

Optimal Taxation Under Different Concepts of Justness*

Robin Jessen[†]
Maria Metzging[‡]
Davud Rostam-Afschar[§]

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Abstract

A common assumption in the optimal taxation literature is that the social planner maximizes a welfarist social welfare function with weights decreasing with income. However, high transfer withdrawal rates in many countries imply very low weights for the working poor in practice. We reconcile this puzzle by extending the optimal taxation framework by [Saez \(2002\)](#) to allow for alternatives to welfarism. In an exercise of positive optimal taxation, we calculate weights of a social planner's function as implied by the German tax and transfer system based on the concepts of welfarism and alternative principles, where the social planner minimizes the weighted sum of increasing functions of absolute or relative tax burdens. This reflects the idea that the total tax liabilities of specific groups matter for the design of the tax system and very high tax liabilities should be avoided per se. While this point is often made in public debates, it does not follow from welfarist considerations. We find that the *absolute tax burden principle* is in line with social weights that decline with net income. Moreover, we illustrate how the model can be used with survey data using a novel question from the German Socio-Economic Panel on perceived just net income.

Keywords Justness · Optimal Taxation · Income Redistribution · Inequality · Subjective Preferences

JEL Classification D63 · D60 · H21 · H23 · I38

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[†]RWI, Invalidenstr. 112, 10115 Berlin, Germany (e-mail: Robin.Jessen@rwi-essen.de).

[‡]DIW Berlin, Mohrenstr. 58, 10117 Berlin, Germany (e-mail: mmetzing@diw.de).

[§]Freie Universität Berlin, Department of Economics, and Universität Hohenheim, Department of Economics, 70593 Stuttgart, Germany (e-mail: davud.rostam-afschar@uni-hohenheim.de).

1 Introduction

Fairness of taxation of incomes and redistribution is a controversial public policy issue, since different concepts of justness may lead to different optimal tax schedules. In fact, the political process may have compromised on a tax policy that respects criteria that cannot be captured by assuming a social planner who weights utility functions. Therefore, we reconcile observed tax transfer practices with an adjusted optimal taxation model allowing for different concepts of justness. More specifically, in an exercise of positive optimal taxation we take the tax and transfer system as given and assume policy makers optimized it under a specific concept of justness taking into account how individuals react to tax changes. We specify three alternative concepts of justness to obtain social weights implied by the tax and transfer system and use two criteria in order to determine, which of the concepts policy makers might have had in mind when designing the tax and transfer system. The first criterion is pareto-efficiency. Even if the government does not explicitly maximize welfare, if some of the weights appear to be negative, then the tax schedule is not second-best Pareto efficient. The second is vertical equity implying that social weights decrease with income as usually assumed in the standard approach in the welfarist optimal taxation literature (e.g., [Saez 2001, 2002](#); [Blundell et al. 2009](#)). Under the welfarist assumption, decreasing weights lie within the bounds confined by the two extreme cases of Rawlsian and Benthamite objective functions. Intuitively, the hypothesis of decreasing welfarist weights expresses the idea that the social planner values an increase of net income of the poor by one Euro more than an increase of net income of higher income groups by one Euro. [Saez and Stantcheva \(2016\)](#) describe welfarism with decreasing weights as one of their two polar cases of interest. In contrast, tax transfer systems in many countries are only optimal if the social planner had chosen social welfare weights in a non-decreasing way. As we show, a major reason for this lies in high transfer withdrawal rates for the working poor.¹ However, tax-transfer systems with high transfer withdrawal rates for the working poor may be optimal and imply decreasing weights under a concept of justness different from the welfarism.

The first main contribution of our paper is an extension of the [Saez \(2002\)](#) model to non-welfarist aims of the social planner. In a recent study, [Saez and Stantcheva \(2016\)](#) propose gen-

¹[Lockwood \(2016\)](#) shows that under present bias and with job search, optimal marginal tax rates are even lower than conventionally calculated. This might be especially relevant for marginal tax rates for the working poor.

eralized marginal welfare weights that may depend on characteristics that do not enter utility.² In our approach, the social planner maximizes an objective function that allows for non-welfarist concepts of justness. In particular, we define the implicit weights of the social welfare function in terms of justness functions instead of utility functions. These functions impose a penalty on deviations of net income from a specific reference point. This implies that even though individuals maximize utility, the social planner does not necessarily maximize a weighted sum of utility but a function potentially including other criteria. The approach in our paper offers the advantage that we can directly quantify the value the social planner puts on a marginal improvement in a specific justness criterion for a given group compared to other groups. Thus, we can show which criterion is in line with social weights that decrease with income.

The second main contribution is the operationalization of an alternative specific idea of justness, which we label the tax burden approach. According to this approach the social planner minimizes the weighted sum of increasing functions of (absolute or relative) tax liabilities. In other words, taxes for groups that have a high tax liability may only be further increased, *ceteris paribus*, if the social planner attributes a low social weight to this group. This formalizes ideas that are often expressed in public debates over tax reforms. Under the welfarist approach the marginal utility of consumption of an individual is traded off against the efficiency costs of taxing. Instead of focusing on this equity-efficiency trade-off, public debates are often dominated by ideas that refer to the magnitude of the tax liability. Opponents of tax increases argue that specific income groups already contribute their "fair share" of taxes and thus their tax liability should not increase further (even if the efficiency loss and loss in utility of such a tax increase might be low). Equivalently, proponents of tax increases often argue that specific groups do not pay their "fair share" of taxes. Therefore, the tax burden principle is very close to the libertarian concept studied in [Saez and Stantcheva \(2016\)](#).³

The related equal sacrifice principle (see [Mill 1871](#); [Musgrave and Musgrave 1973](#); [Richter 1983](#); [Young 1988](#)) is also based on the magnitude of the tax liability. It stipulates that all individuals should suffer the same 'sacrifice' through taxes in terms of utility. I.e., the difference in utility derived from gross income and utility derived from net income should be the same for all

²Similar to [Saez and Stantcheva \(2016\)](#), we take society's preferences as given and do not analyze how they could arise through the political process.

³[Saez and Stantcheva \(2016\)](#) allow for *welfarist* weights to increase with the amount of taxes paid. Thus decreasing taxes for those with a high tax burden is a high priority for the social planner.

individuals. Instead, the tax burden principle puts a penalty on high tax liabilities. This penalty is weighted according to the weight the social planner attaches to different income groups. [Berliant and Gouveia \(1993\)](#) show that incentive compatible equal sacrifice tax systems exist. [da Costa and Pereira \(2014\)](#) derive tax schedules that imply equal sacrifice and show that they inhibit inefficiencies for relatively high levels of government consumption as tax rates for high income earners become very large. In contrast, in our application the social planner considers the trade-off between loss in tax revenue due to mobility across income groups and the maximization of justness functions for groups with a positive social weight. Evidence that the equal sacrifice concept is likely to capture the preferences of a majority is only documented for the U.S: [Weinzierl \(2014\)](#) shows in a survey that around 60 percent preferred the equal sacrifice tax schedule to a welfarist optimal tax schedule.

The third main contribution is to illustrate how the model can be used with survey data. For this, we use a novel question on the just amount of income from the German Socio-Economic Panel and apply the model to the 2015 German tax and transfer system. In addition, we estimate labor supply elasticities using microsimulation and a structural labor supply model (e.g. [Aaberge and Colombino 2014](#)). Our study thus adds to the literature on empirical optimal taxation (e.g., [Aaberge et al. 2000](#); [Colombino and del Boca 1990](#)).

Our main result is that the tax burden principle is in line with positive, declining social weights. The explanation for this finding is that the marginal gain in justness increases with the amount of taxes paid and the working poor pay only a low amount of taxes. Although the efficiency costs of redistributing one Euro to this group are relatively small, the reduction in the loss function is small too. In contrast, the weighted increase in utility is high in the welfarist case. A second finding is a confirmation of previous studies: the welfarist approach implies very low weights for the working poor under the 2015 German tax and transfer system.

In the previous literature, researchers used optimal income taxation frameworks that incorporate labor supply responses to obtain “tax-benefit revealed social preferences” ([Bourguignon and Spadaro 2012](#)), i.e., they calculate the social weights under which the current tax and transfer system is optimal. [Blundell et al. \(2009\)](#) apply the [Saez \(2002\)](#) framework to single mothers in Germany and the UK to calculate implied social weights. They find that working mothers with low incomes have low weights compared to the unemployed and most other income groups. For Germany, social weights for working poor single mothers with children under school-age can even become negative, thus implying a non-paretian social welfare function.

