 months. Compared to the year 2002, this still means a reduction in the maximum entitlement period and could potentially have led to an increase in inequality.

[2] For the 2002 budget constraint, gross labor incomes have been deflated to 2002 levels and – along with simulated net incomes – inflated back to 2011 levels.

Figure 2: Densities of log hourly wage in 2011 Euro



Source: Own calculation base on the SOEP.

regime is far more generous. The lower marginal tax rates of 2011 translate into a steeper slope of the budget constraint starting at a monthly gross income of about 2000 Euro.

2.2 Wage Dispersion

Wages in Germany have dispersed considerably since the 1990s, see, e.g., Fuchs-Schuendeln et al. (2010). Several studies attest that this is partly due to polarization, which is consistent with skill-biased technological change, see, e.g., Dustmann et al. (2009). However, there is less evidence for this phenomenon in the time-span beginning in 2002. The rise of wage dispersion in recent years can more likely be attributed to selection, since the number of unemployed in Germany has decreased substantially. Hence, the expected effect of changes in wage rates is unclear.

Figure 2 depicts the estimated Epanechnikov kernel density of log hourly wage densities in the two years.[3] It shows a marked increase in mass at the right of the distribution from 2002 to 2011 implying a relative increase in the number of high-paying jobs.

3 Empirical Strategy: Decomposition

3.1 Counterfactual Distributions and Decomposition

The decomposition is restricted to parametric techniques that have a straightforward economic interpretation. Let y_{bd}^{ce} be a matrix that describes socio-demographic characteristics and market incomes of the people observed in period b who receive the conditional wage rates of period d with work hours given the incentives of the tax and transfer regulations of period c and the incentives given conditional wages of period e. As described in subsection 3.4, work hours are simulated conditional on the budget constraints of individuals, which are determined by the tax and transfer system and the gross hourly wage. Let x_a be the tax and transfer function that translates market income and socio-demographic characteristics into net income of each household and denote I an inequality index. Specifically, let $I\left(x_{2011}\left(y_{2011,2011}^{2011,2011}\right)\right)$ be an inequality index of the actually observed outcomes of 2011 and $I\left(x_{2002}\left(y_{2002,2002}^{2002,2002}\right)\right)$ inequality of observed outcomes in 2002. Then marginal effects are given by the change in income inequality obtained by changing one factor while keeping everything else equal. For instance, the *static* marginal effect of policy changes on income inequality is given by

$$I\left(x_{\mathbf{2011}}\left(y_{2002,2002}^{2002,2002}\right)\right)-I\left(x_{2002}\left(y_{2002,2002}^{2002,2002}\right)\right). \tag{1}$$

The *total* policy effect is given by

$$I\left(x_{\mathbf{2011}}\left(y_{2002,2002}^{\mathbf{2011},2002}\right)\right)-I\left(x_{2002}\left(y_{2002,2002}^{2002,2002}\right)\right), \tag{2}$$

i.e., the difference between actual inequality in 2002 and inequality of the counterfactual distribution where net incomes according to the 2011 tax transfer system have been calculated and additionally labor supply reactions to the policy changes have been simulated for the 2002 sample. Similarly, the *static* wage effect is given by

$$I\left(x_{2002}\left(y_{2002,\mathbf{2011}}^{2002,2002}\right)\right)-I\left(x_{2002}\left(y_{2002,2002}^{2002,2002}\right)\right) \tag{3}$$

[3]Following Biewen and Juhasz (2012), I use a fixed bandwidth of 0.175 throughout the paper.

and the *total* wage effect is

$$I\left(x_{2002}\left(y_{2002,\mathbf{2011}}^{2002,\mathbf{2011}}\right)\right)-I\left(x_{2002}\left(y_{2002,2002}^{2002,2002}\right)\right), \tag{4}$$

the difference between 2002 income inequality and inequality of the intermediate distribution, where 2011 wages have been predicted for all workers and labor supply reactions to this wage change have been simulated. In section 4, marginal effects of wage and policy changes are reported using the year 2002 as base as in the equations above and using the year 2011 as base year. Additionally, I show the combined effect of wage and policy changes.[4] While the interpretation of the effects of wage and policy changes is straight-forward, other effects represent a residual that captures all household characteristics that are not explicitly modeled, e.g. demographic changes, changes in assortative mating, changes in the distribution of capital income, changes in education choices, etc.

3.2 Changes in Wage Rates

I analyze the effect of conditional wages by running a regression of log hourly wages on years of education, work experience and experience squared as well as years not worked in the last ten years to capture loss of human capital. Heckman's (1979) method is used to account for selection bias with variables capturing the number of children, family status, and the income of other household members as exclusion restriction. Seperate regressions are run for women and men and East and West Germany.

The coefficients and the constant for the years 2002 and 2011 are used to predict counterfactual wages for the respective other years' populations.[5] The entire labor incomes of employees are replaced with the counterfactual predictions. For instance, for the wage effect with base year 2002, equation (3), hourly wages of the 2002 sample are replaced with predicted wages using coefficients of the 2011 wage regression. Following Bourguignon et al. (2008) and Bourguignon and Ferreira (2004), each individual's residuals are multiplied by the ratio of standard deviations of residuals of the counterfactual and the observed period and added to the deterministic (predicted) part of the

[4] Another possibility would be to calculate all possible orders of the decomposition and calculate the average contribution of for example wage rate changes over all decomposition orders. Instead I focus on marginal effects, since they have a precise and intuitive economic interpretation.

[5] 2002 wages are inflated to 2011 Euro for the regressions. Counterfactual predicted wages for the 2002 sample are deflated to 2002 levels.

