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SHIFTING TAXES FROM LABOR TO CONSUMPTION: MORE EMPLOYMENT AND MORE INEQUALITY?

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This paper investigates the effect of shifting taxes from labor income to consumption on labor supply and the distribution of income in Germany. We simulate stepwise increases in the value-added tax (VAT) rate, which are compensated by revenue-neutral reductions in income-related taxes. We differentiate between the personal income tax (PIT) and social security contributions (SSC). Based on a dual data base and a microsimulation model of household labor supply behavior, we find a regressive impact of such a tax shift in the short run. When accounting for labor supply adjustments, the adverse distributional impact persists for PIT reductions, while the overall effects on inequality and progressivity become lower when payroll taxes are reduced. This is partly due to increases in aggregate labor supply, resulting from higher work incentives.

JEL Classification: C63, D31, H23

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1. INTRODUCTION

The appropriate choice between direct and indirect tax instruments has been subject to an extensive debate on their respective merits and disadvantages. Although the question of the optimal mix is still open, there are reasons for a coexistence of both forms of taxation, as they address the economic policy objectives of efficiency and redistribution in different ways. Moreover, in the context of the need for fiscal consolidation, consumption constitutes an attractive and reliable source for government revenues as a stable tax base. In addition, shifting the tax burden from labor to consumption, referred to as *fiscal devaluation*, is currently considered as an alternative to nominal devaluation in order to restore competitiveness in some euro area countries (de Mooij and Keen, 2012; Koske, 2013).

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The debate on possible consequences of a tax shift from income towards consumption centers around two issues. First, according to standard economic theory, such a tax shift might be favorable with respect to employment as a consequence of lower marginal tax rates on labor income, implying higher incentives to take up work. Second, higher consumption taxes are often associated with lower tax progressivity and higher levels of inequality. However, employment increases from a tax shift may outweigh adverse distributional impacts. The degree to which there exists a trade-off between higher inequality and more employment in this context is an empirical question. We provide an analysis for Germany to gauge the extent of this trade-off and investigate whether a shift from income to consumption taxation can be justified in light of positive labor supply effects. Germany represents a particularly interesting case as the tax wedge on labor income is among the highest in industrialized countries (OECD, 2014).

Despite the theoretical virtues of indirect taxes, the direct to indirect tax ratio has been on the rise over the last decades, mostly due to increasing social security contributions (Martinez-Vazquez *et al*., 2010). Consequently, recent years have witnessed a growing discussion on a heavier reliance on consumption taxes, such as sales taxes and the Value Added Tax (VAT) (OECD, 2007, 2010). A concrete policy implementation of such a *tax cut cum base broadening* was the 2007 VAT increase in Germany, which was compensated by simultaneously cutting unemployment insurance contributions.[1] This policy was explicitly motivated by increasing work incentives and generating revenues at the same time. In the same spirit, in 2009, Hungary financed a five percentage point reduction in the employer Social Security Contributions rate through a higher VAT. These policies followed the argumentation that the tax burden on labor in most OECD countries is too high and implies disincentives for labor market participation. Moreover, payroll taxes constitute a significant share of labor costs for employers (OECD, 2014). A shift away from income and payroll taxes towards consumption taxes could therefore release unused productive capacities by increasing labor supply *and* demand. Moreover, labor constitutes the major tax base for generating revenues in most countries, which might be questioned in light of a proper application of the Ability to Pay Principle. Broadening the tax base addresses this issue by treating all sources of income equally. The distributional consequences of a tax shift are however unclear.

In this paper, we carry out microsimulations of several revenue-neutral policy scenarios. We simulate a step-wise increase of the standard VAT rate of currently 19 percent in Germany, accompanied by a reduction in personal income taxes (PIT) or social security contributions (SSC).[2] We add to the existing literature by simulating a range of revenue-neutral reforms on both PIT and SSC, accounting for labor supply responses at the same time. As the distributional analysis is differentiated along several socio-demographic dimensions, the results can help to design

[1]The standard VAT rate was raised from 16 percent to 19 percent, while the total rate of unemployment insurance contributions was lowered from 6.5 percent to 4.2 percent. This specific reform has been ex ante investigated by Bach *et al*. (2006).

[2]There are two VAT rates in Germany. Apart from the standard rate of 19 percent, there is a reduced rate of 7 percent applied on most food commodities, public transport, books, newspapers, journals, entrance to cultural facilities and works of art. Moreover, medical, educational and financial services as well as rents are fully exempted from the VAT.

specifically targeted policies to compensate the potential losers from an increase in VAT rates. For example, if pensioners are found to be worse off, it might be worth considering splitting the additional revenue from the higher VAT on lowering payroll taxes *and* raising old-age pensions. The analysis is carried out with the behavioral microsimulation model IZAΨMOD (Löffler *et al*., 2014a). Based on a representative sample of the German population from the Socio-Economic Panel Study (SOEP) and a detailed model of the German tax and transfer system, we are able to simulate changes in household budgets as well as adjustments in labor supply behavior. As the information on household consumption in SOEP is insufficient, we impute expenditures based on estimates from the German Sample Survey of Income and Expenditures (EVS). Our empirical approach is related to the studies of Decoster *et al*. (2009) and Bach *et al*. (2006), but differs in several aspects. While the former study depicts only the static changes in household budgets ignoring behavioral responses, the latter does not consider a revenue-neutral reform.

We find that both scenarios of reducing the direct tax burden, either lowering PIT or SSC, imply distinct distributional impacts. Due to its strongly progressive design, a compensated reduction of personal income taxes leads to a higher level of inequality. Low-income earners, pensioners and unemployed are found to be the main losers from the policy. For payroll tax reductions, the adverse distributional effects are significantly less severe, because payroll taxes constitute a regressive tax themselves. Taking into account behavioral adjustments, we find that the distributional impacts of the tax shift are weakened. For lowering the PIT level however, a strongly regressive impact persists. Reducing payroll taxes seems particularly promising, given their potential to raise work incentives. In these scenarios, some households are able to compensate their losses through higher labor earnings. Beyond, our results suggest no systematic difference between augmenting both VAT rates or only the standard rate, which underlines the limited redistributional power that is often attributed to a differentiation of VAT rates.

The paper is structured as follows: Section 2 reviews the theory on labor versus consumption taxation and the empirical evidence on tax shifts. Then, we present related empirical findings on the macro and micro level. In section 3, our microsimulation approach and the underlying data base is presented. Furthermore, our method to impute expenditures in an income data set is described in detail. In the results section 4, the simulated labor supply reactions are presented first. Second, a detailed distributional analysis identifies winners and losers from the reform. A comparison of several aggregated measures of inequality and progressivity completes the analysis. Section 5 concludes.

2. Background and Literature

2.1. *Theory*

Taxation affects economic incentives and may therefore induce behavioral adjustments for individuals, causing efficiency costs compared to a hypothetical situation without taxes. As any feasible tax causes distortions, the theoretical question is how to characterize the second-best setting that implies minimum efficiency losses, given a fixed government revenue. Economic theory provides

intuition for why a shift from income to consumption taxation might be favorable in efficiency terms, i.e., promoting growth and employment. Within a static standard utility-maximization framework, it can be shown that both taxes distort the individual decision between consumption and leisure equivalently. An income tax reduces the net wage, while a consumption tax reduces the real value of net earnings. Under non-negative wage and income elasticities of labor supply, both forms of taxation reduce work incentives (Bargain *et al*., 2014). While only a fraction of the population is subject to income taxation, virtually everyone pays consumption taxes. The consumption tax base is hence broader, as it includes expenditures of pensioners, benefit-recipients and capital-income earners. Hence, consumption taxes allow for obtaining the same revenue with a lower rate. If one recalls the classic insight that the excess burden of a tax rises approximately with the square of the tax rate (Auerbach, 1985), a shift towards a consumption tax induces lower aggregate efficiency costs. The intuition is that the positive effect on labor supply from the higher net wage exceeds the negative effect from a lower real income, resulting in higher aggregate labor supply.