[Bourguignon and Spadaro \(2012\)](#) apply positive optimal taxation to the French redistribution

system. They find negative social weights for the highest income earners and equally for the working poor if participation elasticities are high. In general, social weights for the working poor are much lower than those for the unemployed or the middle class. [Bargain et al. \(2014\)](#) calculate social weights for 17 European countries and the United States. For all analyzed countries, they find the highest social weights for the unemployed and substantially lower weights for the working poor, i.e., the group with the lowest net income apart from the unemployed. In Belgium, France, Germany, the Netherlands, Portugal, the UK, and Sweden the tax-transfer system implies the lowest social weights for this group.

[Lockwood and Weinzierl \(2016\)](#) perform inverse optimal taxation for the US from 1979 to 2010. They find that, if the standard welfarist model is correct, either perceived elasticities of taxable income or value judgments have changed considerably over time. This is interpreted as evidence that conventional assumptions of the benchmark model of optimal taxation should be questioned. [Immervoll et al. \(2007\)](#) find for several European countries that expanding redistribution to the working poor would be very cost effective and would virtually imply no deadweight burden.

The next section introduces our optimal taxation model for different concepts of justness, Section 3 describes how we calculate actual and just incomes as well as how we estimate extensive and intensive labor supply elasticities for Germany. In Section 4, we describe the resulting weights for different concepts of justness, while Section 5 concludes.

2 A Model of Optimal Taxation for Concepts of Justness

2.1 The General Framework

We adjust the canonical model by [Saez \(2002\)](#), which combines the pioneering work by [Mirrlees \(1971\)](#) and [Diamond \(1980\)](#), to capture non-welfarist objective functions. See Appendix A for a formal derivation. The key difference between [Saez \(2002\)](#) model and our extension is that in [Saez \(2002\)](#) the social planner maximizes the weighted sum of utility. The main advantage of our approach is that we allow for the social planner to maximize the weighted sum of ‘justness functions’ F_m . These functions can depend on various variables and incorporate different concepts of justness. We show that welfarism as in [Saez \(2002\)](#) is a special case.

Net income equals consumption and is given by $c = y - T$, where y denotes gross income and T denotes total taxes paid by the individual to finance a public good G .

The social planner chooses tax liabilities T to optimize a weighted sum L based on individual justness functions F_m . We describe this function in Subsection 2.2 in more detail. For now it is sufficient to know that it may depend on c_{i^*} , for instance it could be $F_m(c_{i^*}, c_i^{\text{ref}})$, where c_{i^*} is optimal consumption and c_i^{ref} is a reference point, or on other factors even if they do not enter the utility function of individuals. Individuals are indexed by $m \in M$ with measure $d\nu(m)$, where M is a set of measure one. Individuals' utility, $u_m(c_{i^*}, i^*)$, depends on job choice i^* and net income c_{i^*} , where $i = 0, \dots, I$ income groups are defined through the group's gross income y_i .⁴ The optimization is subject to the government budget constraint:

$$\max_{T_0, \dots, T_I} L = \int_M \mu_m F_m d\nu(m) \quad \text{s.t.} \quad \sum_{i=0}^I h_i T_i = G, \quad (1)$$

where μ_m are primitive social weights.⁵ Together with the Lagrange multiplier λ , they define the explicit weights $e_m \equiv \frac{\mu_m}{\lambda}$. Each income group has the share h_i of the total population. These shares are endogenous as individuals adjust their labor supply to the tax-transfer system. We assume that the first derivative of F_m with respect to c_i is the same for all individuals in a given group i , i.e.,

$$f_i = f_m \equiv \frac{\partial F_m}{\partial c_i} \quad \text{for all individuals } m \text{ in group } i. \quad (2)$$

Average explicit social weights in a given income group are defined as:

$$e_i = \frac{1}{\lambda h_i} \int_{M_i} \mu^m d\nu(m). \quad (3)$$

The ratio of explicit weights of two groups has an intuitive interpretation; it indicates how much the social planner values improving the justness function by one unit for one group relative to doing so for another group. As is common in the literature, for the welfarist case, where $F_m = u_m$, we focus on implicit social weights defined by

$$g_i \equiv \frac{1}{\lambda h_i} \int_{M_i} \mu^m f_m d\nu(m), \quad (4)$$

⁴The number of income groups is assumed to be fixed. In the empirical application, we define groups $1, \dots, I$ as quintiles of the positive gross income distribution. [Bargain et al. \(2014\)](#) show that changing the cut-off points does not affect the results substantially.

⁵Positive values of μ_m imply that the social planner aims at 'improving' F_m .

i.e., the sum of marginal utilities of consumption weighted by the explicit social weights. This approach offers the advantage to remain agnostic about utility functions. The interpretation of the ratio of implicit social weights of two groups is similar to that of explicit weights; it denotes how much the social planner values increasing disposable income of individuals in one group by one Euro relative to doing so for individuals in another group.

We calculate *relative* explicit social weights e_i/e_0 for non-welfarist concepts of justness and relative implicit social weights g_i/g_0 for the welfarist case as in [Blundell et al. \(2009\)](#).

We consider the benchmark case with no income effects, where $\sum_{i=0}^I \partial h_j / \partial c_i = 0$ following [Saez \(2002\)](#). Summing the first order conditions (equation (19) in the appendix) over all $i = 0, \dots, I$ we obtain the normalization of weights such that:

$$\sum_{i=0}^I h_i e_i f_i = 1. \quad (5)$$

Following [Saez \(2002\)](#), we assume that labor supply adjustment is restricted to intensive changes to “neighbor” income groups and extensive changes out of or into the labor force. Thus h_i depends only on differences in after-tax income between “neighbor groups” ($c_{i+1} - c_i$, $c_i - c_{i-1}$) and differences between group i and the non-working group ($c_i - c_0$). The intensive mobility elasticity is

$$\zeta_i = \frac{c_i - c_{i-1}}{h_i} \frac{\partial h_i}{\partial (c_i - c_{i-1})} \quad (6)$$

and the extensive elasticity is given by

$$\eta_i = \frac{c_i - c_0}{h_i} \frac{\partial h_i}{\partial (c_i - c_0)}. \quad (7)$$

The main result is that the optimal tax formula for group i expressed in terms of the participation elasticities η_j and the intensive elasticity ζ_i is

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i h_i} \sum_{j=i}^I \left[1 - e_j f_j - \eta_j \frac{T_j - T_0}{c_j - c_0} \right] h_j. \quad (8)$$

The intuition of this can be seen by considering an increase of the same amount dT in all T_j for income groups $j = i, i+1, \dots, I$. A small increase in taxes mechanically increases tax revenues but induces individuals to move to a lower income class or to unemployment, which reduces tax revenues. After multiplying equation (8) with $dT \zeta_i h_i$, the left hand side shows the amount by

which tax revenue is reduced due to individuals switching from job i to $i - 1$.⁶ At the optimum, this must equal the mechanical tax gains, which are valued at $[\sum_{j=i}^I (1 - e_j f_j) h_j] dT$, minus tax losses due to individuals moving to group 0, $-dT \sum_{j=i}^I \eta_j h_j \frac{T_j - T_0}{c_j - c_0}$.⁷

The difference to the standard model in [Saez \(2002\)](#) is that we replace the implicit weights g_i with $e_i f_i$. This implies that even though individuals maximize utility, the social planner does not necessarily maximize a weighted sum of utility but a function potentially including other criteria. The optimal tax schedule in [Saez \(2002\)](#) depends on elasticities and weights g_i , whereas in the adjusted model, it additionally depend on the derivative of the justness function f_i .

The system of equations defining the optimal tax schedule consists of equation (5) and I equations like (8). In our application, we use the 2015 German tax system, i.e. we calculate the actual tax liability T_i of each income group, and solve for e_0, \dots, e_I . Alternatively, one could assume social weights and calculate the optimal tax schedule that maximizes equation (1) (as done in [Appendix C](#)).

2.2 Operationalization of Justness Concepts

The key advantage of our approach is that the justness function can be defined very generally, thus allowing us to capture a broader set of concepts of justness than the standard approach. In principle, the function can depend on individual and aggregate variables. The variables included in the justness function determine the dimensions along which the social planner considers a redistribution to be just. These variables do not need to be included in the utility function. For instance, utility is defined on after-tax income c_i and the choice of income group i in the standard welfarist approach. Our approach allows considering non-welfarist concepts of justness that rely, e.g., on before-government income y_i .

Our approach nests the welfarist approach, where the justness function equals individual utility, i.e. $F_m = u_m$. Individuals maximize a utility function of the form

$$u_m(c_i, i) = v(c_i - l_m(i)) \tag{9}$$

⁶Due to the assumption of no income effects and because the differences in net income between groups $i, i + 1, \dots, I$ are unchanged, groups $i + 1, i + 2, \dots, I$ will only adjust at the extensive margin.