Table 1: Wage regression 2002

	(1) Men East	(2) Women East	(3) Men West	(4) women west
Ln(Hourly Wage)				
Years of Schooling	0.0656***	0.0647***	0.0650***	0.0719***
	(0.00529)	(0.00716)	(0.00241)	(0.00360)
Years not Worked	-0.150***	-0.112***	-0.0952***	-0.0369***
	(0.0197)	(0.0150)	(0.00898)	(0.00500)
Experience	0.0541***	0.0776***	0.0677***	0.0644***
	(0.00662)	(0.00844)	(0.00322)	(0.00443)
$\text{Experience}^2/100$	-0.104***	-0.164***	-0.123***	-0.128***
	(0.0165)	(0.0224)	(0.00793)	(0.0120)
Constant	1.183***	0.921***	1.444***	1.120***
	(0.101)	(0.148)	(0.0454)	(0.0776)
Mills	0.0737	0.0472	0.0227	0.0942*
lambda	(0.0713)	(0.0861)	(0.0314)	(0.0447)
N	2616	2899	7586	8253

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Wage regression 2011

	(1)	(2)	(3)	(4)
	Men East	Women East	Men West	Women West
Ln(Hourly Wage)				
Years of Schooling	0.0550***	0.0677***	0.0546***	0.0565***
	(0.00522)	(0.00643)	(0.00255)	(0.00330)
Years not Worked	-0.137***	-0.113***	-0.146***	-0.0484***
	(0.0159)	(0.0129)	(0.00990)	(0.00548)
Experience	0.0711***	0.0544***	0.0682***	0.0520***
	(0.00721)	(0.00743)	(0.00387)	(0.00429)
Experience^2/100	-0.156***	-0.106***	-0.131***	-0.0948***
	(0.0187)	(0.0188)	(0.00968)	(0.0111)
Constant	1.235***	1.035***	1.486***	1.330***
	(0.0902)	(0.125)	(0.0465)	(0.0740)
Mills	0.0818	-0.00145	0.0970**	0.0274
lambda	(0.0718)	(0.0717)	(0.0370)	(0.0458)
N	2419	2695	6898	7825

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

counterfactual wage.[6] Gross labor incomes are calculated by multiplying the counterfactual hourly wage with actual hours of work.

The results of the wage regressions are reported in tables 1 and 2. The signs of the coefficients are as expected, implying positive returns to schooling, positive and decreasing returns to experience, a wage penalty to human capital loss and – if significant – a positive selection term. They offer no evidence for skill-biased technological change in the observed period, instead, the returns to schooling have decreased for all groups except East German women. However, it should be kept in mind that changes in conditional wage rates reflect changes in both labor demand, e.g., because of skill-biased technological change, and labor supply.

3.3 Tax and Transfer System: Simulated Net Incomes

Counterfactual net incomes and budget constraints are calculated using the microsimulation model STSM, see Steiner et al. (2012) for additional information and Jessen et al. (2016) for a detailed depiction of budget constraints and marginal tax rates simulated with the STSM. The STSM covers the German tax and transfer system and accounts for deductions, allowances, social security payments and child benefits as well as interactions of the components of the tax and transfer system. When simulating counterfactual net incomes, all monetary variables in the data set are inflated or deflated respectively to the policy year. The simulated net incomes are then deflated or inflated back to the data year.

3.4 Behavioral Effects

Labor supply reactions to policy and wage changes are simulated via a random utility discrete choice model following van Soest (1995). For the estimation of the labor supply model, the sample is restricted to household heads and partners with flexible labor supply, i.e., working age individuals excluding self-employed, civil servants, the severely disabled and people in parental leave. Households are assumed to jointly maximize utility, which depends on disposable household income and the leisure of the male and female partner.

The coefficients of the utility function in turn depend on household characteristics such as the household members' age and the number of children. Weekly labor supply is discretized into

[6] The ratio of standard deviations of 2002 and 2011 is 1.002 implying virtually no change in within-group wage inequality.

six categories for women, five for men, and 30 for couples mimicking the observed distribution of labor supply. The net income for each labor supply category is calculated using the STSM. Gross labor income is given by the product of work hours and the (actual or counterfactual) hourly wage. Potential hourly wages of the unemployed are predicted using the selectivity corrected wage regressions described above.[7] Let L_f denote leisure of the female partner, L_m leisure of the male partner, C consumption and ε a random disturbance. Then the utility of household i of choice alternative j is given by

$$V_{ij} = U(Lf_{ij}, Lm_{ij}, C_{ij}) + \varepsilon_{ij}. \tag{5}$$

I use the translog specification of the deterministic part of individual utility and allow for interactions of the components of the utility fuction, i.e.:

$$\begin{aligned} U_{ij} = \beta_1 ln(C_{ij}) + \beta_2 ln(C_{ij})^2 + \beta_3 ln(Lf_{ij}) + \beta_4 ln(Lf_{ij})^2 + \beta_5 ln(Lm_{ij}) \\ + \beta_6 ln(Lm_{ij})^2 + \beta_7 ln(C_{ij}) ln(Lf_{ij}) + \beta_8 ln(C_{ij}) ln(Lm_{ij}) + \beta_9 ln(Lf_{ij}) ln(Lm_{ij}). \end{aligned} \tag{6}$$

Heterogeneity between households' utility functions is incorporated through taste shifters – observed household characteristics that affect some of the coefficients of the utility function:

$$\begin{aligned} \beta_1 &= \alpha_0^C + X_1' \alpha_1^C \\ \beta_2 &= \alpha_0^{C2} + X_2' \alpha_1^{C2} \\ \beta_3 &= \alpha_0^{Lf} + X_3' \alpha_1^{Lf} \\ \beta_5 &= \alpha_0^{Lm} + X_4' \alpha_1^{Lm}. \\ \beta_9 &= \alpha_0^{LfxLm} + X_5' \alpha_1^{LfxLm}. \end{aligned}$$

X_1, X_2, X_3, X_4, and X_5 contain individual and household characteristics like age, disability indicators, whether the observed person is German citizen, and number and age of children.

The error terms ε_{ij} are assumed to be independently and identically distributed across hour categories and households according to the extreme value type I distribution. As shown in McFadden (1974), the probability that alternative k is chosen by household i is then given by:

$$P_{ik} = Pr(V_{ik} > V_{ij}, \forall j \in 1 \ldots J) = \frac{exp(U_{ik})}{\sum_{j=1}^{J} exp(U_{jk})}. \tag{7}$$

[7] For simulations with counterfactual wages, wages of the employed are predicted as well, see subsection 3.2.

Alternative k is chosen if it implies a higher utility than any other alternative. Changes in net income associated with specific hours points lead to changes in the choice probabilities given by equation 7. These allow for the calculation of labor supply effects of the hypothetical tax and transfer systems or gross wages.

Estimation results and resulting elasticities are reported in the appendix in tables 5 and 6. The uncompensated labor elasticity for women in couples is particularly large and cross-wage elasticities are negligible, in line with common previous findings in the literature summarized, e.g., in Blundell and Macurdy (1999).