A theoretical counter-argument is that throughout the life-cycle, income necessarily equals consumption and therefore implies an equal burden of both taxes (Caspersen and Metcalf, 1993; Metcalf, 1994). However, this argument only holds if both tax schedules are constant in the long-run and if bequests are not considered. Although the only difference between (labor) income and consumption arises from consumption smoothing, this intuition is hardly relevant in the policy debate on what is understood as a regressive tax.[3] Another argument refers to the treatment of capital income. A tax levied on capital income distorts an individual's saving decision, as it implicitly taxes future consumption. If this is a normal good, an income tax discourages savings. In contrast, the savings decision is neutral to the level of consumption taxation, as the consumption tax does not alter the returns to savings. Reducing the capital income tax in favor of the consumption tax is therefore expected to increase savings and hence economic growth (Feldstein, 1978; Auerbach and Hines, 2002).

The interdependencies between both forms of taxation have regularly been addressed by the optimal taxation literature. Atkinson and Stiglitz (1976) were the first to capture the equity-efficiency trade-off of both taxes within a formal framework. Under the assumption of separable preferences and individuals that are inequality-neutral, they neglect any role for indirect taxation. Since all commodities are equally substitutable for leisure, any attempt to offset the distortion between labor and leisure is bound to cause efficiency losses.[4] Later contributions refined this argument by imposing more realistic assumptions and found commodity taxation to be a necessary component of any optimal tax structure. Among these assumptions are uncertainty about individual wages (Cremer and Gahvari, 1995), heterogeneity among agents not only in ability (Cremer *et al*., 2001; Saez, 2002), different underlying production technologies (Naito, 2007) or different evasion characteristics of both taxes (Boadway *et al*., 1994; Richter and Boadway, 2005).

[3]For a treatment of lifetime inequality in a simulation context, see Creedy (1997). A recent empirical analysis of lifetime inequality among German employees can be found in Bönke *et al*. (2015).

[4]See also the argumentation by Sørensen (2007).

According to Mankiw *et al.* (2009), the advance of indirect taxes and VAT in particular can be attributed to findings of optimal taxation theory. Despite Atkinson and Stiglitz' wide-known result not to levy any indirect taxes, it seems worth considering whether a shift to consumption taxation might adjust the direct to indirect tax mix towards the optimum (European Commission, 2008).

A proper application of the Ability to Pay Principle might provide further justification for a heavier reliance on consumption taxation. Such arguments favor consumption (the use of income) to income (the contribution to national production) as the better measure for individual ability (Gruber, 2011, chap. 25).[5]

2.2. *Empirical Evidence*

The efficiency impact of a shift from income to consumption taxation has been investigated by a number of empirical studies, most of them based on a macrosimulation framework. They largely reveal positive, but moderate effects from a compensated SSC reduction on GDP growth rate and employment for the German case.[6] All studies suggest positive, but moderate employment effects not higher than 1 percent of total employment. Similar results are obtained for other countries.[7] Unions' behavior in the aftermath of the reform is found crucial for the long-run effects of the tax shift. Studies that explicitly incorporate the mode of wage bargaining draw rather pessimistic conclusions. If unions' bargaining power is assumed to be sufficiently high, wage increases as a consequence of increased living costs become likely in the medium term. Another channel that might work against the effectiveness, though not captured in these studies, are announcement effects of VAT increases that cause domestic demand to boost before and to decline in the aftermath of the policy change.

Macro approaches exhibit drawbacks when it comes to distributional questions. Any conclusions derived from macro simulations do not account for heterogeneity among individuals. As a consequence, these kinds of questions have been addressed by a number of microsimulation studies which all focus on SSC reductions. Decoster *et al.* (2009) provide a comprehensive study incorporating four European countries. They simulate a 25 percent reduction in social security contributions, compensated by a VAT increase. Their results indicate negative welfare effects for households in low income deciles, as well as for households with low-educated and unemployed heads. This is in line with O'Donoghue *et al.* (2004), who find a general regressive impact in 12 OECD countries, Portugal being most regressive and Belgium being nearly proportional. Similar results are obtained by Bach *et al.* (2006), who simulate the effect of the three percentage points VAT increase implemented by the German government in 2007. This was complemented by a cut in unemployment insurance contributions by two percentage

[5]This idea dates as far back as to Thomas Hobbes: "It is fairer to tax people on what they extract from the economy, as roughly measured by their consumption, than to tax them on what they produce for the economy, as roughly measured by their income." (Gruber, 2011, p. 754)

[6]See Steiner (1996), Buscher *et al.* (2001), Böhringer *et al.* (2005), Feil and Zika (2005), Meinhardt and Zwiener (2005), Feil *et al.* (2006).

[7]See European Commission (2006, 2008) for a cut in income taxes in the EU as a whole, Altig *et al.* (2001) for a shift of the US federal income tax, and Dahlby (2003) for income tax shifting in Canada.

points. It should however be noted that this reform was not revenue-neutral. Thomas and Picos-Sanchez (2012) simulate a revenue-neutral shift of 5 percent of the SSC burden to VAT and find increasing work incentives particularly for low-income earners across several European countries. Applying the same reform, Picos-Sanchez and Thomas (2015) identify employees as particular beneficiaries. Meinhardt and Zwiener (2005) simulate a cut in SSC by two percentage points, combined with an increase in VAT by the same amount. Although the authors do not report fiscal effects, this reform is presumably not revenue-neutral as well. They identify civil servants, self-employed and unemployed as the main losers from the reform, while gains for employed persons are rather moderate. A related study is provided by Moscarola *et al*. (2015), who consider a shift of the tax base from labor to property, while accounting for labor market reactions.

The empirical results partly strengthen the cause for a tax shift for efficiency reasons, though the positive impact on employment and growth seems to be rather moderate. As the results for Germany indicate, the magnitude crucially depends on the institutional setting of the economy. The microsimulation studies presented here confirm a regressive impact. Low-income groups are typically worse off from a tax shift as well as unemployed and pensioners. This result is not surprising, as these groups typically face a low burden of income taxes and social security contributions.

3. Empirical Approach

Microsimulation models have become a standard tool in the ex-ante assessment of reforms of the tax-benefit system and therefore allow to trace changes in highly complex tax regulations. In particular, the specific institutional setting and the socio-economic structure in a given country need to be taken into account, which can hardly be accomplished by an analysis on an aggregate level.

The basic idea of microsimulation in the context of labor supply is to model the individual (or household) decision between leisure and consumption. Based on observed behavior of a representative population sample in a given institutional setting, preference parameters can be estimated. If net income (and thus consumption possibilities) changes as a consequence of a tax-benefit reform, these estimates are used to predict individual labor supply *after* the reform. The reform effect is then defined as the difference in aggregate behavior between the two institutional regimes. For this, a detailed representation of the tax-benefit system is necessary. We use the IZA Policy SImulation MODel (IZAΨMOD) of the Institute for the Study of Labor (Löffler *et al*., 2014a). Apart from replicating the German tax and transfer system, it comprises an econometrically estimated model of labor supply behavior. It assumes a discrete choice set of working hours, which facilitates the treatment of family labor supply. As our main database does not capture consumption expenditures, we have to extend our database. This is done by an Engel curve procedure, adopting the approach of Decoster *et al*. (2013).[8]

[8]Details on the database, the imputation procedure and the underlying labor supply model are provided in the Appendix.

