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Who bears the tax burden in Germany?

Tax structure slightly progressive

By Stefan Bach, Martin Beznoska, and Viktor Steiner

A comprehensive, microdata-based analysis of the German tax system's distributional effects in 2015 shows that the total tax burden from direct and indirect taxes is slightly progressive on higher income segments, but regressive in the lower income deciles. Income and corporate taxes are distinctly progressive. They impose hardly any burden on lower- and middle-income households, but the average burden significantly increases for higher incomes. On the other hand, the indirect taxes that generate almost half of Germany's tax revenues have a highly regressive effect. In relation to income, they burden low earners more heavily than high-income households. When some of the social security contribution is assigned to the tax system, the total tax burden on middle income groups is not much lower than that on the very wealthy, whose corporate and capital income are not subject to a progressive income tax.

Until now, there has been no precise information on the distribution of the total tax burden—including indirect taxes and corporate taxes—by personal income in Germany.¹ In a research project funded by the Hans Böckler Foundation, DIW Berlin, and Freie Universität Berlin compiled the relevant data sources and conducted a comprehensive analysis of the German tax and social security contribution system.²

We combined survey data on the incomes and expenditures of private households with wage and income tax statistics to create a consistent database, and projected the data to 2015 (Box). The key underlying data sources are the Socio-Economic Panel (SOEP), the Income and Consumption Survey (*Einkommens- und Verbrauchsstichprobe*, EVS), and the wage and income tax statistics from the Federal Statistical Office. On this basis, complex microsimulation models determined the tax and social security contribution burden according to the current taxation and social security contribution laws in the year in question. Using household surveys allowed for a broad picture of the distribution effects by the socio-economic household characteristics. And including the income tax statistics captures income and corporate tax burdens more precisely. Business and capital income, which are highly concentrated at the very top of the income distribution, are underrepresented in the household surveys, but are well represented in the income tax statistics.³

¹ For previous analyses, see Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI) and the FiFo Institute for Public Economics at the University of Cologne, "Wer trägt den Staat? Die aktuelle Verteilung von Steuer- und Beitragslasten auf die Bevölkerung in Deutschland," RWI Project Report (2009); Rheinisch-Westfälisches Institut für Wirtschaftsforschung and the Initiative Neue Soziale Marktwirtschaft (INSM), "Wer trägt den Staat im Jahr 2015? Die aktuelle Verteilung der Steuer- und Abgabenlasten auf die Bevölkerung in Deutschland," RWI Project Report (2015).

² Stefan Bach et al., "Wer trägt die Steuerlast in Deutschland? Verteilungswirkungen des deutschen Steuer- und Transfersystems," DIW Berlin Politikberatung kompakt 114 (2016). A shorter version with the same title was published as Hans Böckler Foundation Study, Vol. 347 (2016).

³ Stefan Bach et al., "From Bottom to Top: The Entire Income Distribution in Germany, 1992-2003," *Review of Income and Wealth* 55 (2) (2009): 331-59 and Stefan Bach et al., "Effective Taxation of Top Incomes in Germany," *German Economic Review* 14 (2) (2013): 115-37; Charlotte Bartels and Carsten Schröder,

Box

Data and methods

Data and data editing

To analyze the distribution of taxes and social security contributions, we compiled the relevant data into a representative database for the period 1998 to 2008 and extrapolated the data base to for 2015. Our key data sources are the Socio-Economic Panel (SOEP), the Income and Consumption Survey (*Einkommens- und Verbrauchsstichprobe*, EVS), and the wage and income tax statistics of the Federal Statistical Office from 2007 and 2008.

Available for all years, the SOEP is representative for the total population living in households in Germany and provides detailed information on income by source, household composition, and other variables affecting taxes and social transfers. We used a statistical matching procedure to integrate the consumption information from the EVS into the SOEP. This allowed us to simulate indirect taxes. The last survey of the EVS available to us when this study was undertaken refers to the 2008 wave.