3.5 Data

This study is based on the Socio-Economic Panel (SOEP)[8], a yearly representative survey of German households. See Wagner et al. (2007) for further information. It contains about 27,000 observations in each of the examined years 2002 and 2011. The concept of income in this study is yearly equivalent post-government income. Like most surveys the SOEP does not capture the very top of the income distribution. Bach et al. (2009) combine the SOEP with income tax return data to cover the entire distribution of market incomes until the year 2003. They find that the SOEP serves reasonably well to describe the evolution of income inequality as measured with the inequality indices used in this study, while it fails to describe the change of the top-focused entropy index GE(2).

4 Decomposition Results

I show two kinds of marginal effects of wage rate and tax and transfer changes. First, I present ceteris paribus effects of changes in labor market returns and the tax and transfer system, i.e., I keep everything at the 2002 level and change only one factor. Following Biewen and Juhasz (2012), this comes closest to the "effect" of a particular factor. Second, I keep everything at the 2011 level and change only one factor to the 2002 level. This exercise demonstrates what would have happened if wage rates or the tax and transfer system had not changed since 2002 apart from adjustment

[8] Socio-Economic Panel (SOEP), data for years 1984-2012, version 29, SOEP, 2014,doi: 10.5684/soep.v29.

to inflation. I analyze the distribution of yearly personal equivalized net income according to the OECD modified equivalence scale.[9]

4.1 Policy Effect

The solid line in figure 3a shows the static policy effect. It is the difference between the actual estimated Epanechnikov kernel densities of log equivalized net income per year for the population of 2002 and the counterfactual distribution where the tax and transfer system is as in 2011 but work hours remain as in 2002. The dashed line shows total policy effect, i.e., the counterfactual distribution where the tax and transfer system is as in 2011 and labor supply reactions to the tax and transfer changes are simulated.

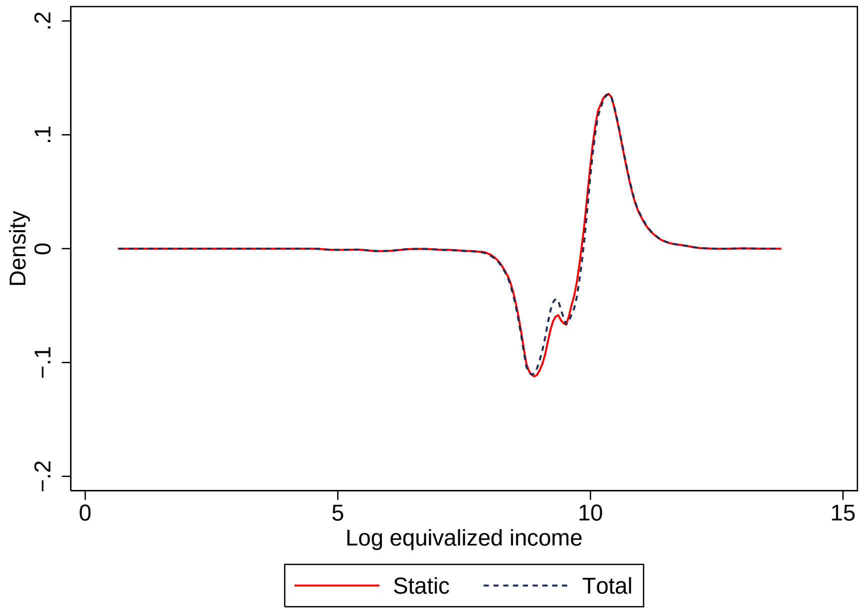
The static effect of policy reforms yields a decrease in density at the bottom of the distribution which is in line with the findings by Biewen and Juhasz (2012). It can be explained with former recipients of Social Assistance receiving the more generous Unemployment Benefit II. Moreover, density at the right of the distribution is increased due to policy reforms – this is likely the effect of tax reductions. Compared to the static counterfactual, labor supply reactions to policy reforms seem to have partly offset the static effect. The density in the middle of the distribution is closer to the status quo.

Figure 3b shows static and behavioral counterfactual distributions using the year 2011 as base and applying the tax and transfer system of 2002. It is the "inverse" of Figure 3a, which displays ex-ante effects of the policy reforms, so the interaction with different populations of 2002 and 2011 does not change the direction of the distributional effects of the policy reforms. Applying the tax and transfer system of 2002 to the population of 2011 leads to an increase in density at the bottom of the distribution due to less generous transfers in 2002. The higher top marginal tax rate of 2002 leads to a decrease in density at the top of the distribution and the labor supply effects are similar to those depicted in Figure 3a. Again, the behavioral adjustments occur in the middle of the income distribution. They lead to an increase in density slightly below the log equivalized net income of 10 and a slight decrease in density at lower parts relative to the solid line. This can be interpreted as the effect of higher labor supply in the 2002 counterfactual compared to the 2011 distribution. The likely cause for this is the decrease in labor supply incentives for low income households due to the increase in the generosity of transfers.

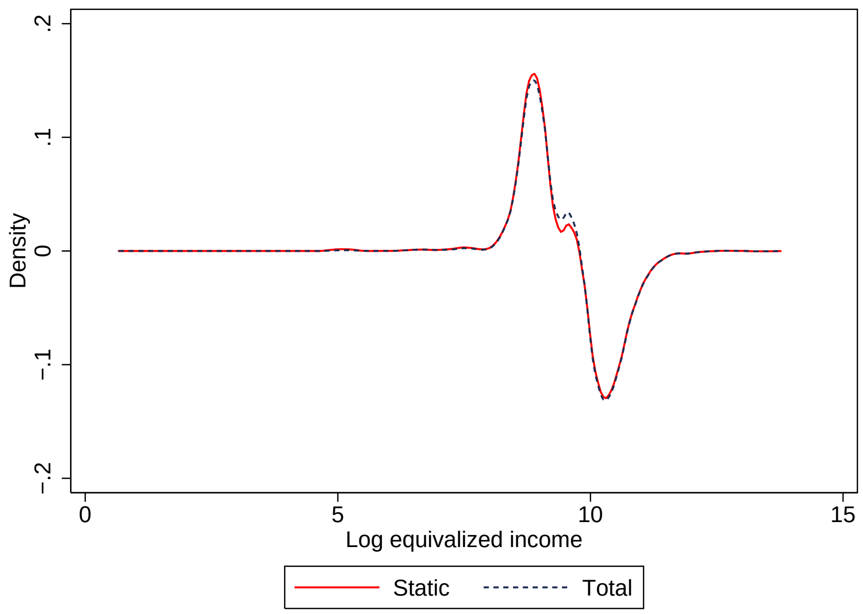
[9] I.e., net household incomes are divided by 1 plus 0.5 for each additional adult and 0.3 for each child under 14 years.