⁷At the optimum, individual m moving into different jobs due to a slight tax increase does not impact the objective function if the change in μ_m offsets the difference in the justness function between the two groups. In the welfarist case, where the envelope theorem applies, this implies that μ_m does not change, when a marginal individual changes job.

with $v'(\cdot) > 0, v''(\cdot) \leq 0, l'(\cdot) > 0, l''(\cdot) > 0$ and where $l_m(i)$ denotes the disutility of work in income group i .⁸ This functional form rules out income effects.

We only require the first derivative of F_m with respect to c_m to be identical for all individuals in an income group. Nonetheless, for simplification, we specify the function F_m itself as F_i , i.e. to be identical for all members of income group i . By introducing this general justness function F_i , we may operationalize other moral judgments that depend directly on variables that do not enter the utility function as in the concept of *absolute tax burden*. We operationalize two ideas of justness that are based on increasing functions of the tax liability: Minimum absolute tax burden based on the absolute tax liability and minimum relative tax burden based on the tax liability relative to the net income. The justness function depends on $F_i(c_i^*, c_i^{\text{ref}})$, where c_i^* is net income at optimally chosen labor supply and c_i^{ref} is a reference point. With $c_i^{\text{ref}} = y_i$, F_i is a function of the tax burden, i.e., the difference between actual net income and gross income.⁹ This loss function is the justness function associated with the tax burden.

In the case of *absolute* tax burden the loss that captures deviations of c_i^* from gross income y_i is determined by the parameters γ and δ :¹⁰

$$\begin{aligned} F_i &= -(y_i - c_i^*)^\gamma \text{ if } y_i \geq c_i^*, \\ F_i &= (c_i^* - y_i)^\delta \text{ if } c_i^* > y_i, \\ \gamma &> 1, \delta \leq 1. \end{aligned} \tag{10}$$

The first line gives the penalty of paid taxes. $\gamma > 1$ implies that the penalty increases more than proportionally with the amount of taxes paid. This formalizes the idea that the social planner dislikes the idea of taxes for those who already have a high tax liability. The second line captures the gains of individuals who receive transfers. If δ is smaller than one, the marginal benefits of transfers are decreasing. With positive e_i , the social planner never chooses points on the right

⁸ $\log(c_i - l_m(i))$ and the quasilinear utility function $c_i - l_m(i)$ are special cases. In the latter case relative explicit welfare weights equal relative implicit welfare weights, i.e., $\frac{g_i}{g_0} = \frac{e_i}{e_0} \frac{\partial u(c_i^*, i^*) / \partial c_i}{\partial u(c_0^*, 0^*) / \partial c_0} = \frac{e_i}{e_0}$.

⁹In the case of quasi-linear preferences, the difference between gross income and net income equals the difference in utility for these two magnitudes of income. The tax burden can then be interpreted as utility loss of taxation or sacrifice

¹⁰We leave for future research empirical identification of penalty functions. Note however, that this is only possible if the social weights are known.

hand side of the Laffer curve (which are not Pareto optimal).¹¹ This justness function respects two properties. First, losses due to negative deviations from zero taxation, i.e., from positive tax liabilities, increase more than proportionally with the size of the deviation. Second, positive deviations, i.e., transfers, of the same size do not offset these losses.¹² It is important to understand that the social welfare weights are the parameters to be estimated, not γ and δ . The choice of these parameters determines the loss function analogously to the decision of an econometrician whether to use a loss function on residuals leading to least squares regression or to least absolute deviations regression. In our main application, we set γ to two and δ to one. The latter parameter affects mainly the unemployed, the only group that receives net transfers in our application and thus has a ‘positive tax burden’. The aim of this paper is to show which concepts of justness are in line with declining social weights under a reasonable calibration. See Subsection 4.3 for variations of δ and γ .

Similarly, we also consider the *relative* tax burden where the function includes deviations of consumption c_i from gross income y_i relative to the level of consumption such that

$$\begin{aligned}
 F_i &= - \left(\frac{y_i - c_i^*}{y_i} \right)^\gamma \quad \text{if } y_i \geq c_i^*, \\
 F_i &= \left(\frac{c_i^* - y_i}{y_i} \right)^\delta \quad \text{if } c_i^* > y_i > 0, \\
 &\quad \gamma > 1, \delta \leq 1.
 \end{aligned}
 \tag{11}$$

In this case the social planner dislikes large tax payments relative to the level of consumption, i.e., *ceteris paribus*, at the optimum groups with a higher net income pay more taxes than groups with a lower income. Note that equation (11) does not include a definition of the function for $y_i = 0$. Although we are interested in the relative relations of the weights of the groups with positive gross income, with the relative tax burden specification, we need to take a stance on the marginal gain in justness for unemployed, because f_i would equal zero and therefore be meaningless if the same function as that for individuals with positive gross incomes was applied for $y = 0$. A

¹¹Starting from a point on the right-hand side of the Laffer curve for group i , improvements in the objective function of the social planner are possible by decreasing taxes T_i . This would increase F_i and increase tax revenues. This would, in turn, allow reducing taxes for some other group $j \neq i$. This increase in the objective function of the social planner would be a Pareto improvement as long as individual utility increases with net income.

¹²As noted in Weinzierl (2014), this is consistent with loss aversion (Kahneman and Tversky 1979).

straightforward calibration is to set the value of the derivative of the justness function for income group 0 to equal 1. This does not change the relations of weights for groups with positive gross income, which are the focus of this study.

Note that the resulting *absolute* weights from an inverse optimal taxation simulation with different justness functions differ in magnitude because derivatives of the F_i functions differ. To make the comparison of weights between concepts of justness easier, we therefore calculate relative weights by dividing the obtained absolute weights e_i through the absolute weight of group 0 as in [Blundell et al. \(2009\)](#).

3 Empirical Calibration

3.1 The Data

We use data from the 2015 wave of the German Socio-Economic Panel (SOEP), a representative annual household panel survey. [Wagner et al. \(2007\)](#) and [Britzke and Schupp \(2017\)](#) provide a detailed description of the data.¹³ As the model does not cover spousal labor supply, we restrict the analysis to working-age singles. We exclude individuals with children, heavily disabled and people who receive Unemployment Benefit I,¹⁴ because their budget constraints and labor supply behavior differ substantially. Group 0 consists of the unemployed receiving Unemployment Benefit II.¹⁵ We exclude the long-term unemployed with transfer non-take up, as they differ substantially from the standard case and face a different budget constraint.

¹³Socio-Economic Panel (SOEP) data for the year 2015, version 32, 2016, doi:10.5684/soep.v32.

¹⁴This transfer is targeted to the short-term unemployed and depends on the previous labor income.

¹⁵This transfer is targeted at the long-term unemployed and covers the social existence minimum.

Table 1: Summary Statistics

| | Mean | Std. Dev. | Obs. |
|---------------------------|----------|-----------|-------|
| Monetary variables | | | |
| Monthly Gross Income | 2,626.75 | 1,925.41 | 1,119 |
| Monthly Net Income | 1,766.18 | 991.86 | 1,119 |
| Demographics | | | |
| Sex (1=men, 2=women) | 1.41 | 0.49 | 1,119 |
| Weekly Hours of Work* | 41.66 | 9.51 | 990 |
| Age | 43.97 | 10.47 | 1,119 |
| East Germany Dummy | 0.27 | 0.45 | 1,119 |

Source: Own calculations based on the SOEP

*Excluding the unemployed

Table 1 shows summary statistics for our sample. Net incomes equal gross incomes and transfers minus income taxes and social security contributions.

3.2 Labor Supply Elasticities

Similar to [Blundell et al. \(2009\)](#) and [Haan and Wrohlich \(2010\)](#), we calibrate the optimal taxation analysis with labor supply estimates obtained from the same microdata (the SOEP), which we used to generate income groups. To this end we specify a random utility discrete choice labor supply model following [van Soest \(1995\)](#); [Aaberge et al. \(1995\)](#); [Aaberge and Colombino \(2014\)](#). We flexibly specify the transcendental logarithmic utility function V_{mj} , which is “a local second-order approximation to any utility function” ([Christensen et al. 1975](#)). While the highest value of V_{mj} over the j hours alternatives non-stochastically determines the choice of labor supply, additionally an independently and identically distributed random term ε_{mj} captures an idiosyncratic component.

Gross income is defined as the product of wages and hours of work. Of course, we do not observe potential wages for unemployed. Therefore, we predict potential hourly wages of the unemployed using a selectivity-corrected wage regression (results available on request). The selectivity correction follows the two-step [Heckman \(1979\)](#) approach with binary variables for young children of four age groups, marital status, non-labor income, and indicators for health as exclusion restriction.