Reform Scenarios

We carry out simulations of two benchmark scenarios, in which the standard VAT rate of 19 percent is increased in steps of one percentage point each. For a given increase in the standard VAT rate $d\tau > 0$, we obtain the resulting additional VAT revenue from total simulated revenues. We rely on simulated, not official revenues for this, as our micro-data only capture consumption from private households living in Germany and therefore cannot depict VAT payments from public consumption, enterprises and foreigners.[9] On the basis of revenue statistics, we obtain the necessary proportional reduction on income-related taxes and apply this factor to the simulated tax liabilities.[10] This is done for personal income taxes and social security contributions separately. This procedure is repeated 11 times until in the last step, an increase in the standard VAT rate from 19 percent to 30 percent is combined with a corresponding reduction on labor-related taxes. At the same time, we provide more detailed results for a reference scenario with a standard rate of 25 percent. While this implies substantial tax shifts, secondary effects, such as demand for compensation by unions, are less likely to play a role than for even stronger tax shifts.

Although SSC and income tax payments flow into separate budgets, their impacts on the overall budget are highly interlinked. For many years, the German statutory pension system has been partly financed through the tax budget, since SSC revenues are not sufficient to cover public pension payments. In fact, these payments have become the largest share of federal expenses.[11] For this reason, reforms on either income taxes or SSC imply equivalent effects for the public budget as a whole. A VAT increase by six percentage points would result in additional VAT revenue of €29 bn, the corresponding relief amounting to 16.9 percent for the personal income tax (total status quo revenues: €174.6 bn) and 15.5 percent for social security contributions (total status quo revenues from employees: €190.5 bn). As a consequence, pensions and public health care would need to receive more tax funding, thus dispersing the welfare state financing away from employees.

Income Concept

For each reform step, the combined tax change alters household budget constraints which, in turn, induces adjustments in household labor supply if the expected utility of an alternative choice category is higher than the status quo. In order to account for the budget effect of an increased consumption tax, the commonly used concept of disposable income is not sufficient here, as it ignores

[9]We however correct the simulated revenue by the under-coverage of total private consumption compared to national accounts, which amounts to 81 percent for the 2008 EVS.

[10]There are numerous ways for governments to reduce the burden of income-related taxes. Here, we refrain from discussing the various interdependent impacts of instruments, such as reducing marginal tax rates or raising the exemption level. Instead of providing a blueprint for a tax reform, we rather aim at gaining a rough insight on the interaction between both forms of taxation with respect to distributional questions. Therefore, we opt for the most straightforward way to reduce taxes, namely by proportional reduction. This is the standard approach in the literature.

[11]In 2009, €102 bn of tax revenues (roughly one third of total revenues) were spent on financing social security.

consumption taxes. For the subsequent analysis, the quantity of interest will be *Post-VAT Income (PVI)*, which is defined as disposable income minus VAT expenses. PVI can be understood as the amount of money that *would* be left for consumption after paying the VAT. This income is of course virtual, as it is not disposable for consumption after VAT has been paid. PVI is not only the basis for the distributional analysis, but also enters the utility function and hence determines the labor supply decision. We thereby implicitly assume that households have an identical perception of their burden of direct and indirect taxes. This may be questioned in light of the experimental studies by Sausgruber and Tyran (2005) and Blumkin *et al*. (2012), both pointing to a lower perception of consumption taxes. If this is true, households would ignore the VAT increase to some extent, implying a higher reaction from a reduced direct tax. With positive elasticities of labor supply, our estimated labor supply reaction should hence be understood as a lower bound.

Subtracting VAT expenses from disposable income is equivalent to full and instantaneous VAT shifting from firms to consumers.[12] We therefore abstract from the fact that it may take time until firms shift the higher VAT to consumers, which is in line with the logic of static models. Our expenditure imputation is also able to depict the effect on commodity demand through income and price changes.[13] This affects savings behavior as well as adjustments in the expenditure structure across commodity groups. As the level of basic social assistance in Germany is linked to inflation rates, we address the importance of this particular channel on our results.[14]

Incidence and VAT Differentiation

Subtracting the revenue-neutral deduction from household income implicitly assumes that workers bear the full burden of income taxes and social security contributions. Doubts are however justified, particularly for the case of payroll taxes, as their payment is split between employers and employees.[15] We address this issue by assuming alternative divisions of the tax incidence in a robustness check. If the incidence is low, employees benefit less from a tax reduction. We evaluate the extent to which this influences the overall distributional impact of the reform.

In a further robustness check, we alter the benchmark scenarios by increasing both VAT rates simultaneously, thereby addressing the issue of VAT rate differentiation. As in most OECD countries, expenditures for necessities are taxed with a reduced rate in Germany. The common justification for this policy are

[12]Full incidence of the German VAT in the medium run has been found by the Bundesbank (2008).

[13]See Appendix for details.

[14]In practice, the level of the means-tested unemployment benefit (*Arbeitslosengeld II*) is annually adjusted by the change of an index consisting of the price change in basic goods and services (70 percent) and the average change in employees' net wages (30 percent). As 55 percent of all expenditures are subject to the standard VAT rate (see Table A.2), each percentage point of higher standard VAT rate mechanically raises the price level and hence the unemployment benefit by 0.46 percentage points.

[15]The findings of Saez *et al*. (2012), exploiting a natural experiment in Greece, suggest that for a payroll tax increase, the long-term burden of workers is limited to the *employee* share. It is however unclear whether their findings are applicable for a different institutional setting and a payroll tax *reduction*.

TABLE 1
Labor Supply Effects (Standard VAT Rate of 25%)

		PIT Reduction		SSC Reduction	
Reform Scenario	Base	with UB indexation	no UB indexation	with UB indexation	no UB indexation
			in thousands		
Full-Time Equivalents	38,039	242.9	286.3	207.9	249.9
Participation	40,344	86.3	125.3	123.7	161.6

Own calculations with IZAΨMOD v.3.0.4. Full-Time Equivalent = 40 hours per week.

equity concerns. If the reduced rate is fulfilling its redistributional objective, a simultaneous increase of both VAT rates should imply more regressive effects than the benchmark scenarios.

4. Results

4.1. *Labor Supply Effects*

Our microsimulation approach sheds light on whether the expectations of positive effects on work incentives can be confirmed. The labor supply effects simulated here have to be interpreted as medium-term outcomes, i.e., after households have adjusted their labor supply behavior to the new institutional environment. If one assumes a negative wage elasticity of labor demand, firms will react to higher labor supply by lowering offered wages, leading to an equilibrium outcome below the initial labor supply shift (Peichl and Siegloch, 2012).

The simulated labor supply responses, for an increase of the standard VAT rate from 19 percent to 25 percent, are displayed in Table 1. It shows the aggregate change in hours worked, measured in full-time equivalents (FTE) of 40 hours per week. The total effect is found to be positive in the order of 200,000 to 250,000 FTE for both the PIT and the SSC reduction. This corresponds to an increase in labor supply by around 0.5 percent of total employment. This is well in line with results obtained from CGE studies (Buscher *et al*., 2001, p. 466; Böhringer *et al*., 2005, pp. 95ff). Looking at the extensive margin of labor supply, i.e., the number of individuals entering the labor market from inactivity, we simulate an increase by 86,000 (PIT reduction) and 124,000 (SSC reduction) workers respectively, indicating substantially higher activating potential of lower social security contributions compared to lower PIT. This is not surprising, as many workers with comparably low earnings are subject to these contributions, while still exempted from the income tax. If the increase in labor supply can be mostly realized, i.e., facing limited constraints on the demand side, our simulation results confirm the theoretical expectations concerning a moderate growth in total employment.[16] In

[16]Microsimulation approaches with demand side restrictions are provided by Creedy and Duncan (2005) and Peichl and Siegloch (2012). In both studies, at least half of the supply effect is maintained.