Figure 3: Policy effect

(a) Base: 2002



(b) Base: 2011



Difference between actual distribution in base year and counterfactual distributions applying the other year's tax and transfer system to the base year population (static) and additionally simulating labor supply reactions (total).

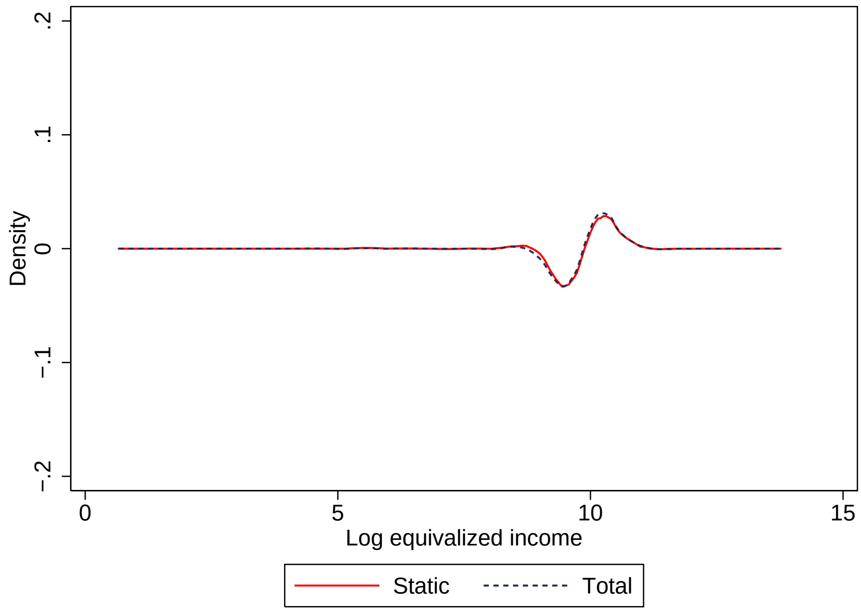
4.2 Wage Effect

Figure 4a shows the difference between the actual log income distribution of 2002 along with counterfactual distributions applying 2011 wage rates with (dashed line) and without (solid line) labor supply reactions to wage changes. Applying the coefficients of the 2011 wage regression to the 2002 population leads to a slight shift of the distribution to the right, the labor supply effect is negligible.

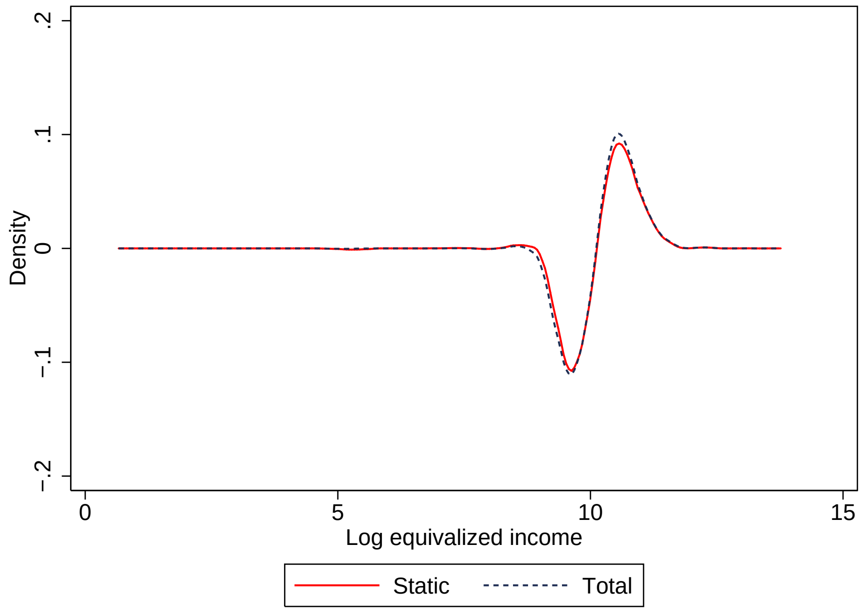
Applying 2002 wage rates to the 2011 population (Figure 4b) also leads to an increase in density at the right and a decrease at the left of the distribution which might be attributable to the higher education premium of 2002 documented in section 2.2. Labor supply effects are small, but the dynamic counterfactual distribution has a slightly higher density in the upper part and lower density at the lower part than the static counterfactual distribution indicating that some former low income households have slightly higher labor supply in the counterfactual.

Figure 4: Wage effect

(a) Base: 2002



(b) Base: 2011



Difference between actual distribution in base year and counterfactual distributions applying the other year's conditional wage rates to the base year population (static) and additionally simulating labor supply reactions (total).

4.3 Summary of Effects

Table 3: Decomposition with base 2002.

Marginal effect		Gini	Theil	MLD	Q90/50
$x_{2002}(y^{2002,2002}_{2002,2002})$	Status quo	28.5***	.144***	.143***	1.82***
		(.32)	(.0051)	(.0038)	(.0203)
$x_{\mathbf{2011}}(y^{2002,2002}_{2002,2002})$	Static tax and transfer	-.4***	0	-.01***	.026***
$-x_{2002}(y^{2002,2002}_{2002,2002})$		(.11)	(.0017)	(.0022)	(.009)
$x_{\mathbf{2011}}(y^{\mathbf{2011},2002}_{2002,2002})$	Total tax and transfer	0	.002	-.008***	.044***
$-x_{2002}(y^{2002,2002}_{2002,2002})$		(.13)	(.0018)	(.0025)	(.0101)
$x_{2002}(y^{2002,2002}_{2002,\mathbf{2011}})$	Static wage	-.4***	-.004***	-.003**	-.021***
$-x_{2002}(y^{2002,2002}_{2002,2002})$		(.09)	(.0012)	(.0013)	(.0099)
$x_{2002}(y^{2002,\mathbf{2011}}_{2002,\mathbf{2011}})$	Total wage	-.3 ***	-.003**	-.002	-.024**
$-x_{2002}(y^{2002,2002}_{2002,2002})$		(.11)	(.0015)	(.0016)	(.0104)
$x_{\mathbf{2011}}(y^{2002,2002}_{2002,\mathbf{2011}})$	Static wage and tax transfer	-1***	-.006***	-.016***	.01
$-x_{2002}(y^{2002,2002}_{2002,2002})$		(.15)	(.0022)	(.0024)	(.0116)
$x_{\mathbf{2011}}(y^{2002,\mathbf{2011}}_{\mathbf{2011},\mathbf{2011}})$	Total wage and tax transfer	-.7***	-.003	-.013***	.030**
$-x_{2002}(y^{2002,2002}_{2002,2002})$		(.16)	(.0023)	(.0027)	(.0126)

$x_a(y^{ce}_{bd})$: household net incomes according to the tax and transfer regulations of period a of gross incomes of the population of period b with wages according to labor market prices of period d with labor supply outcomes given the incentives of the tax and transfer regulations of period c and wages of period e.