In the next step, we replaced the top decile of the gross income distribution by data from the wage and income tax statistics at the weakly aggregated level of 100 groups (0.1 percent percentiles). While this group, which bears a disproportionately large share of the income tax burden, is heavily underrepresented in the survey data, it is fully covered in the income tax statistics. For this purpose, we were able to use all of the information in the income tax statistics via controlled remote data processing in the national statistical offices. We could also identify the dividend payments that were documented in the personal income tax statistics until 2008. On this basis, we calculated the statutory corporate and local business tax burdens on capital income. Moreover, we used the local business tax basic rate reported in the personal income tax statistics to simulate the local business tax burden on income from non-incorporated firms. The income tax statistics do not include corporate retained earnings. As a result, gross income is underreported and the analysis of the tax burden distribution incomplete. This primarily applies to very wealthy households that plow their corporate and investment income back into corporations, trusts, family offices, and other similar vehicles.

The integrated database was extrapolated to 2015, where we accounted for changes in the structure of taxpayers with regard to marital status and employment (static aging) and of key income variables relative to the base year. These extrapolations use information from the German National Accounts (*volkswirtschaftliche Gesamtrechnungen*, VGR), the Current Population and Labor Force Survey (*Mikrozensus*), the Federal Employment Agency's employment statistics, and the German Federal Statistical Office's annual population projection.

For the simulations on the tax burden, the existing STSM microsimulation model¹ was expanded into an integrated microsimulation model that includes consumption-related taxation (STSM+). We determined the income and corporate tax burden for 2015 using a microsimulation model based on the personal income tax statistics.

Tax incidence assumptions

We adopted the following standard assumptions on the effective burden of taxes and social security contributions (*tax incidence*) made in the literature:

- The personal wage and income tax is borne by the taxpayers.
- Employees bear social security contributions (SSC) in full, including the employer contributions that are shifted to wage and salary income. This is consistent with the treatment of employers' SSC in the National Accounts. In an alternative scenario, total SSC were assumed to be split equally between employees and employers.
- Social transfers are fully apportioned to household incomes.
- Indirect taxes (value-added tax, energy taxes including the renewable energy surcharge, other excise taxes)

¹ Viktor Steiner, Katharina Wrohlich, Peter Haan, Johannes Geyer, "Documentation of the Tax-Benefit Microsimulation Model STSM. Version 2012," DIW Berlin Data Documentation, no. 63 (2012).

Basically, all taxes and social security contributions levied on private households are included in the distribution analysis. In addition to personal income tax, we included the flat rate withholding tax on capital income and the corporate tax on dividends among the direct

taxes. Indirect taxes include the renewable energy surcharge (*EEG-Umlage*),⁴ motor vehicle and property taxes,

"Development of Top Incomes in Germany Since 2001," *DIW Economic Bulletin* 1/2, (2016).

⁴ The surcharge based on the Renewable Energy Sources Act (*Gesetz für den Ausbau erneuerbarer Energien*, EEG) is not a formal tax. Instead, it is a surcharge on power consumption used to finance the promotion of electricity production from renewable sources. It functions in effect as an extra electricity tax. In 2015, the rate was 0.0617 euros per kilowatt-hour.

are completely shifted to final consumers. Since part of indirect taxes relate to inputs used by companies and the government in producing goods, we imputed this part on the basis of the relevant tax statistics, business statistics, the National Accounts and using input-output analysis.

- Business income taxes (local business tax and corporate income tax including the solidarity surcharge) are born by capital owners. In an alternative incidence scenario, it was assumed that half of business taxes is shifted onto wage income.
- Property taxes and the real estate transfer tax are assumed to be equally split between owners and users of residential property. Taxes levied on commercial real estate are assumed to be shifted onto the selling prices.