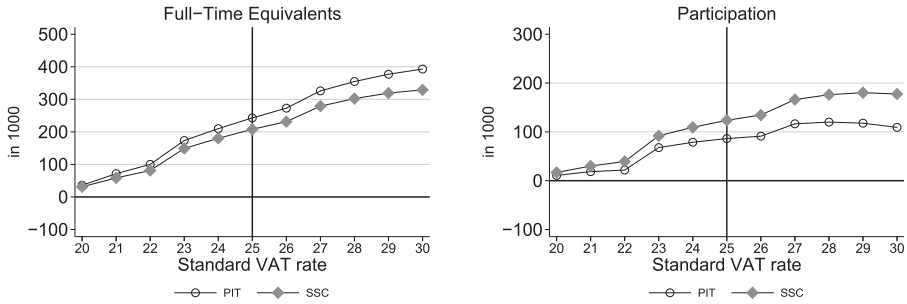

Figure 1. Labor Supply Effects for Different VAT Rate Increases

Own calculations with IZAΨMOD v.3.0.4. Full-Time Equivalent = 40 hours per week. The vertical line indicates the reference scenario that displayed in Table 1.

the results presented so far, unemployment benefits are indexed by the inflation rate. The additional two columns in Table 1 reveal that ignoring this channel would significantly overestimate potential labor supply effects. This holds particularly for the extensive margin (up to 1.5 times higher labor supply effect), as higher unemployment benefits reduce the price for leisure and hence lower work incentives.

Aggregate labor supply effects for different reform scenarios (i.e., different VAT increases) are depicted in Figure 1. This sheds light on the interaction between both taxes if the shift is smaller. Overall, the total hours effect increases about linearly for both scenarios, reaching 400,000 (PIT) and 330,000 (SSC) full-time equivalents respectively. For the participation margin, effects are substantial only after the fourth reform step. Moreover, the labor supply effect of the SSC reduction is stronger than the PIT reduction across the whole range of reforms for the participation margin. The inverse holds for the change in aggregate hours.

The total change in labor supply for the reference scenario is decomposed by income deciles in Figure 2. It can be seen that the increase in hours worked in the PIT scenario (dark gray bars) is mainly driven by higher income groups. The participation effect is even slightly negative up to the third decile, while most workers entering the labor market are in the top deciles. These are mostly secondary

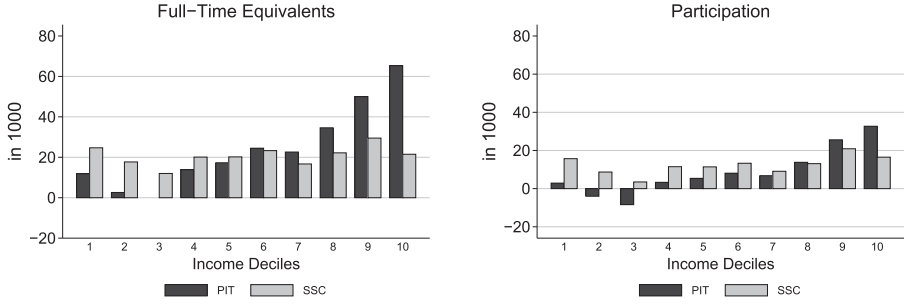

Figure 2. Labor Supply Effects by Income Deciles (VAT Rate of 25 Percent)

Own calculations with IZAΨMOD v.3.0.4. Income deciles are based on equivalized Post-VAT income. Full-Time Equivalent = 40 hours per week.

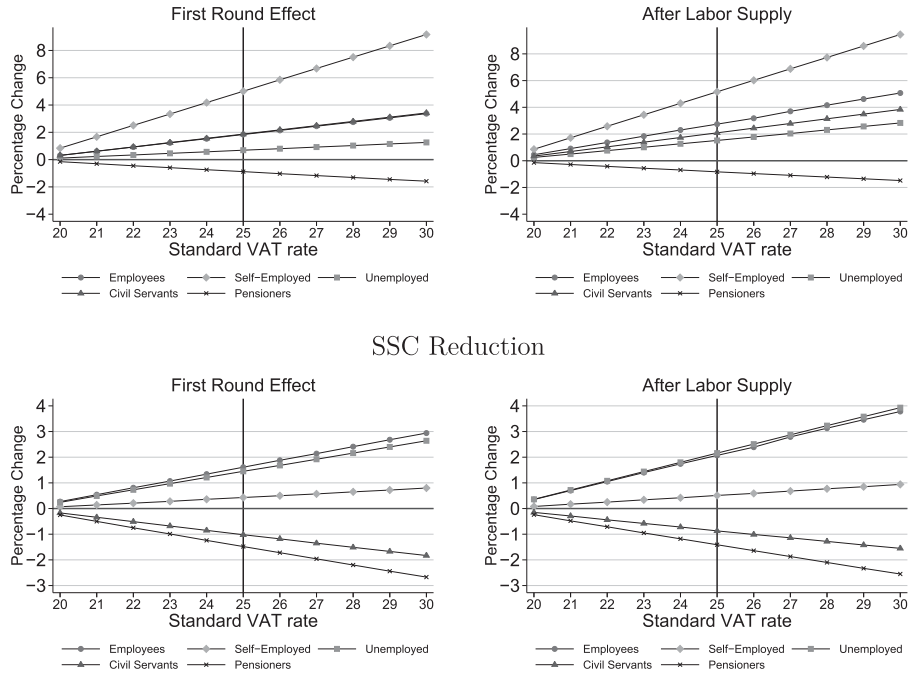

Figure 3. Income Change by Employment Type

Own calculations with IZAΨMOD v.3.0.4. Income changes refer to equivalized Post-VAT income. First-Round Effects refer to the situation without labor supply reactions. The vertical line indicates the reference scenario.

earners who have been previously inactive and now face a lower individual marginal tax rate. Shifting from SSC affects household budgets already at a lower income level and exceeds the hours effect from the PIT reduction in the bottom half of the distribution, as indicated by the light gray bars. If policy-makers seek to reduce entry barriers into the labor market by reducing the tax wedge, the SSC scenario appears to be better targeted.

4.2. *Distributional Impact*

Employment Type

The average budget effects with respect to the employment type are illustrated in Figure 3.[17] Employees experience modest income gains *vis-à-vis* the status quo (+4 percent in the short run, +5 percent when accounting for labor supply changes). For other employment groups, the differences between the scenarios with and without behavioral adjustment are negligible.[18] Pensioners lose most from the reform, as they hardly benefit from reductions on the income side.

[17]Throughout the distributional analysis, incomes are adjusted by equivalence weights using the modified OECD scale.

[18]This is in line with Picos-Sanchez and Thomas (2015). The results for the standard VAT rate of 21 percent is complementary to their second reform scenario.

Moreover, they are not able to cushion the adverse budget effect through increased labor supply. For self-employed and civil servants, the picture is mixed. On the one hand, these groups significantly benefit from income tax reductions. However, they are not subject to social security payments. For this reason, civil servants turn out to be slightly worse off from the SSC reform (see also Meinhardt and Zwiener (2005)).[19]

With the exception of pensioners and civil servants, all employment groups are able to compensate a large share of their losses through increased realized labor supply. The main losers from the SSC reform are pensioners, who lose around 2 percent on average. In relative terms, employees and unemployed workers are the main beneficiaries. The average budget effect for unemployed (+2 percent and +4 percent respectively for the SSC reduction) is due to substantial increases for *some* unemployed. For those remaining unemployed the total change in PVI will be about zero, as the increase in VAT expenses is expected to correspond roughly to the increase in unemployment benefits due to indexation. In general, these results are in line with expectations as well. Those who are not affected by the tax that is reduced are, in tendency, worse off from the reform.