Given their hourly wage, individuals make a discrete choice of weekly working hours to maximize utility, which depends on leisure L_{mj} and after-tax and transfer income C_{mj} . We discretize hours of work into five alternatives and unemployment (weekly working hours $\in \{0, 10, 20, 30, 40, 50\}$)

for the precise calculation of net incomes associated with labor supply decisions using the STSM (see [Jessen et al. 2017](#); [Steiner et al. 2012](#)). In contrast to continuous labor supply models this does not require convexity of the budget set.

If the error terms ε_{mj} are assumed to be distributed according to the Extreme-Value type I distribution, the probability that alternative k is chosen by person m is given by a conditional logit model ([McFadden 1974](#)):

$$P_{mk} = Pr(V_{mk} > V_{mj}, \forall j = 1 \dots J) = \frac{\exp(U_{mk})}{\sum_{j=1}^J \exp(U_{mj})}, k \in J, \quad (12)$$

where the deterministic component is

$$U_{mj} = \beta_1 \ln(C_{mj}) + \beta_2 \ln(C_{mj})^2 + \beta_3 \ln(L_{mj}) + \beta_4 \ln(L_{mj})^2 + \beta_5 \ln(C_{mj}) \ln(L_{mj}). \quad (13)$$

Observed individual characteristics X_1 , X_2 and X_3 including age, disability indicators, whether the observed person is German citizen, and number and age of children are allowed to shift tastes for leisure and consumption $\beta_1 = \alpha_0^C + X_1' \alpha_1^C$, $\beta_2 = \alpha_0^{C^2} + X_1' \alpha_1^{C^2}$, $\beta_3 = \alpha_0^L + X_3' \alpha_1^L$, $\beta_4 = \alpha_0^{L^2} + X_1' \alpha_1^{L^2}$, $\beta_5 = \alpha_0^{C \times L} + X_1' \alpha_1^{C \times L}$.

To obtain mobility elasticities we first assign each individual m to an income group $i = 1, \dots, I$ based on the wage-hours combination observed in the data. For instance, a person with an hourly wage of 20 Euros earns a gross income of approximately 860 Euros per month, if she works 10 hours per week and about 1720 Euros if she works 20 hours. If she works 10 hours, she is assigned to group 1, $C_{m=20,k=10} = c_{i=1}$. If she works 20 hours, she is assigned to group II, $C_{m=20,k=20} = c_{i=2}$. In contrast, a person with an hourly wage of 50 Euros is assigned to income group II if she works 10 hours, earning about 2150 Euro per month, $C_{m=50,k=10} = c_{i=2}$.

Changes in net income associated with specific hours points lead to changes in the choice probabilities given by equation (12). These allow for the calculation of aggregate labor supply effects of an hypothetical increase in income. We simulate these effects by the *Probability or expectation method*, i.e. we assign to each individual probabilities for each hours category (see [Creedy and Duncan 2002](#)) and thus for different income groups assuming that the income group with the highest probability is chosen.

Then we predict changes in relative employment share s of income groups due to changes in relative net incomes $c_i - c_{i-1}$ and $c_i - c_0$ (in practice we increase annual net income by 10%) and calculate the mobility elasticities given by equations (6) and (7). The elasticities are reported in the tables in the next section.

4 Results

4.1 Main Results

Table 1 shows average monthly individual gross incomes (column I) and corresponding average net incomes (column II) for six income groups. As is apparent from the increase in net incomes from group 0 to group 1, the marginal transfer withdrawal rate is substantial in the status quo.

Column III shows the population share of each income group and columns IV and V display the estimated extensive and intensive mobility elasticities. For group 1, there is only one elasticity, see equations (6) and (7). Column IV shows relative implicit social welfare weights g_i/g_0 as defined in equation (4). The last two columns show relative explicit social weights e_i/e_0 as defined in equation (3) for the tax burden approach. The welfarist approach is an application of Saez (2002) as in Blundell et al. (2009). Group 0 has the highest implicit social weight, the working poor (group 1) have the lowest weight in line with previous studies described in the introduction.

Table 1: Resulting Relative Weights for Different Justness Concepts

| | I | II | III | IV | V | VI | VII | VIII |
|-------|-----------------|---------------|-------|--------|---------|-----------|------------|---------|
| Group | Gross Income | Net Income | Share | η | ζ | Welfarist | Tax Burden | |
| | | | | | | | Abs. | Rel. |
| 0 | 0 | 625 | 0.11 | — | — | 1 | 1 | 1 |
| 1 | 1,137 | 949 | 0.19 | 0.08* | 0.08* | 0.29068 | 0.00077 | 0.29068 |
| 2 | 2,082 | 1,452 | 0.17 | 0.10 | 0.08 | 0.37729 | 0.00030 | 0.37752 |
| 3 | 2,697 | 1,755 | 0.19 | 0.09 | 0.07 | 0.37342 | 0.00020 | 0.41932 |
| 4 | 3,472 | 2,170 | 0.17 | 0.07 | 0.06 | 0.40902 | 0.00016 | 0.55072 |
| 5 | 5,458 | 3,257 | 0.18 | 0.05 | 0.08 | 0.38680 | 0.00009 | 0.76134 |

Note: German single households without children; own calculations based on the SOEP and the STSM. Implicit weights g_i for welfarism, explicit weights e_i for tax burden principle.

*Overall elasticity of group one is 0.16.

At the optimum, the welfarist weights show the costs of redistributing one Euro from individuals in group 0 to individuals in other groups. For instance, an increase in income for individuals in group 1 would reduce income in group 0 by only 0.29 Euro because individuals would move from group 0 to group 1, reducing the transfer burden of the state. Equivalently, the social planner values increasing the income for group 1 by one Euro 0.29 times as much as increasing the income of group 0 by one Euro. The low weights for the working poor are related to the high marginal tax

rate for individuals moving from group 0 to group 1.¹⁶ Relative weights of the upper four income groups are close to each other, in line with previous findings for Germany by Bargain et al. (2014).

Table C.1 in Appendix C shows the optimal welfarist tax schedule with implicit weights decreasing with income. The resulting optimal tax schedule implies a substantially lower marginal transfer withdrawal rate for the working poor than in the status quo and higher net incomes for groups 1, 2, and 3. This underlines our finding that decreasing welfarist weights would imply lower transfer withdrawal rates.

Column VII of Table 1 displays optimal weights for the absolute tax burden approach, i.e., the negative marginal impact of taxes paid by a specific income group on the social planner's objective function is higher, the higher the tax liability of that group and the higher the explicit weight the social planner attributes to this group are. The weights show how much it costs in terms of the loss function of group 0 to reduce the loss function for members of a particular group as defined in equation (10). We focus the interpretation on the working groups as the unemployed are net recipients of transfers and thus have a 'positive tax burden', see Section 2.2. A comparison of the weights of tax-paying groups shows the highest weight for the working poor, 0.00077, and decreasing weights with income. The social planner is indifferent between imposing a slightly higher increase in the loss function on the working poor and imposing four times this increase on the middle class (group 3). As the loss function increases quadratically with taxes paid, the first derivative of the loss function with respect to consumption for the working poor is relatively small. Consider the benchmark case with fixed incomes and the same derivative of the loss function for all groups. In this case, all weights would be the same. In our analysis the derivative of the loss function is lower for the working poor. Therefore, weights are higher for this group.¹⁷ A similar reasoning applies to the other groups, which results in declining social weights. Consequently, the absolute tax burden principle is in line with the 2015 German tax and transfer system.

Column VIII shows results for the *relative* tax burden principle. Note that the relative weight of group 1 is the same as for the welfarist approach. The reason is that we calibrated f_0 to equal f_1 for the relative tax burden approach, because $y_0 = 0$, as described in Subsection 2.2. For the welfarist case the implicit weights g_i indicate the value the social planner attaches to an additional Euro of consumption for individuals in group i . For non-welfarist concepts, when $f_0 = f_1$, the

¹⁶*Ceteris paribus*, higher elasticities and higher marginal tax rates imply a position further to the right of the Laffer curve and thus lower social weights.

¹⁷As the welfarist weights indicate, the deadweight loss of increasing taxes for group 1 is very high. If it was lower, this group's absolute tax burden weight would be even higher.

costs of increasing F_1 by one relative to the costs of increasing F_0 by one therefore are the same as the ratio of the costs of giving one Euro to group 1 or group 0, which are reflected by the ratio of implicit welfare weights g_1 and g_0 . This is directly reflected by the relative weights, whereas the absolute weights (not reported) differ between the welfarist and relative tax burden approaches. This calibration only impacts the explicit weight of group 0 and does not change the relations of weights for groups 1-5.