Bootstrapped standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3 shows the Gini along with two entropy measures, the Theil index (GE(1)) and the Mean Log Deviation (MLD, GE(0)), as well as the ratio between the 90th and the 50th income percentile (Q90/50) for the year 2002 as well as the difference in inequality between the actual 2002 distribution and the counterfactual distributions depicted in Figure 3a and Figure 4a. Finally, the joint effect of policy and wage changes is reported.

The Gini index, which is sensitive to changes in the middle of the distribution, was 28.5 in 2002 and a ceteris paribus change to the tax and transfer system of 2011 would have reduced it by 0.4. The effect on the MLD, which is more sensitive to changes at the lower end of the distribution, is negative as well (-0.01). In contrast, the effect of policy reforms on the Q90/50 ratio is positive, so part of its increase can be explained with policy reforms. These three effects are highly significant. The Theil index, which puts the same weight on inequality at all parts of the distribution, remains unchanged. The increased generosity of the transfer system has reduced inequality as measured by the MLD and the Gini, but when an equal weight is put on all parts of the distribution (Theil index), this is offset by the inequality increasing effect of tax reductions for high income earners. Lower tax rates have led to an increase in the Q90/50 ratio. The total tax and transfer effect shows that labor supply reactions to policy changes have offset the inequality reducing effect of policy changes as measured through the Gini. As the Gini index is sensitive to changes in the middle of the distribution, it was substantially affected by the labor supply adjustments depicted above in fugure 3. In contrast, labor supply reactions have led to an additional increase in the Q90/50 ratio.

A change in wage rates to 2011 levels with and without behavioral adjustments would have led to slight decreases in all reported inequality indices. Including behavioral effects renders the wage effect on the MLD insignificant. The last two lines show how changes in wage rates and policy changes interact. These effects are negative as measured by the Gini, MLD and Theil index. The point estimates of the total effects are closer to zero than the static effects. In contrast the total effect of policy and wage effects on the Q90/50 ratio is positive (0.03) and statistically significant. Thus, part of the increase in this measure is explained through wage and policy changes.

A comparison of the first line of Table 4, which displays actual and counterfactual inequality measures with the year 2011 as base, with the first line of Table 3 shows the actual increases in the four inequality measures. Note that the signs of the effects in the following lines of Table 4 have the opposite meaning than those of Table 3. For instance, a positive tax and transfer effect with base 2011 means that applying the 2002 tax and transfer system to the 2011 sample increases inequality relative to the status quo in 2011. In other words, policy changes from 2002 to 2011 have led to a *decrease* in income inequality.

Table 4: Decomposition with base 2011.

Marginal Effect		Gini	Theil	MLD	Q90/50
$x_{2011}(y^{2011,2011}_{2011,2011})$	Status quo	29.5***	.168***	.148***	1.93***
		(.49)	(.0136)	(.006)	(.0232)
$x_{\mathbf{2002}}(y^{2011,2011}_{2011,2011}) - x_{2011}(y^{2011,2011}_{2011,2011})$	Static tax and transfer	.3***	-.001	.008***	-.036***
		(.11)	(.003)	(.0018)	(.0091)
$x_{\mathbf{2002}}(y^{\mathbf{2002},2011}_{2011,2011}) - x_{2011}(y^{2011,2011}_{2011,2011})$	Total tax and transfer	.1	-.003	.005**	-.04***
		(.12)	(.003)	(.0022)	(.0094)
$x_{2011}(y^{2011,2011}_{2011,\mathbf{2002}}) - x_{2011}(y^{2011,2011}_{2011,2011})$	Static wage	1***	.009***	.009***	.064***
		(.07)	(.0016)	(.0012)	(.0132)
$x_{2011}(y^{\mathbf{2002},2011}_{2011,\mathbf{2002}}) - x_{2011}(y^{2011,2011}_{2011,2011})$	Total wage	1.1***	.01***	.01***	.066***
		(.1)	(.0023)	(.0014)	(.013)
$x_{\mathbf{2002}}(y^{2011,2011}_{2011,\mathbf{2002}}) - x_{2011}(y^{2011,2011}_{2011,2011})$	Static wage and tax transfer	1.2***	.007*	.016***	.022*
		(.13)	(.0036)	(.0022)	(.0121)
$x_{\mathbf{2002}}(y^{\mathbf{2002},\mathbf{2002}}_{2011,\mathbf{2002}}) - x_{2011}(y^{2011,2011}_{2011,2011})$	Total wage and tax transfer	.9***	.004	.013***	.026**
		(.16)	(.0041)	(.0025)	(.0131)

$x_a(y^{ce}_{bd})$: household net incomes according to the tax and transfer regulations of period a of gross incomes of the population of period b with wages according to labor market prices of period d with labor supply outcomes given the incentives of the tax and transfer regulations of period c and wages of period e.
Bootstrapped standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

While the base year changes the magnitude of the results, the results for the tax and transfer system are qualitatively similar:[10] Changes in the tax and transfer system have led to a decrease in inequality as measured by the Gini index and the MLD, the effect on the Theil is insignificant. In contrast, the effect of policy changes on the Q90/50 ratio is positive and highly significant. When taking labor supply responses into account, the effect on the Gini becomes insignificant.

As is the case for the the decomposition using the year 2002 as base, changes in wage rates from 2002 to 2011 have had a significant decreasing impact on all four indices.

The last two lines of Table 4 show the interaction of policy and wage effects. Similarly to the decomposition with base 2002, the overall effects on the Gini, MLD and Theil imply that wage

[10] It is common that the order of the decomposition has a strong influence on the estimated effect of a single factor on the change in inequality. For instance, Bargain and Callan (2010) decompose the change in inequality in Ireland from 1994 to 2000. When using 1994 as base year, the effect of policy changes on the Gini coefficient is 1.4. When using 2000 as base year, the effect is only 0.7.

and policy changes together have had a negative impact on income inequality. In contrast to the previous decomposition, the total effect on the Q90/50 ratio is inequality decreasing as well as it is dominated by the wage effect, which is stronger in the 2011 decomposition.