Income deciles: The distributional impact along the reform path, differentiated by (status quo) deciles of Post-VAT-Income, is illustrated in the upper part of Figure 4. It displays the relative income change due to the reform by income deciles. For a clearer exposition, we restrict the presentation to five selected deciles.

The upper panel of Figure 4 demonstrates the increasingly regressive impact of a shift from personal income tax to VAT. Minor VAT increases hardly affect budgets of medium-income earners, but rather let the high-income earners better off. After the final reform step (standard VAT rate of 30 percent), the lowest decile suffers from an income loss of around 4 percent, while the top decile gains more than 8 percent. This is in principle not surprising as one would typically expect those households to lose from a shift towards consumption taxation who bear a low burden of PIT prior to the reform. The higher saving ratio of high-income earners exacerbates this effect. The core interest of our investigation is to analyze to what extent the regressive impact is weakened if behavioral responses are accounted for. As the right panel shows, the distributional picture however hardly changes for the PIT scenario, if we consider the budget changes after the labor supply response. The improvement to the first-round effect is one percentage point at most across income deciles, leaving the poorest decile 4 percent worse off compared to the baseline.

The equivalent analysis is presented in the lower panel of Figure 4 for the SSC reduction. While still implying a regressive impact in the short run, income gains are not larger than 1.5 percent. The bottom decile loses around 2 percent on average. Besides, the 7^{th} decile experiences larger gains than the 10^{th} income decile. This can be explained by a low marginal payroll tax burden for top-earners due to the assessment threshold and a decreasing income share of labor earnings for this group. The labor supply response causes the picture to change to some extent by raising the income effects for all deciles. Middle income groups gain relatively

[19]The slightly positive budget effect for self-employed is purely due to changes in spouses' income, which cause equivalence-weighted household income to change.

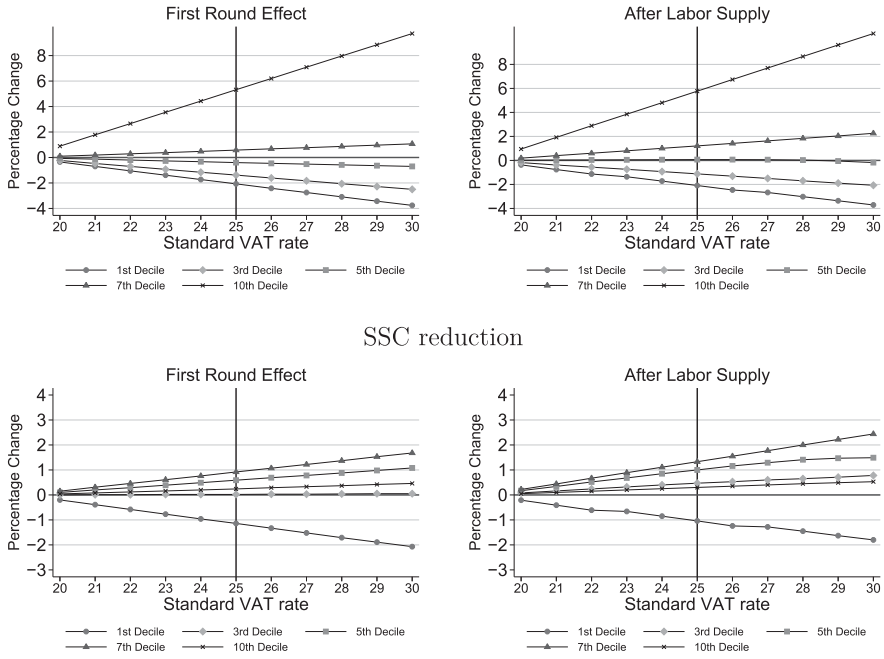

Figure 4. Income Change by Income Deciles

Own calculations with IZAΨMOD v.3.0.4. Income changes refer to equivalized Post-VAT income. First-Round Effects refer to the situation without labor supply reactions. The vertical line indicates the reference scenario.

more than the highest income decile. The SSC reductions shift taxes from one regressive form of taxation to the other, which clearly has lower adverse distributional effects than the income tax reduction. As the burden of SSC is more dispersed over the income distribution, the budget changes from the reform are less pronounced for the second scenario.

Summing up, a shift from labor to consumption taxation indeed exhibits a regressive impact on household budgets. Lower income groups lose while receivers of high incomes benefit, in tendency, from the reform. This can be easily explained by the fact that the bottom 50 percent of the income distribution account only for 5 percent of total income tax revenues and thus hardly benefit from a reduction. The regressive impact is substantially less severe for a shift from social security contributions to VAT. Hence, reforming the personal income tax as suggested here is likely to be confronted with strong political opposition and is therefore not a realistic policy proposal. As a consequence, the in-depth analysis in Section 4.3 concentrates on the SSC reductions as the more attractive option for policy-makers.

Tax Progressivity and Inequality

To complete the picture on the distributional impact of the reform, Table 2 shows results for the degree of tax progressivity for different components of the

TABLE 2
PROGRESSIVITY OF DIFFERENT TAXES

Reference Scenario	Total	PIT	SSC	VAT
	Base			
π_{Suits}	0.218	0.346	−0.060	−0.194
π_{RS}	0.076	0.049	−0.007	−0.012
	Reform 1: PIT Reduction			
π_{Suits}	0.185	0.345	−0.058	−0.188
π_{RS}	0.063	0.040	−0.007	−0.014
	Reform 2: SSC Reduction			
π_{Suits}	0.212	0.345	−0.059	−0.192
π_{RS}	0.074	0.049	−0.005	−0.015

Own calculations with IZAΨMOD v.3.0.4. Reform effects after Labor Supply adjustment for VAT standard rate of 25%. All reforms with indexation of basic unemployment benefit.

tax-benefit system. We analyze two measures of tax progressivity. The Suits index π_{Suits} builds on the Lorenz curve for tax payments. Let $L_X(p)$ and $L_T(p)$ denote the Lorenz curves for pre-tax incomes and tax liabilities respectively. Then the *Suits* index π_{Suits} is obtained by

$$\pi_{Suits}=2\int_0^1 [L_X(p)-L_T(p)]L'_X(p)dp \tag{1}$$

If π_{Suits} is calculated for some parts of the tax-benefit system (as in Table 2), the index for the overall progressivity is a weighted average of the partial indices, with average tax rate as weights (Suits, 1977). The index takes values in the [−1;1] interval and is an indicator for the progressivity of the tax schedule. A value of 1 would imply an extremely progressive system where only one individual would be subject to the tax. Opposed to this, the *Reynold-Smolensky* index π_{RS} captures the redistributional impact of a particular tax by the difference in pre- and post-tax income concentration.

$$\pi_{RS}=2\int_0^1 [L_{X-T}(p)-L_X(p)]dp=\text{Gini}_{\text{PreTax}}-\text{Gini}_{\text{PostTax}} \tag{2}$$

The difference of both indices can be illustrated by the following example. A strongly progressive tax schedule (as measured by π_{Suits}) only exerts a redistributive impact if high marginal tax rates are paid by a significant number of taxpayers (captured by π_{RS}). Similarly to π_{Suits}, π_{RS} can be decomposed into the relative contributions of certain elements of the tax system (Lambert, 2001). For both concepts, a progressive (regressive) tax is associated with a negative (positive) value.

In the status quo, π_{Suits} for VAT amounts to −0.194, while it is 0.346 for the personal income tax. Hence, the Value-Added Tax is about half as regressive as the income tax schedule is progressive.[20] At the same time, the distributional

[20]See Decoster *et al*. (2010) for other countries.