Again, the working poor have the highest weight of the groups with a positive tax burden. However, in contrast to the absolute tax burden principle, weights are not decreasing with income but U-shaped. Top income earners have relatively high weights according to the *relative* tax burden principle, because the tax paid is divided through a high consumption level. Thus a small increase in taxes would not increase the loss function of this group by much. In fact, the middle class (group 3) has the lowest weight according to this principle as one would have to redistribute less to members of this group than to members of other groups in order to reduce their loss function by a given amount. Thus, the 2015 German tax and transfer system does not imply decreasing social weights under the relative tax burden principle.

In sum, we find that the absolute tax burden principle is in accordance with declining social weights in the status quo. Thus, the minimization of the weighted sum of an increasing function of the tax liability is a good description of the aims of the German society regarding the tax and transfer system.

4.2 Results for Subsamples

To explore whether the 2015 tax transfer schedule was designed according to a particular concept of justness with focus on a specific group in mind, we split the sample into different groups. These groups differ substantially regarding the income distribution and elasticities, which might lead to different social weights.

First, the sample is split into females and males. We find that women's have a more elastic labor supply than men and lower incomes. Then we present our results for East Germans and West Germans, respectively. These two groups lived under different political systems for more than 40 years. We show that West Germans have higher incomes and less unemployment than East Germans.

4.2.1 Results for Men and Women

In Table 2 we report results for the subsample of women without children, which we compare, in the following, with the results for the main sample and, later, to men.

Table 2: Resulting Relative Weights for Different Justness Concepts for Women without Children

| | I | II | III | IV | V | VI | VII | VIII |
|-------|-----------------|---------------|-------|--------|---------|-----------|------------|----------|
| Group | Gross Income | Net Income | Share | η | ζ | Welfarist | Tax Burden | |
| | | | | | | | Abs. | Rel. |
| 0 | 0 | 615 | 0.05 | — | — | 1 | 1 | 1 |
| 1 | 976 | 872 | 0.19 | 0.09* | 0.09* | 0.13061 | 0.00063 | 0.13061 |
| 2 | 1,903 | 1,331 | 0.20 | 0.12 | 0.10 | 0.16613 | 0.00015 | 0.110483 |
| 3 | 2,548 | 1,705 | 0.19 | 0.10 | 0.10 | 0.20113 | 0.00012 | 0.16912 |
| 4 | 3,342 | 2,079 | 0.23 | 0.07 | 0.10 | 0.18486 | 0.00007 | 0.17848 |
| 5 | 4,948 | 3,011 | 0.15 | 0.06 | 0.12 | 0.18374 | 0.00005 | 0.25355 |

Note: German single households; own calculations based on the SOEP and the STSM. Implicit weights g_i for welfarism, explicit weights e_i for tax burden principle.

*Overall elasticity of group one is 0.18.

As expected, gross and net incomes in all income groups are lower and labor supply elasticities are slightly higher. For the welfarist case, the working groups have smaller weights relative to the unemployed than in the main sample. As before, we find that the working poor have the lowest weight. The finding that social weights for the absolute tax burden concept are decreasing with income is robust for this subsample. As before, in the relative tax burden case, the working poor have the highest weights among working groups and top income earners have the second highest weights.

Table 3: Resulting Relative Weights for Different Justness Concepts for Men without Children

| | I | II | III | IV | V | VI | VII | VIII |
|-------|-----------------|---------------|-------|--------|---------|-----------|------------|---------|
| Group | Gross Income | Net Income | Share | η | ζ | Welfarist | Tax Burden | |
| | | | | | | | Abs. | Rel. |
| 0 | 0 | 627 | 0.15 | — | — | 1 | 1 | 1 |
| 1 | 1,265 | 1,038 | 0.17 | 0.05* | 0.05* | 0.49473 | 0.00109 | 0.49473 |
| 2 | 2,228 | 1,520 | 0.18 | 0.08 | 0.04 | 0.52023 | 0.00037 | 0.51742 |
| 3 | 2,875 | 1,837 | 0.16 | 0.07 | 0.04 | 0.52845 | 0.00025 | 0.59694 |
| 4 | 3,622 | 2,279 | 0.17 | 0.06 | 0.04 | 0.56493 | 0.00021 | 0.78282 |
| 5 | 6,124 | 3,581 | 0.16 | 0.05 | 0.06 | 0.52826 | 0.00010 | 1.10515 |

Note: German single households; own calculations based on the SOEP and the STSM. Implicit weights g_i for welfarism, explicit weights e_i for tax burden principle.

*Overall elasticity of group one is 0.10.

Table 3 shows results for the subsample of men. Incomes are higher and elasticities are lower than for women. In the welfarist case, weights of working groups are higher than for women. This is caused by lower elasticities, which lead to men being further on the left of the Laffer curve. Nevertheless, the working poor again have the lowest weight. The finding that weights in the absolute tax burden case decrease with income holds for men as well. As in the welfarist case, the weight of the working poor is higher for men than for women because male elasticities are lower. Again, in the relative tax burden case, the working poor have the highest weight and the middle class has the lowest weight of working groups.

4.2.2 Results for East and West Germany

Gross and net incomes are higher across all groups in West Germany (see Table 5) compared to East Germany (see Table 4). In contrast to the main sample and the previously analyzed subsamples, in the sample of East Germans the working poor are net transfer recipients and the marginal withdrawal rate when moving from group 1 to group 2 is still substantial.

The welfarist weights show highest social weights for the unemployed and lowest for the working poor (group 1 in the West, groups 1 and 2 in the East). An increase in income for individuals in group 1 by one Euro would reduce income in group 0 by only 0.27 Euro in West Germany and by about 0.30 in East Germany. The relative weights of the four (three for East Germany) higher income groups are very similar and higher than the weights for the working poor.

Table 4: Resulting Relative Weights for Different Justness Concepts for East Germany

| | I | II | III | IV | V | VI | VII | VIII |
|-------|-----------------|---------------|-------|--------|---------|-----------|------------|---------|
| Group | Gross Income | Net Income | Share | η | ζ | Welfarist | Tax Burden | |
| | | | | | | | Abs. | Rel. |
| 0 | 0 | 596 | 0.18 | — | — | 1 | 1 | 1 |
| 1 | 774 | 851 | 0.17 | 0.10* | 0.10* | 0.30249 | 0.30249 | 0.30249 |
| 2 | 1,581 | 1,222 | 0.18 | 0.16 | 0.08 | 0.33926 | 0.00044 | 1.41185 |
| 3 | 2,200 | 1,594 | 0.17 | 0.13 | 0.08 | 0.40821 | 0.00032 | 1.99735 |
| 4 | 2,808 | 1,920 | 0.14 | 0.11 | 0.07 | 0.42652 | 0.00022 | 2.2917 |
| 5 | 4,039 | 2,625 | 0.16 | 0.09 | 0.08 | 0.40168 | 0.00013 | 2.75589 |

Note: German single households; own calculations based on the SOEP and the STSM. Implicit weights g_i for welfarism, explicit weights e_i for tax burden principle.

*Overall elasticity of group one is 0.20.

Table 5: Resulting Relative Weights for Different Justness Concepts for West Germany

| | I | II | III | IV | V | VI | VII | VIII |
|-------|-----------------|---------------|-------|--------|---------|-----------|------------|---------|
| Group | Gross Income | Net Income | Share | η | ζ | Welfarist | Tax Burden | |
| | | | | | | | Abs. | Rel. |
| 0 | 0 | 653 | 0.08 | — | — | 1 | 1 | 1 |
| 1 | 1,408 | 1,072 | 0.21 | 0.07* | 0.07* | 0.26746 | 0.00040 | 0.26746 |
| 2 | 2,324 | 1,549 | 0.16 | 0.09 | 0.08 | 0.31984 | 0.00021 | 0.37777 |
| 3 | 2,907 | 1,857 | 0.19 | 0.08 | 0.08 | 0.31618 | 0.00015 | 0.43129 |
| 4 | 3,699 | 2,321 | 0.19 | 0.06 | 0.06 | 0.35053 | 0.00013 | 0.5899 |
| 5 | 6,010 | 3,519 | 0.17 | 0.05 | 0.08 | 0.32097 | 0.00006 | 0.78881 |

Note: German single households; own calculations based on the SOEP and the STSM. Implicit weights g_i for welfarism, explicit weights e_i for tax burden principle.

*Overall elasticity of group one is 0.14.

As in our main findings, optimal weights under absolute tax burden are decreasing in both samples, though the weight of group 1 is closer to the weight of group 0 than is the case for West Germany as group 1 in the East are net transfer recipients and thus enjoy a ‘positive tax burden’. Note that as group 1 in East Germany consists of transfer net recipients, $f_0 = f_1$ (see equation (10)) for this group and thus the relative weight of group 1 is the same as in the welfarist and relative tax burden cases. Regarding groups with a positive tax burden, the weights imply that

the social planner is roughly indifferent between imposing a slight increase in the loss function on the working poor (group 1) in West Germany and imposing five times this increase in the loss function on group 2. For East Germany, the social planner is indifferent between imposing a slight increase in the loss function for individuals in group 2 and an about 38 percent higher increase in the loss function for individuals in group 3. This shows that the absolute tax burden principle with decreasing weights is in line with the 2015 German tax and transfer system for East and West Germans.