Overall, both decompositions, with base 2002 and 2011, show that policy changes from 2002 to 2011 have reduced inequality (Gini index and MLD) and this reduction was partly offset by labor supply reactions. The Q90/50 ratio was increased through policy changes. The effect of wage rate changes on income inequality was negative.

5 Conclusion

This paper suggests a decomposition of changes in inequality into contributions from policy changes, changes in conditional wage rates, and population changes while considering both static and behavioral effects. In the application of the decomposition method to changes in income inequality in Germany from 2002 to 2011, I find that changes in the tax and transfer system have had a small inequality reducing effect on inequality as measured by the Gini and MLD and a negligible effect as measured by the Theil index. This inequality decreasing effect on the Gini was offset by labor supply reactions to the policy reforms. In contrast, tax reductions have increased the ratio between the 90th and the 50th income percentile.

Contrary to the often stipulated skill-biased technological change, the education premium has decreased from 2002 to 2011 for all groups except for East German women. The effect of changes in wage rates on income inequality was significantly negative.

This study confirms findings in Arntz et al. (2007) and Biewen and Juhasz (2012) regarding the distributional effects of the most important reforms of the German tax and transfer system in recent years, which, contrary to common belief, have had an inequality reducing effect. As the policy reforms undertaken in the analyzed time span, an increase in the generosity of the transfer system and a tax reduction, have had a negative impact on the government budget, future research should look at the distributional effects of the funding of these policy measures.

In addition, the decomposition exercise shows that most of the change in inequality cannot be explained with policy and wage rate changes. Other factors that warrant further research include changes in household structure and the distribution of non-labor income (Biewen and Juhasz 2012; Peichl et al. 2012) as well as changes in employment patterns unrelated to changes in wage rates and the tax and transfer system.

6 Appendix

Table 5: Estimation Results for Labor Supply Model 2002.

Variables	Flexible Couples	Women with Inflexible Spouse	Men with Inflexible Spouse	Single Men	Single Women
Log Net Income	-4.541*	-4.728	7.295	1.063	-2.690
	(2.054)	(4.142)	(6.018)	(2.507)	(2.373)
Log Net Income^2	0.575***	0.597***	-0.0702	0.266***	0.285***
	(0.0582)	(0.179)	(0.242)	(0.0787)	(0.0664)
Log Net Income × East	-1.905	-1.030	-4.428	1.799	-1.504
	(1.900)	(7.409)	(7.005)	(1.330)	(2.548)
Log Net Income^2 × East	0.105	-0.0286	0.244	-0.107	0.120
	(0.107)	(0.388)	(0.361)	(0.0894)	(0.158)
Log Net Income × German Female	0.674*	1.762	-0.324		0.531
	(0.273)	(0.935)	(0.341)		(0.405)
Log Leisure Female	128.3***	118.5***			124.0***
	(6.900)	(9.573)			(10.49)
Log Net Income	-0.447*	-1.027***			-0.403
× Log Leisure Female	(0.191)	(0.250)			(0.384)
Log Leisure Female ^{2}	-14.65***	-12.37***			-14.43***
	(0.752)	(1.111)			(1.096)
Log Leisure Female × German Female	-0.331	0.0445			1.118
	(0.345)	(0.640)			(0.621)
Age Female *x* Log Leisure Female	-0.372***	-0.525***			-0.397***
	(0.0621)	(0.0813)			(0.0771)
Age ^{2} × Log Leisure Female	0.00588***	0.00820***			0.00621***
	(0.000746)	(0.000938)			(0.000893)
Log Leisure Female × Disability I	-0.134	-0.274			0.263
	(0.323)	(0.470)			(0.542)
Log Leisure Female × Disability II	1.036	1.086			1.196
	(0.574)	(0.780)			(0.885)
Log Leisure Female × East	-8.175***	-2.578***			0.755
	(1.717)	(0.490)			(0.561)
Log Leisure Female	4.892***	3.897***			5.962***
× Children Under 3 Years	(0.267)	(0.438)			(0.738)
Log Leisure Female	2.426***	2.011***			1.370***
× Children 7 to 16 Years	(0.158)	(0.275)			(0.315)
Log Leisure Female	2.140***	2.238***			2.838***
× Children 4 to 6 Years	(0.225)	(0.409)			(0.493)
Log Leisure Female	0.468**	0.466			0.245
× Children over 17 Years	(0.160)	(0.259)			(0.349)
Female Part Time I	-2.114***	-2.498***			-3.053***
	(0.0793)	(0.130)			(0.183)
Female Part Time II	-2.126***	-2.134***			-2.572***
	(0.0971)	(0.149)			(0.146)

Table continued on next page.

Variables	Flexible Couples	Women with Inflexible Spouse	Men with Inflexible Spouse	Single Men	Single Women
Log Net Income × German Male	-1.459**	-1.161*	-0.253	-0.193	
	(0.475)	(0.488)	(0.867)	(0.410)	
Log Leisure Male × Log Net Income	-0.492**		-1.073**	-1.068**	
	(0.172)		(0.400)	(0.362)	
Log Leisure Male	31.44***		43.65***	38.21***	
	(3.308)		(6.227)	(6.751)	
Log Leisure Male^2	-2.797***		-3.472***	-3.585***	
	(0.182)		(0.398)	(0.529)	
Log Leisure × German Male	-1.086**		-0.694	-1.281	
	(0.406)		(0.763)	(0.769)	
Log Leisure Male × Age Male	-0.231***		-0.315***	0.0216	
	(0.0469)		(0.0782)	(0.0787)	
Log Leisure Male × Age Male^2	0.00326***		0.00402***	0.000518	
	(0.000529)		(0.000868)	(0.000913)	
Log Leisure Male × Disability I	0.792***		0.973*	0.312	
	(0.237)		(0.489)	(0.529)	
Log Leisure Male × Disability II	1.537***		3.493***	1.721*	
	(0.409)		(1.032)	(0.683)	
Log Leisure Male × East	-6.092***		1.041	0.660	
	(1.815)		(0.533)	(0.549)	
Male Over Time	-1.683***		-1.307***	-1.522***	
	(0.0800)		(0.164)	(0.202)	
Male Part Time	-2.803***		-2.463***	-2.428***	
	(0.112)		(0.199)	(0.195)	
Log Leisure Male × Log Leisure Female	-0.118				
× German Male	(0.103)				
Log Leisure Male × Log Leisure Female	0.137				
	(0.288)				
Log Leisure Male × Log Leisure Female	1.648***				
quad × East	(0.456)				
Observations	117395	10031	4130	3960	6854
$PseudoR^2$	0.29	0.27	0.35	0.41	0.28
$Log-Likelihood$	-9498	-2189	-871	-754	-1474
Uncompensated own-wage elasticities					
Male	0.15		0.12	0.24	
Female	0.27	0.57			0.23
Uncompensated cross-wage elasticities					
Male	-0.03		0.00		
Female	-0.01	-0.00			

Source: Source: Own calculations based on the SOEP and a modified version of the STSM.