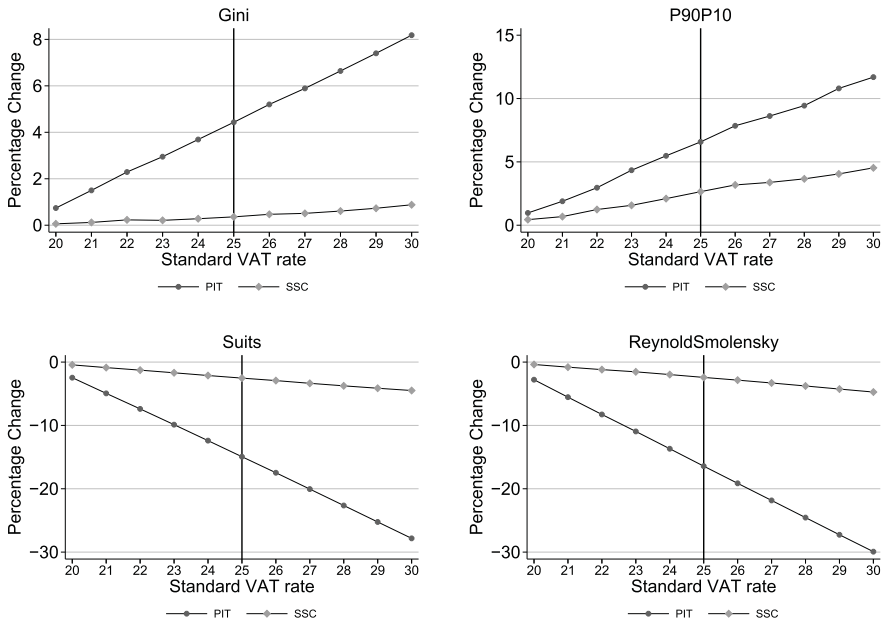

Figure 5. Changes in Inequality and Tax Progressivity

Own calculations with IZAΨMOD v.3.0.4. The graphs show the difference in distributional indices from reducing SSC after labor supply response. Graphs without behavioral response are available upon request. The vertical line indicates the reference scenario.

impact of VAT as measured by π_{RS} is regressive (-0.012), but only a quarter compared to the PIT progressivity (0.049). The PIT reduction does not affect the progressivity of the tax tariff, but reduces redistribution via the income tax. It is also apparent that both reforms make the VAT schedule more regressive in distributive terms. The Reynold-Smolenksy measure for VAT is only slightly higher than for SSC. This explains why the SSC reform is close to neutral in terms of total progressivity ($\Delta\pi_{Suits} = -2.7\%$) and redistribution ($\Delta\pi_{RS} = -2.6\%$).

The baseline Gini for our income concepts amounts to 0.303. For the reference scenario, it increases by 0.013 for the PIT reform after Labor Supply. For the SSC reform, the Gini index increases by only 0.001, leaving inequality nearly unchanged. The percentage changes for four basic inequality and progressivity measures are depicted in Figure 5 for each intermediate reform step. The Gini index rises by about 8 percent for the full PIT reform and around 1 percent for the SSC reform. The $P90/P10$ ratio (upper right panel) however shows a significant increase also for the SSC reform, suggesting higher income polarization.

4.3. *Sensitivity Analysis*

Alternative Payroll Tax Incidence

We deviate from the benchmark SSC reduction scenario by altering the assumption of full incidence of the payroll tax. This implies that the total payroll tax

reduction falls on employees. Instead, we present changes in aggregate distributional measures in Figure 6 for payroll tax incidence values of 100 percent, 75 percent, 50 percent, 25 percent and 0 percent, respectively. As labor demand is typically estimated to be more elastic than labor supply (Lichter *et al*., 2015), an incidence share of more than 50 percent for employees seems most realistic. Incidence below 100 percent causes employees to gain less from a payroll tax reduction and hence weakens the positive effect on work incentives. For the extreme case of no incidence, we simply raise only the Value Added Tax. For larger SSC reductions, the labor demand channel may gain importance. As labor costs for firms decrease, hiring may become more attractive. However, this mechanism is out of our models' scope.[21]

As expected, the labor supply response is weaker if the net wage is less affected by the payroll tax change (left panel of Figure 6). For an incidence of 25 percent or less, aggregate labor supply even decreases for all scenarios. The right panel depicts the corresponding changes of various measures of inequality and tax progressivity, the left bar representing the benchmark scenario of 100 percent. While the Gini index is higher for lower incidence, income polarization, measured by the $P90/P10$ share, decreases. The intuition is that earners of higher incomes are losing disproportionately if tax incidence is lower. Tax regressivity is increasing steadily as assumed incidence decreases; the overall redistribution of the tax system does not vary much for different incidence values. For the most realistic range of 50 percent and above, our main conclusions with regard to the overall inequality impact however remain unaffected.

The Suits index indicates a steadily increasing overall regressivity. Interestingly, the $P90/P10$ measure slightly decreases for lower tax incidence, suggesting slightly lower income polarization.

Increasing both VAT Rates

So far, our reform scenarios left the reduced VAT rate of 7 percent unchanged. Levying reduced VAT rates on necessities is justified, among others, by equity considerations. As a consequence, all EU countries with the exception of Denmark impose differentiated VAT rates. Nonetheless, VAT differentiation is often criticized for not achieving its social purpose (OECD/Korea Institute of Public Finance, 2014) and to distort consumers' choices. In the following, we address the question whether shifting the tax burden also on commodities that are taxed at a lower rate is particularly to the detriment of low-income earners. We alter the SSC reduction scenario such that in each reform step, we increase both rates simultaneously in steps of one percentage point. A VAT structure with rates of 23 percent and 11 percent (Status Quo: 19 percent and 7 percent) is comparable with the reference scenario with regard to the revenue effect. It is important to note that the zero-rate commodities remain exempted.

The distributional outcome of this reform is depicted in Figure 7, contrasted with the reference scenario for the SSC reform. As there is virtually no difference in the income changes both in the short and medium run, it is fair to conclude

[21]This possible positive employment impact would also need to be contrasted with lower commodity demand.

(a) Labor Supply Effects, Participation

(b) Inequality Effects, after LS

Figure 6. Alternative Incidence Assumptions

Own calculations with IZAΨMOD v.3.0.4.

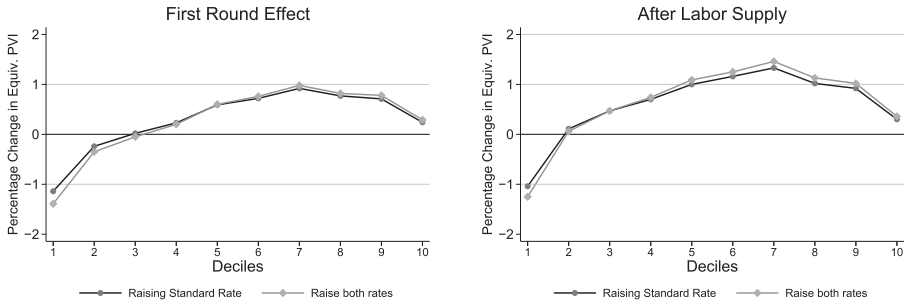

Figure 7. Distributional Impact of Raising Both VAT Rates for the Reference Scenario

Own calculations with IZAΨMOD v.3.0.4. The standard rate scenario corresponds to the baseline SSC reduction with a standard VAT rate of 25 percent, the second scenario applies a standard rate of 23 percent and a reduced rate of 11 percent, while reducing SSC. Income changes refer to equivalized Post-VAT income. First-Round Effects refer to the situation without labor supply reactions.