Results for the *relative* tax burden principle show that group 3 has the highest weight of the groups with a positive tax burden in East Germany, while in West Germany weights for the top income group are highest. The difference arises because top income earners in West Germany earn considerably more than their East German counterparts. As explained in Section 4.1, this implies higher weights for this justness concept because the denominator of the loss function is higher. Thus, the German tax and transfer system does not result in decreasing social weights under the relative tax burden principle.

4.3 Robustness and Extensions

4.3.1 Subjective Justness

Our framework allows using information on the level of taxes that is considered just by individuals in the optimal tax formulae. We specify the justness functions similarly to the case of the tax burden principle and set as reference point the level of just after-tax income taken from the survey (instead of setting gross income as reference point). Thus the absolute formulation of the justness function is

$$\begin{aligned}
 F_i &= -(c_i^{\text{just}} - c_{i^*})^\gamma \text{ if } c_i^{\text{just}} \geq c_{i^*}, \\
 F_i &= (c_{i^*} - c_i^{\text{just}})^\delta \text{ if } c_{i^*} > c_i^{\text{just}}, \\
 &\gamma > 1, \delta \leq 1
 \end{aligned} \tag{14}$$

and the relative one is

$$\begin{aligned}
 F_i &= - \left(\frac{c_i^{\text{just}} - c_{i^*}}{c_{i^*}} \right)^\gamma \quad \text{if } c_i^{\text{just}} \geq c_{i^*}, \\
 F_i &= \left(\frac{c_{i^*} - c_i^{\text{just}}}{c_{i^*}} \right)^\delta \quad \text{if } c_{i^*} > c_i^{\text{just}} > 0, \\
 &\qquad \qquad \qquad \gamma > 1, \delta \leq 1.
 \end{aligned} \tag{15}$$

The parameters are calibrated as for the tax burden exercise. In the 2015 wave, the SOEP introduced new questions that ask what amount of income respondents would consider just in their current occupation. In particular, individuals state how high their gross income and net income would have to be in order to be just. A screenshot of this part of the questionnaire is provided in Appendix B.¹⁸ Only the currently employed are asked questions about what income they would consider as just.¹⁹

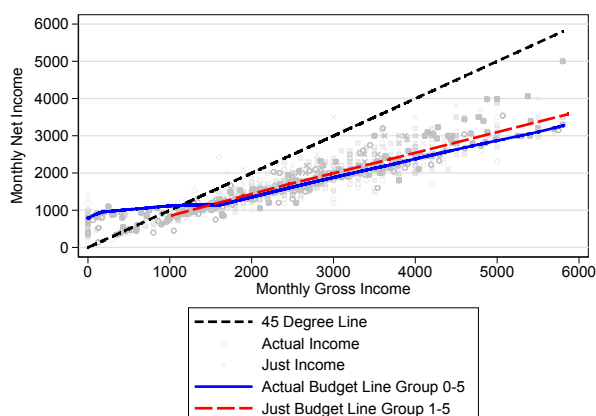
Compared to other approaches to obtain information about individuals' ideas of justness, the advantage of the question is that individuals do not need to have a worked out theory of just taxation in mind to answer the question. Moreover, interviewees do not need a thorough understanding of tax schedules.

Figure 1a shows the status quo of the German tax and transfer system and the just tax and transfer system based on our sample. The first segment of the actual budget line is almost horizontal at a net income of about 600 Euro due to the high transfer withdrawal rate. The slope of the budget line is steeper further to the right, representing individuals who do not receive transfers, but pay income taxes and social security contributions.

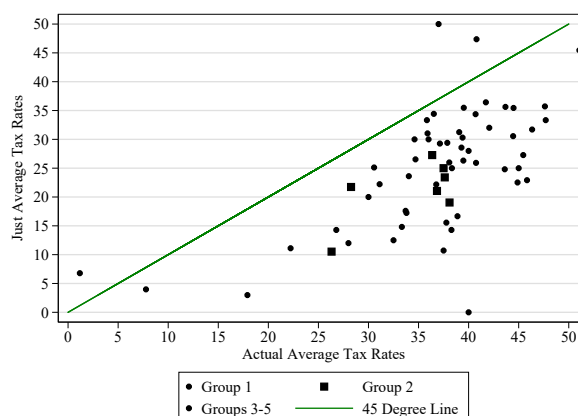
Gray circles represent the actual net incomes for given gross incomes. Some circles are crossed by x. This means either that an individual considers his or her actual income just or the actual income of another person. The 45 degree line marks the points where no taxes are paid. Points

¹⁸Since 2005 the SOEP includes a question on just income “Is the income that you earn at your current job just, from your point of view?”. If respondents answer “No”, they are asked “How high would your net income have to be in order to be just?” and since 2009 additionally “How high would your gross income have to be in order to be just?”. The introduced justness question in 2005 was inspired by a perceived justness of earnings formula developed by Jasso (1978). In 2015 these questions are revised to allow for more research topics and now all respondents are asked about just gross and net income (see Appendix B).

¹⁹For the working poor, we add actual transfers to stated just net incomes, as these do not include transfers. Transfers include Unemployment Benefit II, housing benefits.



(a) Just Net and Gross Incomes. Source: Own calculations based on SOEP



(b) Average Tax Rates

Figure 1: Just Net and Gross Incomes and Average Tax Rates

Source: Authors' calculations based on SOEP.

above this line represent actual transfer recipients or those who deem receiving transfers as just. However, most individuals perceive net incomes to be just, where taxes have to be paid. It is likely that status quo bias explains this pattern. Nonetheless, the answers of the respondents reflect actual perceptions of just incomes. The solid blue and the dashed red lines summarize this information. The solid blue line depicts the average actual budget constraint for six income groups that we use in the main analysis. The dashed red line shows the just budget constraint for the same groups. The budget lines are based on averages for the groups. The *just* budget line is defined only for those with positive labor income and lies slightly above the actual budget line. This reflects the preferences for paying less taxes. The distribution of net incomes for a given value of gross income is skewed toward the no tax line. Deviations in this direction can be explained with allowances. The positive skew of just net incomes is due to more people perceiving substantially higher net incomes as just than substantially lower net incomes. The incidence of crossed circles, i.e., persons who perceive their current income as just is higher below and around the average budget lines.

As only employed persons respond to the SOEP question about just net income, just net income is set marginally above the actual average transfer income of group 0.²⁰

²⁰We experimented with different values for this number. While changing the just net income of group 0 has a substantial impact on this group's subjective social justness weights relative to other groups, the weights of other groups relative to one another remain virtually the same.

Table 6: Resulting Relative Weights for Subjective Justness

| Group | I | II | III | IV | V | VI | VII |
|-------|--------|----------|------------|--------|---------|---------------------|---------|
| | Net | Just Net | Difference | η | ζ | Subjective Justness | |
| | Income | Income | | | | Abs. | Rel. |
| 0 | 779 | 784* | 5 | | | 1 | 1 |
| 1 | 1,024 | 1,036 | 12 | 0.08 | 0.08 | 0.15341 | 0.26369 |
| 2 | 1,420 | 1,461 | 41 | 0.10 | 0.07 | 0.05241 | 0.17035 |
| 3 | 1,741 | 1,778 | 37 | 0.09 | 0.07 | 0.06424 | 0.31620 |
| 4 | 2,195 | 2,243 | 48 | 0.07 | 0.07 | 0.05207 | 0.40717 |
| 5 | 3,317 | 3,415 | 98 | 0.05 | 0.08 | 0.02475 | 0.43868 |

Note: German single households; own calculations based on the SOEP and the STSM. Explicit weights e_i .

*Just net income for this group is set as explained in the text.

Table 6 shows social weights according to the absolute and relative subjective justness principles respectively. The sample—and thus means for current gross and net incomes—differs from the main one as only individuals who report that their current gross income is just are used. The subjective justness principle implies penalties for the deviation of net incomes from perceived just net incomes. As discussed above, there is no information on perceived just net incomes of the unemployed, so we focus on the interpretation of the social weights of working groups. For the absolute justness principle, the working poor have the highest social weights of the working population because their average net income deviates from just net income by only 12 Euros. Social weights are decreasing except for group 3, where the just net income is closer to actual net income than is the case for groups 2 and 4. When considering *relative* deviations from just net income, group 5 has the highest social weights of all working groups since the deviation from just income is small relative to the high consumption level of this group.