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Estimation Results for Labor Supply Model 2011.

Variables	Flexible Couples	Women with Inflexible Spouse	Men with Inflexible Spouse	Single Men	Single Women
Log Net Income	6.056**	-20.63**	-5.577	0.996	0.697
	(2.126)	(6.515)	(5.947)	(2.681)	(2.729)
Log Net Income^2	0.239***	1.101***	0.365	0.254**	0.258***
	(0.0517)	(0.269)	(0.221)	(0.0776)	(0.0704)
Log Net Income × East	-1.908	-10.53	-1.301	-0.893	-2.260
	(1.582)	(10.23)	(9.729)	(1.766)	(2.025)
Log Net Income)^2 × East	0.126	0.540	0.0750	0.0770	0.145
	(0.0928)	(0.515)	(0.502)	(0.116)	(0.125)
Log Net Income × German Female	0.355	0.662	-0.260		-1.440
	(0.486)	(1.140)	(0.388)		(1.111)
Log Leisure Female	118.1***	107.3***			121.1***
	(7.369)	(9.449)			(9.709)
Log Net Income × Log Leisure Female	-0.975***	-0.0934			-0.616
	(0.217)	(0.315)			(0.357)
Log Leisure Female ^{2}	-12.67***	-11.96***			-13.47***
	(0.777)	(1.051)			(0.992)
Log Leisure Female × German Female	-0.543	-1.041			-2.504*
	(0.411)	(0.691)			(1.021)
Age Female *x* Log Leisure Female	-0.209**	-0.593***			-0.324***
	(0.0717)	(0.0839)			(0.0719)
Age ^{2} Female *x* Log Leisure Female	0.00384***	0.00840***			0.00499***
	(0.000832)	(0.000934)			(0.000812)
Log Leisure Female × Disability I	0.155	0.968*			0.910*
	(0.347)	(0.444)			(0.409)
Log Leisure Female × Disability I	0.689	1.665*			1.363*
	(0.669)	(0.811)			(0.615)
Log Leisure Female × East	-12.85***	-1.519**			0.0807
	(2.214)	(0.464)			(0.459)
Log Leisure Female × Children Under 3 Years	4.763***	4.267***			5.033***
	(0.301)	(0.423)			(0.733)
Log Leisure Female × Children 7 to 16 Years	2.005***	1.948***			1.949***
	(0.189)	(0.283)			(0.279)
Log Leisure Female × Children 4 to 6 Years	2.207***	2.328***			2.288***
	(0.272)	(0.437)			(0.498)
Log Leisure Female × Children over 17 Years	0.969***	0.702**			0.189
	(0.191)	(0.269)			(0.299)
Female Part Time I1	-1.614***	-2.070***			-2.888***
	(0.0857)	(0.123)			(0.160)
Female Part Time II	-1.605***	-1.778***			-2.279***
	(0.102)	(0.140)			(0.131)

Table continued on next page.

Variables	Flexible Couples	Women with Inflexible Spouse	Men with Inflexible Spouse	Single Men	Single Women
Log Net Income × German Male	0.650	-0.570	1.872	0.436	
	(0.693)	(0.388)	(1.939)	(0.602)	
Log Leisure Male × Log Net Income	-1.397***		-0.652	-1.143**	
	(0.218)		(0.420)	(0.391)	
Log Leisure Male	57.74***		37.55***	30.19***	
	(4.205)		(6.469)	(6.835)	
Log Leisure Male^2	-4.360***		-3.589***	-2.809***	
	(0.236)		(0.393)	(0.476)	
Log Leisure × German Male	-0.158		0.472	1.418	
	(0.515)		(1.094)	(0.853)	
Log Leisure Male × Age Male	-0.334***		-0.285**	0.0455	
	(0.0632)		(0.0933)	(0.0746)	
Log Leisure Male × Age Male^2	0.00431***		0.00369***	-0.0000668	
	(0.000695)		(0.00104)	(0.000880)	
Log Leisure Male × Disability I	0.750**		1.489***	1.398***	
	(0.270)		(0.431)	(0.422)	
Log Leisure Male × Disability II	1.488**		2.131*	1.487*	
	(0.516)		(0.902)	(0.597)	
Log Leisure Male × East	-11.19***		0.275	1.005*	
	(2.349)		(0.590)	(0.493)	
Male Over Time	-1.647***		-1.535***	-1.805***	
	(0.0928)		(0.165)	(0.193)	
Male Part Time	-2.592***		-2.247***	-2.405***	
	(0.124)		(0.216)	(0.185)	
Log Leisure Male × Log Leisure Female × German Male	-0.0430				
	(0.127)				
Log Leisure Male × Log Leisure Female	-0.936**				
	(0.360)				
Log Leisure Male × Log Leisure Female quad × East	2.927***				
	(0.580)				
Observations	87236	9690	3749	4212	8090
$Log-Likelihood$	-7180	-2349	-782	-847	-1910
$PseudoR^2$	0.27	0.19	0.35	0.38	0.21
Uncompensated own-wage elasticities					
Male	0.11		0.05	0.30	
Female	0.28	0.04			0.11
Uncompensated cross-wage elasticities					
Male	0.01		0.00		
Female	-0.03	-0.01			

Source: Source: Own calculations based on the SOEP and a modified version of the STSM.

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

References

ARNTZ, M. ET AL. (2007): "Arbeitsangebotseffekte und Verteilungswirkungen der Hartz-IV-Reform," IAB-Forschungsbericht 200710, Institut fur Arbeitsmarkt- und Berufsforschung (IAB), Nurnberg [Institute for Employment Research, Nuremberg, Germany]. Cited on pages 3 and 21.