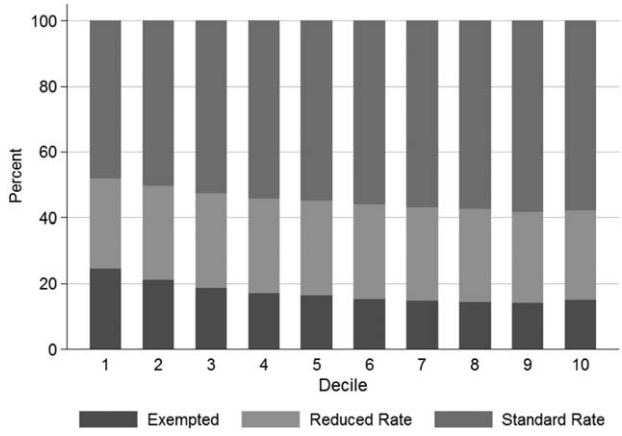

Figure 8. VAT Tax Rates over Income Deciles

Source: EVS 2008. Income deciles for equivalized disposable income. Each bar shows mean values of expenditures shares by the respective VAT rate applied.

that raising both VAT rates instead of the standard rate does not imply a distinct distributional impact. This suggests that the reduced VAT rate in Germany hardly achieves its redistributional purpose. The intuition is given in Figure 8. Reduced-rate commodities account for about the same expenditure share across income groups. A further policy proposal often discussed is the introduction of a uniform VAT rate. If the VAT-exempted commodities are left untouched, one would expect (qualitatively) very similar distributional effects of this reform as in Figure 7.

5. Conclusions

This paper examines a partial shift of taxation from labor income to consumption in Germany. Our empirical approach combines a detailed analysis of

changes in household budgets with a microsimulation of behavioral reactions on the labor market. Based on a dual data base, we carry out a microsimulation of several reform scenarios shifting a substantial share of personal income taxes or social security contributions onto the Value Added Tax. The policies are designed revenue-neutral. The expectations of positive effects on household work incentives are confirmed by the simulation. The total increase in labor supply for the reference scenario (Standard VAT rate of 25 percent) is expected to be rather moderate below 1 percent of total employment for the benchmark scenarios. This suggests a limited capacity of this policy instrument for targeting workers at the margin to enter employment.

The distributional evidence suggests that a shift from personal income tax to VAT has a regressive impact on household budgets. Negative effects are expected for low-income households, unemployed and pensioners in particular. This budget loss amounts to up to 4 percent of equivalized income, whereas the policy clearly favors high-income earners. The change in aggregate distributional measures supports this view by indicating higher inequality and a lower degree of the overall tax progressivity. Typically, most losers have a low burden of direct taxes and thus hardly benefit from a reduction on the income side. These static (i.e., non-behavioral) results are in line with micro-based evidence from other studies (Meinhardt and Zwiener, 2005; Thomas and Picos-Sanchez, 2012; Picos-Sanchez and Thomas, 2015).

Taking into consideration labor supply effects, the overall picture slightly improves for the SSC reduction, as income effects turn positive for the majority of people. This is for two reasons. First, SSC are a regressive form of taxation themselves. Replacing them with another regressive form of taxation hardly alters its distributional impact. Second, SSC reductions affect household budgets at a rather low income level, which bears activating potential. Reducing social security contributions overall entails lower inequality increases than a shift from personal income taxes. Besides, we demonstrate the negligible redistributive impact of the reduced VAT rate. It is worth noting that our static approach does not allow conclusions beyond the medium run. It is possible that positive employment effects vanish in the long run if unions are able to assert higher wages.

Our empirical results may serve as a point of departure for further research in several areas. First, it is worth considering possible extensions of the policy proposal in order to increase both political feasibility and effectiveness with regard to increasing work incentives for low-income groups (Thomas and Picos-Sanchez, 2012). One could think of a reform that is both *revenue*- and *inequality*-neutral. As Decoster *et al*. (2010) suggest, increasing the progressivity of the remaining income tax schedule is one option. Another way would be to compensate the main losers by raising old-age pensions. Our results suggest that designing such a reform is very well possible. In order to get a broader picture of the overall distribution of the consumption tax burden, incorporating excise taxes seems promising. A shift towards taxes on fuel or electricity is regularly discussed in the context of environmental tax reforms that aim at internalizing external effects.

References

Altig, D., A. J. Auerbach, L. J. Kotlikoff, K. A. Smetters, and J. Walliser, "Simulating Fundamental Tax Reform in the United States," *American Economic Review*, 91, 574–95, 2001.

Atkinson, A. and J. Stiglitz, "The Design of Tax Structure: Direct Versus Indirect Taxation," *Journal of Public Economics*, 6, 55–75, 1976.

Auerbach, A. J., The Theory of Excess Burden and Optimal Taxation, Vol. 1 of Handbook of Public Economics, Chap. 2, 61–127, Amsterdam: North-Holland, 1985.

Auerbach, A. J. and J. R. Hines, *Taxation and Economic Efficiency*, Vol. 3 of Handbook of Public Economics, Chap. 21, 1347–421: North-Holland, 2002.

Bach, S., P. Haan, O. Hofmeister, and V. Steiner, "Increasing the Value-Added Tax to Re-Finance a Reduction of Social Security Contributions?" A Behavioral Microsimulation Analysis for Germany DIW Berlin, 2006.

Bargain, O., K. Orsini, and A. Peichl, "Comparing Labor Supply Elasticities in Europe and the US: New Results," *Journal of Human Resources*, 49, 723–838, 2014.

Becker, I., J. R. Frick, M. M. Grabka, R. Hauser, P. Krause, and G. G. Wagner, "A Comparison of the Main Household Income Surveys for Germany: EVS and SOEP," in R. Hauser and I. Becker (Eds) *Reporting on Income Distribution and Poverty*, Heidelberg: Springer, 55–90, 2003.

Blumkin, T., B. J. Ruffle, and Y. Ganun, "Are Income and Consumption Taxes Ever Really Equivalent? Evidence from a Real-Effort Experiment with Real Goods," *European Economic Review*, 56, 1200–19, 2012.

Boadway, R., M. Marchand, and P. Pestieau, "Towards a Theory of the Direct-Indirect Tax Mix," *Journal of Public Economics*, 55, 71–88, 1994.

Böhringer, C., S. Boeters, and M. Feil, "Taxation and Unemployment: An Applied General Equilibrium Approach," *Economic Modelling*, 22, 81–108, 2005.

Bönke, T., G. Corneo, and H. Lüthen, "Lifetime Earnings Inequality in Germany," *Journal of Labor Economics*, 33, 171–208, 2015.

Bundesbank, Preis- und Mengenwirkungen der Mehrwertsteueranhebung zum 1. Januar 2007 Monatsbericht April, 2008.

Buscher, H. S., H. Buslei, K. Göggelmann, H. Koschel, T. F. Schmidt, V. Steiner, and P. Winker, "Empirical Macro Models Under Test. A Comparative Simulation Study of the Employment Effects of a Revenue Neutral Cut in Social Security Contributions," *Economic Modelling*, 18, 455–74, 2001.

Caspersen, E. and G. Metcalf, "Is a Value Added Tax Progressive? Annual versus Lifetime Incidence Measures," NBER Working Paper No. 4387, 1993.

Creedy, J. "Lifetime Inequality and Tax Progressivity with Alternative Income Concepts," *Review of Income and Wealth*, 43, 283–95, 1997.

Creedy, J. and A. Duncan, "Aggregating Labour Supply and Feedback Effects in Microsimulation," *Australian Journal of Labour Economics*, 8, 277–90, 2005.