4.3.2 Different Reference Points of Justness Functions

For the *subjective justness* approach, reference points of loss functions were taken directly from survey data. It is interesting to see how the resulting weights for reference points taken from the data compare with weights resulting from three classical scenarios of redistribution, where reference points of all income groups are higher than net income: First, the social planner assumes that low income groups ask for less redistribution relative to the status quo than the high income groups. Second, the low income groups ask for more redistribution than the high income groups. Third,

each income group wants to keep up with the next higher income group and asks for redistribution to achieve the net incomes of the next higher group.

The absolute and relative loss functions are then given by

$$\begin{aligned}
 F_i &= -(c_i^{\text{ref}} - c_{i^*})^\gamma \text{ if } c_i^{\text{ref}} \geq c_{i^*}, \\
 F_i &= (c_{i^*} - c_i^{\text{ref}})^\delta \text{ if } c_{i^*} > c_i^{\text{ref}}, \\
 &\gamma > 1, \delta \leq 1
 \end{aligned}
 \tag{16}$$

and

$$\begin{aligned}
 F_i &= -\left(\frac{c_i^{\text{ref}} - c_{i^*}}{c_{i^*}}\right)^\gamma \text{ if } c_i^{\text{ref}} \geq c_{i^*}, \\
 F_i &= \left(\frac{c_{i^*} - c_i^{\text{ref}}}{c_{i^*}}\right)^\delta \text{ if } c_{i^*} > c_i^{\text{ref}} > 0, \\
 &\gamma > 1, \delta \leq 1,
 \end{aligned}
 \tag{17}$$

where c_i^{ref} is a calibrated reference point. Tables 7-9 show results for this exercise for the three different cases.

Table 7: Case 1: Difference to Reference Points Increasing with Income

| | I | II | III | IV | V |
|-------|------------|-----------------|------------|---------|---------|
| Group | Net Income | Reference Point | Difference | Abs. | Rel. |
| 0 | 625 | 675 | 50 | 1 | 1 |
| 1 | 949 | 1,049 | 100 | 0.14534 | 0.32739 |
| 2 | 1,452 | 1,602 | 150 | 0.12576 | 0.66444 |
| 3 | 1,755 | 1,955 | 200 | 0.09335 | 0.71364 |
| 4 | 2,170 | 2,420 | 250 | 0.08180 | 0.9550 |
| 5 | 3,257 | 3,557 | 300 | 0.06447 | 1.73131 |

Note: German single households; own calculations based on the SOEP and the STSM. Explicit weights e_i .

In Table 7 the reference point is set 50 Euros above the actual net income for group 0 and the difference between actual income and the reference point increases by 50 Euros for every income group until it reaches 300 Euros for group 5. For the absolute loss function, this results in continuously decreasing social weights. In contrast, using the relative loss function, social weights

are increasing starting from group 1 as the increase in the denominator of the loss function more than offsets the increase in the nominator with increasing net income. Nonetheless, the social weight of group 0 is highest because reducing transfers for this group would be associated with a substantial efficiency gain. Not reducing the transfer for this group is only reconcilable with a high social weight. The exercise reported in Table 7 is related to the tax burden principle; if the designer of the tax and transfer system followed this principle, implicitly an income-increasing difference between net income and reference point was chosen. Therefore, the pattern for the absolute tax burden case in Table 1 is similar to this stylized case.

Table 8: Case 2: Difference to Reference Points Decreasing with Income

| | I | II | III | IV | V |
|-------|------------|-----------------|------------|---------|---------|
| Group | Net Income | Reference Point | Difference | Abs. | Rel. |
| 0 | 625 | 1,625 | 1,000 | 1 | 1 |
| 1 | 949 | 1,119 | 170 | 1.70986 | 8.69247 |
| 2 | 1,452 | 1,612 | 160 | 2.35808 | 29.8062 |
| 3 | 1,755 | 1,905 | 150 | 2.48944 | 47.0166 |
| 4 | 2,170 | 2,310 | 140 | 2.92157 | 86.0196 |
| 5 | 3,257 | 3,387 | 130 | 2.97542 | 202.023 |

Note: German single households; own calculations based on the SOEP and the STSM. Explicit weights e_i .

Table 9: Case 3: Reference Point Next Higher Income Group

| | I | II | III | IV | V |
|-------|------------|-----------------|------------|---------|---------|
| Group | Net Income | Reference Point | Difference | Abs. | Rel. |
| 0 | 625 | 949 | 324 | 1 | 1 |
| 1 | 949 | 1,452 | 503 | 0.18724 | 0.42840 |
| 2 | 1,452 | 1,755 | 303 | 0.40344 | 2.73546 |
| 3 | 1,755 | 2,170 | 415 | 0.29153 | 2.82285 |
| 4 | 2,170 | 3,257 | 1,087 | 0.12192 | 1.48678 |
| 5 | 3,257 | 4,757 | 1,500 | 0.08355 | 2.35881 |

Note: German single households; own calculations based on the SOEP and the STSM. Explicit weights e_i .

Table 8 is the counterpart of Table 7 and shows resulting weights, where the difference between actual net income and the reference points decreases with income. For group 0 this difference is

set to 1000 Euro in order to obtain continuously increasing social weights. Again, the efficiency gain of reducing transfers for this group is very large and only when the reference point is far away from actual income would the increase in the loss function offset this efficiency gain. This results in a low relative social weight for this group. The relative loss function weights are increasing with income too—to a much stronger degree than in case 1.

Finally, in Table 9, the net income of the next higher income group is taken as a reference point, except for the highest income earners, where we set the reference point 1500 Euro above the current net income. In this “Keeping up with the Joneses” scenario groups 2 and 3 have relatively high weights for both absolute and relative loss functions as their net income is close to that of the respective next higher income group.

4.3.3 Robustness

As for any loss function, results may differ depending on the properties of the function that is to be minimized. We analyze the robustness of the obtained social weights for the absolute tax burden principle to different values of γ and δ (Tables 10 and 11). The result that social weights decline with income is robust to a wide range of calibrations. This shows that the main result is not driven by the parameter choice. Second, we set the intensive and extensive elasticities of all groups to 0.1 and show the results for all concepts of justness (Table D.1 in the appendix). The results are very close to the main results. This shows that slight variations in the elasticities do not change the results substantially.

Table 10: Resulting Relative Weights for Absolute Tax Burden for Different Values of γ ($\delta = 1$)

| | I | II | III | IV |
|-------|----------------|--------------|-----------------------|------------------------|
| Group | $\gamma = 1.5$ | $\gamma = 2$ | $\gamma = 3$ | $\gamma = 5$ |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 0.01413 | 0.00077 | 2.74×10^{-6} | 4.65×10^{-11} |
| 2 | 0.01002 | 0.00030 | 3.17×10^{-7} | 4.79×10^{-13} |
| 3 | 0.00811 | 0.00020 | 1.40×10^{-7} | 9.48×10^{-14} |
| 4 | 0.00756 | 0.00016 | 8.04×10^{-8} | 2.85×10^{-14} |
| 5 | 0.00550 | 0.00009 | 2.66×10^{-8} | 3.30×10^{-15} |

Note: German single households; own calculations based on the SOEP and the STSM. Explicit weights e_i .

Table 11: Resulting Relative Weights for Absolute Tax Burden for Different Values of δ ($\gamma = 2$)

| | I | II | III | IV |
|-------|-----------------------|-----------------------|-----------------------|--------------|
| Group | $\delta = 0.1$ | $\delta = 0.3$ | $\delta = 0.5$ | $\delta = 1$ |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 2.35×10^{-7} | 2.56×10^{-6} | 1.55×10^{-5} | 0.00077 |
| 2 | 9.12×10^{-8} | 9.92×10^{-7} | 5.99×10^{-6} | 0.00030 |
| 3 | 6.04×10^{-8} | 6.56×10^{-7} | 3.96×10^{-6} | 0.00020 |
| 4 | 4.78×10^{-8} | 5.20×10^{-7} | 3.14×10^{-6} | 0.00016 |
| 5 | 2.68×10^{-8} | 2.91×10^{-7} | 1.76×10^{-6} | 0.00009 |

Note: German single households; own calculations based on the SOEP and the STSM. Explicit weights e_i .

5 Conclusion

In this paper, we reconcile a puzzling contrast between current tax transfer practice in many countries and the common approach in the optimal taxation literature. While the literature commonly assumes that the social planner values an additional unit of income for poor households more than an additional unit of income for higher income households, commonly observed high transfer withdrawal rates are only optimal if social weights of the working poor are very small. Therefore, we compare alternative approaches to welfarism and calculate the implied social weights. We formulate the problem of a social planner for two distinct concepts of justness: the welfarist approach, where the social planner maximizes the weighted sum of utility; alternatively, the tax burden concept where the social planner minimizes the weighted sum of increasing functions of absolute or relative tax liabilities. The latter concept formalizes the ideas that taxes for groups with already high tax liabilities should rather not be increased further. This point is often made in public debates but does not follow from classical welfarist considerations.