BACH, S., G. CORNEO, AND V. STEINER (2009): "From Bottom to Top: The Entire Income Distribution in Germany, 1992-2003," *Review of Income and Wealth*, 55(2), 303–330. Cited on page 13.

BARGAIN, O. (2012a): "Decomposition Analysis of Distributive Policies Using Behavioural Simulations," *International Tax and Public Finance*, 19(5), 708–731. Cited on page 2.

——— (2012b): "The Distributional Effects of Tax-benefit Policies under New Labour: A Decomposition Approach," *Oxford Bulletin of Economics and Statistics*, 74(6), 856–874. Cited on page 2.

BARGAIN, O., AND T. CALLAN (2010): "Analysing the Effects of Tax-Benefit Reforms on Income Distribution: A Decomposition Approach," *Journal of Economic Inequality*, 8(1), 1–21. Cited on pages 2 and 20.

BARGAIN, O., T. CALLAN, K. DOORLEY, AND C. KEANE (2013): "Changes in Income Distributions and the Role of Tax-Benefit Policy During the Great Recession: An International Perspective," IZA Discussion Papers 7737, Institute for the Study of Labor (IZA). Cited on pages 2 and 3.

BARGAIN, O. ET AL. (2015): "Tax Policy and Income Inequality in the United States 1979-2007," *Economic Inquiry*, 53(2), 1061–1085. Cited on page 2.

BIEWEN, M., AND A. JUHASZ (2012): "Understanding Rising Income Inequality in Germany, 1999/2000-2005/2006," *Review of Income and Wealth*, 58(4), 622–647. Cited on pages 3, 5, 7, 13, and 21.

BLINDER, A. S. (1973): "Wage Discrimination: Reduced Form and Structural Estimates," *Journal of Human Resources*, 8(4), 436–455. Cited on page 2.

BLUNDELL, R., AND T. MACURDY (1999): "Labor Supply: A Review of Alternative Approaches," in *Handbook of Labor Economics*, ed. by O. Ashenfelter, and D. Card, vol. 3 of *Handbook of Labor Economics*, chap. 27, 1559–1695. Elsevier. Cited on page 13.

BOURGUIGNON, F., AND F. FERREIRA (2004): "Decomposing Changes in the Distribution of Household Incomes: Methodological Aspects," in *The Microeconomics of Income Distribution Dynamics in East Asia and Latin America*, ed. by F. Bourguignon, F. Ferreira, and N. Lustig, 17–46. The World Bank and Oxford University Press, Washington, DC. Cited on page 8.

BOURGUIGNON, F., F. FERREIRA, AND P. LEITE (2008): "Beyond Oaxaca-Blinder: Accounting for Differences in Household Income Distributions," *Journal of Economic Inequality*, 6(2), 117–148. Cited on pages 2 and 8.

BREWER, M., AND L. WREN-LEWIS (2015): "Accounting for Changes in Income Inequality: Decomposition Analyses for the UK, 1978-2008," *Oxford Bulletin of Economics and Statistics*, n/a–n/a. Cited on page 3.

BRUCKMEIER, K., AND D. SCHNITZLEIN (2007): "Was wurde aus den Arbeitslosenhilfeempfängern? Eine Empirische Analyse des übergangs und Verbleibs von Arbeitslosenhilfeempfängern nach der Hartz-IV-Reform," IAB Discussion Paper 200724, Institut für Arbeitsmarkt- und Berufsforschung (IAB), Nürnberg [Institute for Employment Research, Nuremberg, Germany]. Cited on page 5.

CREEDY, J., AND N. HERAULT (2011): "Decomposing Inequality and Social Welfare Changes: The Use of Alternative Welfare Metrics," Melbourne Institute Working Paper Series 1121, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne. Cited on page 2.

DINARDO, J., N. M. FORTIN, AND T. LEMIEUX (1996): "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach," *Econometrica*, 64(5), 1001–44. Cited on page 3.

DUSTMANN, C., J. LUDSTECK, AND U. SCHONBERG (2009): "Revisiting the German Wage Structure," *The Quarterly Journal of Economics*, 124(2), 843–881. Cited on page 6.

Fuchs-Schuendeln, N., D. Krueger, and M. Sommer (2010): “Inequality Trends for Germany in the Last Two Decades: A Tale of Two Countries,” *Review of Economic Dynamics*, 13(1), 103–132. Cited on page 6.

Heckman, J. J. (1979): “Sample Selection Bias as a Specification Error,” *Econometrica*, 47(1), 153–161. Cited on page 8.

Herault, N., and F. Azpitarte (2016): “Understanding Changes in the Distribution and Redistribution of Income: A Unifying Decomposition Framework,” *Review of Income and Wealth*, 62(2), 266–282. Cited on pages 2 and 3.

Jessen, R., D. Rostam-Afschar, and V. Steiner (2016): “Getting the Poor to Work: Three Welfare Increasing Reforms for a Busy Germany,” *FinanzArchiv / Public Finance Analysis*, forthcoming. Cited on page 11.

McFadden, D. (1974): “Conditional Logit Analysis of Qualitative Choice Behavior,” in *Frontiers in Econometrics*, ed. by P. Zarembka, 105–142. Academic Press, New York. Cited on page 12.

Oaxaca, R. (1973): “Male-Female Wage Differentials in Urban Labor Markets,” *International Economic Review*, 14(3), 693–709. Cited on page 2.

Peichl, A., N. Pestel, and H. Schneider (2012): “Does Size Matter? The Impact Of Changes In Household Structure On Income Distribution In Germany,” *Review of Income and Wealth*, 58(1), 118–141. Cited on pages 3 and 21.

Steiner, V., K. Wrohlich, P. Haan, and J. Geyer (2012): “Documentation of the Tax-Benefit Microsimulation Model STSM: Version 2012,” Data Documentation 63, DIW Berlin, German Institute for Economic Research. Cited on page 11.

van Soest, A. (1995): “Structural Models of Family Labor Supply: A Discrete Choice Approach,” *Journal of Human Resources*, 30(1), 63–88. Cited on page 11.

Wagner, G. G., J. R. Frick, and J. Schupp (2007): “The German Socio-Economic Panel Study (SOEP): scope, evolution and enhancements,” *Schmollers Jahr.*, 127(1), 139–169. Cited on page 13.