Cremer, H. and F. Gahvari, "Uncertainty, Optimal Taxation and the Direct versus Indirect Tax Controversy," *The Economic Journal*, 105, 1165–79, 1995.

Cremer, H., P. Pestieau, and J.-C. Rochet, "Direct Versus Indirect Taxation: The Design of the Tax Structure Revisited," *International Economic Review*, 42, 781–99, 2001.

Dahlby, B. "Restructuring the Canadian Tax System by Changing the Mix of Direct and Indirect Taxes," in H. Grubel (ed.) *Tax Reform in Canada: Our Path to Greater Prosperity*: The Fraser Institute, 77–108, 2003.

Decoster, A., K. De Swerdt, J. Loughrey, C. O'Donoghue, and D. Verwerft, "Comparative Analysis of the Distributional Impact of Combined Changes in Direct and Indirect Taxes and Benefits for Five European Countries," EUROMOD AIM-AP Deliverable 3.6, University of Leuven, 2009.

Decoster, A., J. Loughrey, C. O'Donoghue, and D. Verwerft, "How Regressive are Indirect Taxes? A Microsimulation Analysis for Five European Countries," *Journal of Policy Analysis and Management*, 29, 326–350, 2010.

Decoster, A., R. Ochmann, and K. Spiritus, "Integrating Indirect Taxation into EUROMOD—Documentation and Results for Germany," EUROMOD Working Paper No. EM 20/13, 2013.

European Commission, Macroeconomic Effects of a Shift from Direct to Indirect Taxation: A simulation for 15 EU Member States in *72nd meeting of the OECD Working Party No. 2 on Tax Policy Analysis and Tax Statistics*, 2006.

European Commission, The Efficiency of Tax Systems: shifting taxation from labour to consumption Note for the EPC Working Group on Quality and Public Finances, 2008.

Feil, M., S. Klinger, and G. Zika, Sozialabgaben und Beschäftigung. Simulation mit drei makroökonomischen Modellen IAB Discussion Paper No. 22/2006, 2006.

Feil, M. and G. Zika, "Less Contribution, More Employment? What Will Cutting Social-Security Contributions Accomplish?," in C. Dreger, H. P. Galler, and U. Walwei (Eds) *Determinants of employment. The macroeconomic view*: Nomos, 123–156, 2005.
Feldstein, M., "The Welfare Cost of Capital Income Taxation," *Journal of Political Economy*, 86, 29–51, 1978.
Gruber, J., *Public Finance and Public Policy:* Worth Publishers, 3rd edition, 2011.
Koske, I. "Fiscal Devaluation—Can it help to boost competitiveness?," OECD Economics Department Working Paper No. 1089, 2013.
Lambert, P. J., *The Distribution and Redistribution of Income*: Manchester University Press, 3rd edition, 2001.
Lichter, A., A. Peichl, and S. Siegloch, "The Own-Wage Elasticity of Labor Demand: A Meta-Regression Analysis," *European Economic Review*, 80, 94–119, 2015.
Löffler, M., A. Peichl, N. Pestel, S. Siegloch, and E. Sommer, "Documentation IZAΨMOD v3.0: The IZA Policy Simulation Model," IZA Discussion Paper No. 8553, 2014a.
Löffler, M., A. Peichl, and S. Siegloch, "Discrete Choice Labor Supply Models and Wage Exogeneity," IZA Discussion Paper No. 8281, 2014b.
Mankiw, N. G., M. Weinzierl, and D. Yagan, "Optimal Taxation in Theory and Practice," *Journal of Economic Perspectives*, 23, 147–74, 2009.
Martinez-Vazquez, J., V. Vulovic, and Y. Liu, "Direct versus Indirect Taxation: Trends, Theory and Economic Significance," International Studies Program Working Paper Series at AYSPS No. 1014, International Studies Program, Andrew Young School of Policy Studies, Georgia State University, 2010.
Meinhardt, V. and R. Zwiener, "Gesamtwirtschaftliche Wirkungen einer Steuerfinanzierung versicherungsfremder Leistungen in der Sozialversicherung," DIW Politikberatung Kompakt 7, 2005.
Metcalf, G. E., "Life Cycle versus Annual Perspectives on the Incidence of a Value Added Tax," in J. M. Poterba (ed.) *Tax Policy and The Economy*, 8: MIT Press, 45–64, 1994.
de Mooij, R. and M. Keen, "Fiscal Devaluation and Fiscal Consolidation: The VAT in Troubled Times," NBER Working Paper No. 17913, 2012.
Moscarola, F. C., U. Colombino, F. Figari, and M. Locatelli, "Shifting Taxes from Labour to Property: A Simulation under Labor Market Equilibrium," IZA Discussion Paper No. 8832, 2015.
Naito, H., "Atkinson-Stiglitz Theorem with Endogenous Human Capital Accumulation," *The B.E. Journal of Economic Analysis & Policy*, 7, 2007.
O'Donoghue, C., M. Baldani, and D. Mantovani, "Modelling the Redistributive Impact of Indirect Taxes in Europe: An Application of Euromod," EUROMOD Working Papers No. EM7/01, 2004.
OECD, Consumption Taxes: the Way to the Future? OECD Policy Brief, 2007.
OECD, "Choosing a Broad Base—Low Rate Approach to Taxation," OECD Tax Policy Studies No. 19, 2010.
OECD, Taxing Wages 2014, OECD Publishing, 2014.
OECD/Korea Institute of Public Finance, "The Distributional Effects of Consumption Taxes in OECD Countries," OECD Tax Policy Studies No. 22, OECD Publishing, 2014.
Peichl, A. and S. Siegloch, "Accounting for Labor Demand Effects in Structural Labor Supply Models," *Labour Economics*, 19, 129–38, 2012.
Picos-Sanchez, F. and A. Thomas, "A Revenue-neutral Shift from SSC to VAT: Analysis of the Distributional Impact for 12 EU-OECD Countries," *FinanzArchiv: Public Finance Analysis*, 71, 278–98, 2015.
Richter, W. F. and R. W. Boadway, "Trading Off Tax Distortion and Tax Evasion," *Journal of Public Economic Theory*, 7, 361–81, 2005.
Saez, E., "The Desirability of Commodity Taxation under Non-Linear Income Taxation and Heterogeneous Tastes," *Journal of Public Economics*, 83, 217–30, 2002.
Saez, E., M. Matsaganis, and P. Takloglou, "Earnings Determination and Taxes: Evidence from a Cohort-Based Payroll Tax Reform in Greece," *The Quarterly of Journal of Economics*, 127, 493–533, 2012.
Sausgruber, R. and J.-R. Tyran, "Testing the Mill Hypothesis of Fiscal Illusion," *Public Choice*, 122, 39–68, 2005.
Savage, M. and T. Callan, "Modelling the Impact of Direct and Indirect Taxes Using Complementary Datasets," IZA Discussion Paper No. 8897, 2015.
Sørensen, P. B., "The Theory of Optimal Taxation: What is the Policy Relevance?," *International Tax and Public Finance*, 14, 383–406, 2007.
Steiner, V., "Employment and Wage Effects of Social Security Financing," ZEW Discussion Paper No. 96-14, 1996.

Suits, D., "Measurement of Tax Progressivity," *American Economic Review*, 67, 747–52, 1977.
Thomas, A. and F. Picos-Sanchez, "Shifting from Social Security Contributions to Consumption Taxes: The Impact on Low-Income Earner Work Incentives," OECD Taxation Working Papers, No. 11, OECD Publishing, 2012.

Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

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Figure A2: VAT Incidence.
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Table A2: VAT Shares by Expenditure Categories.
Table A3: Estimates of Structural Labor Supply Model.
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Appendix A2: Imputation of Expenditures.
Appendix A3: Tax-Benefit and Labor Supply Modules.