Moreover, we illustrate how subjective justness can be used in our model where the social planner minimizes absolute or relative deviations from perceived just net income. Of course, all approaches maintain budget neutrality and account for labor supply reactions.

Like the existing literature, we find that the 2015 German tax and transfer system implies very low social weights for the working poor according to the welfarist criterion. The social planner values increasing the income for the working poor by one Euro 0.75 times as much as increasing the income of top earners by one Euro. This implies that an additional Euro of consumption for the working poor is valued less than marginal consumption of top income earners.

In contrast, the current tax-transfer practice can be reconciled as optimal and in line with decreasing social weights under the absolute tax burden criterion, under which the social planner minimizes a function that puts an increasing penalty on tax liabilities. In this case, the social planner is indifferent between a slight increase in the loss function for the working poor and imposing four times this additional increase in the loss function on the middle class.

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Appendix

A Optimal Tax Formulae in the General Model

Behavioral reactions imply that h_i changes in case of a change in T_i . Using the product rule and assuming that marginal movers do not impact the objective function, the first order condition with respect to T_i is obtained as

$$\int_M \mu_m f_m d\nu(m) = \lambda \left(h_i - \sum_{j=0}^I T_j \frac{\partial h_j}{\partial c_i} \right), \quad (18)$$

where λ is the multiplier of the budget constraint. The first order condition with respect to λ is the budget constraint. Assuming $f_i = f_m$, reorganizing (18), and defining the average explicit social weights as $e_i = \mu_i / \lambda h_i$ yields

$$(1 - e_i f_i) h_i = \sum_{j=0}^I T_j \frac{\partial h_j}{\partial c_i}. \quad (19)$$

The assumption of no income effects implies that only h_{i-1} , h_i , h_{i+1} , and h_0 change when T_i changes. If we assume that h_i can be expressed as a function depending on the difference to the adjacent income groups and the unemployed $h_i(c_{i+1} - c_i, c_i - c_{i-1}, c_i - c_0)$, equation (19) simplifies to

$$\begin{aligned} (1 - e_i f_i) h_i &= T_0 \frac{\partial h_0}{\partial (c_i - c_0)} + T_i \frac{\partial h_i}{\partial (c_i - c_0)} - T_{i+1} \frac{\partial h_{i+1}}{\partial (c_{i+1} - c_i)} - T_i \frac{\partial h_i}{\partial (c_{i+1} - c_i)} \\ &+ T_i \frac{\partial h_i}{\partial (c_i - c_{i-1})} + T_{i-1} \frac{\partial h_{i-1}}{\partial (c_i - c_{i-1})}. \end{aligned} \quad (20)$$

Using the facts that $\frac{\partial h_i}{\partial (c_i - c_0)} = -\frac{\partial h_0}{\partial (c_i - c_0)}$, $\frac{\partial h_{i+1}}{\partial (c_{i+1} - c_i)} = -\frac{\partial h_i}{\partial (c_{i+1} - c_i)}$, $\frac{\partial h_i}{\partial (c_i - c_{i-1})} = -\frac{\partial h_{i-1}}{\partial (c_i - c_{i-1})}$, we can write after rearranging

$$(1 - e_i f_i) h_i = (T_i - T_0) \frac{\partial h_i}{\partial (c_i - c_0)} - (T_{i+1} - T_i) \frac{\partial h_{i+1}}{\partial (c_{i+1} - c_i)} + (T_i - T_{i-1}) \frac{\partial h_i}{\partial (c_i - c_{i-1})} \quad (21)$$

Using the definition of the elasticities (6) and (7), we obtain for each group after reorganizing

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i h_i} \left\{ (1 - e_i f_i) h_i - \eta_i h_i \frac{T_i - T_0}{c_i - c_0} + \zeta_{i+1} h_{i+1} \frac{T_{i+1} - T_i}{c_{i+1} - c_i} \right\}. \quad (22)$$

Note that, by setting $e_0 = e_i = 0$, we obtain the Laffer-condition

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i} + \frac{\zeta_{i+1} h_{i+1}}{\zeta_i h_i} \frac{T_{i+1} - T_i}{c_{i+1} - c_i} - \frac{\eta_i}{\zeta_i} \frac{T_i - T_0}{c_i - c_0}. \quad (23)$$

Substituting the equivalent of (22) for the next group $i + 1$ in (22) and simplifying gives

$$\begin{aligned} \frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i h_i} \left\{ (1 - e_i f_i) h_i + (1 - e_{i+1} f_{i+1}) h_{i+1} \right. \\ \left. - \eta_i h_i \frac{T_i - T_0}{c_i - c_0} - \eta_{i+1} h_{i+1} \frac{T_{i+1} - T_0}{c_{i+1} - c_0} + \zeta_{i+2} h_{i+2} \frac{T_{i+2} - T_{i+1}}{c_{i+2} - c_{i+1}} \right\}. \end{aligned} \quad (24)$$

Recursive insertion and simplifying gives the I formulae (8) that must hold if function (1) is optimized.

B Questionnaire

67. Is the gross income that you earn at your current job just, from your point of view?
 No Yes → Question 69!
 ↓
68. How high would your gross income have to be in order to be just?
 Gross: euros per month Don't know
69. Is the net income that you earn at your current job just, from your point of your view?
 No Yes → Question 71!
 ↓
70. How high would your net income have to be in order to be just?
 Net: euros per month Don't know

Figure B.1: The Question for Justness. Source: Official SOEP Questionnaire

C Optimal Welfarist Tax Schedule

Table C.1 shows the optimal welfarist tax schedule, where, following [Saez \(2002\)](#), implicit welfare weights are set according to the formula

$$g_i = \frac{1}{\lambda c_i^{0.25}} \quad (25)$$

and the shares of income groups are determined endogenously by

$$h_i = h_i^0 \left(\frac{c_i - c_0}{c_i^0 - c_0^0} \right)^{\eta_i}, \quad (26)$$

where the superscript 0 denotes values in the status quo. The simulation was done achieving budget neutrality and setting net income of group 0 to the status quo, as a deviation from this is not politically feasible.

Table C.1: Optimal Welfarist Tax Schedule

| Group | Gross Income | Net Income | Share | Optimal Net Income | Optimal Share | Relative Weight |
|-------|--------------|------------|-------|--------------------|---------------|-----------------|
| 0 | 0 | 625 | 0.11 | 625 | 0.09 | 1 |
| 1 | 1,137 | 949 | 0.19 | 1,260 | 0.20 | 0.84 |
| 2 | 2,082 | 1,452 | 0.17 | 1,629 | 0.17 | 0.79 |
| 3 | 2,697 | 1,755 | 0.19 | 1,837 | 0.19 | 0.76 |
| 4 | 3,472 | 2,170 | 0.17 | 2,047 | 0.17 | 0.74 |
| 5 | 5,458 | 3,257 | 0.18 | 2,826 | 0.18 | 0.69 |

Note: German single households; own calculations based on the SOEP and the STSM.

D Further Sensitivity Checks

Table D.1: Resulting Relative Weights for Different Justness Concepts with Elasticities set to 0.1

| Group | I | | II | | III | | IV | | V | |
|-------|--------|---------|-----------|---------|------------|---------|------------|---------|------------|---------|
| | η | ζ | Welfarist | | Tax Burden | | Tax Burden | | Tax Burden | |
| | | | Abs. | Rel. | Abs. | Rel. | Abs. | Rel. | | |
| 0 | — | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0.1* | 0.1* | 0.22027 | 0.22027 | 0.00059 | 0.00059 | 0.22027 | 0.22027 | 0.22027 | 0.22027 |
| 2 | 0.1 | 0.1 | 0.33434 | 0.33434 | 0.00027 | 0.00027 | 0.33454 | 0.33454 | 0.33454 | 0.33454 |
| 3 | 0.1 | 0.1 | 0.31926 | 0.31926 | 0.00017 | 0.00017 | 0.35851 | 0.35851 | 0.35851 | 0.35851 |
| 4 | 0.1 | 0.1 | 0.33459 | 0.33459 | 0.00013 | 0.00013 | 0.45050 | 0.45050 | 0.45050 | 0.45050 |
| 5 | 0.1 | 0.1 | 0.30932 | 0.30932 | 0.00007 | 0.00007 | 0.60882 | 0.60882 | 0.60882 | 0.60882 |

Note: German single households; own calculations based on the SOEP and the STSM.

*Overall elasticity of group one is 0.2.