These assumptions represent the long-term tax incidence in competitive markets. Under conditions of incomplete competition, during the adjustment to changes in economic conditions or to tax changes distribution effects may differ from the long-term fiscal incidence. For example, increases in indirect taxes or the employer social security contribution can initially burden corporate earnings, and increases in social transfers to employed persons with low incomes can be shifted to lower wages. An environment of increasingly international economic competition can facilitate the shift from corporate and capital income taxes to wage and transfer income. Due to the static nature of our distribution analyses, these dynamic effects could not be taken into account. However, in order to show the sensitivity of the distribution analysis with regard to these assumptions, we also simulated alternative fiscal incidence scenarios.²

The distribution analyses are based on annual income cross-sections, since reliable panel data that would permit an empirical analysis of the overall distribution of taxes and transfers over time and the individual lifecycle are not available. This would be particularly important regarding the analysis of capital gains, loss carryforwards and carrybacks, and provisions for pensions and other risks as part of social security or private pensions. Furthermore, dynamic effects of taxes and social transfers on

² Bach et al., "Wer trägt die Steuerlast in Deutschland?" 72 et seq.

economic behavior (e.g., consumption/savings, labor supply decisions) could have important effects on distribution effects.

Gross household income as income basis

We use gross household income as the most comprehensive income measure from which all taxes and social security contributions are paid. It comprises earned and capital income (wages, profits, capital and rental income, and the imputed rent of owner-occupied housing) and transfer income (pensions, wage-replacement benefits such as unemployment and health benefits, child benefits, parental benefits, educational funding, housing allowance, and means-tested income support payments). Public transfer income is partly subject to taxation and social security contributions and constitutes a significant part of the redistribution through the public tax and transfer system.³

In order to classify the population by gross income on a comparable basis, we account for differences in household size and composition by using equivalent income.⁴ We assigned the population to groups of the same size based on the level of gross equivalent income (quantiles). In Tables 2 and 3, we used deciles—further differentiating the bottom and top deciles. In Figure 1, we used percentiles: one hundred same-sized groups.

The ten percent of the population with the lowest income is assigned to the first decile. In 2015, they had to survive on an average gross monthly income adjusted for household size of 970 euros. The median monthly income was 2,400 euros—this is the income that divides the population into two groups of equal size. To belong to the wealthiest ten percent of income earners, you would have to earn at least 5,300 euros per month gross before taxes and social contributions, including the employer's portion. The top 0.1 percent—the richest 80,000 people in Germany—earn a gross monthly income of at least 37,000 euros for a single-person household.

³ See the detailed analyses on income distribution and redistribution by the tax and transfer system in the final report on the study: Bach et al., "Wer trägt die Steuerlast in Deutschland?" 30 et seq.

⁴ To adjust for household size, we used the new, international OECD scale. In it, the head of household receives a weight of 1; the other adults in the household and children 14 and over have a weight of 0.5. Children under 14 receive a weight of 0.3.

and the real estate transfer tax. These elements encompass most of the German tax and social security contribution system (Table 1). We omitted corporate taxes on retained earnings and inheritance tax because there is no reliable distribution information on the level of private households. The government also pays direct taxes on its market income and indirect taxes on its expenditures, which are not apportioned to private households.

Moreover, we examined the tax burden on private households resident in Germany, thus neglecting taxes paid by foreigners. In total, we capture around 80 percent of total tax revenues. We simulated employee and social security contributions, as well as the imputed social security contributions of civil servants. Additional public charges such as fees, other contributions and special charges were not included.

Table 1

Revenue of taxes and social security contributions, 2015

Tax type	billion euros	percent
Personal and corporate income tax	376.9	52.8
Personal income tax incl. tax credits	295.5	41.4
Wage tax	178.9	25.1
Child benefit	39.4	5.5
Assessed income tax	48.6	6.8
Non-assessed taxes on capital income	17.9	2.5
Final withholding tax on interest	8.3	1.2
Pension allowance and other tax credits	2.4	0.3
Corporate income tax, incl. investment grant	19.8	2.8
Solidarity surcharge	15.9	2.2
Local business tax	45.7	6.4
Inheritance tax	6.3	0.9
Indirect taxes	330.6	46.3
Value added tax (VAT)	209.9	29.4
Energy and electricity tax	46.2	6.5
Tabacco tax	14.9	2.1
Insurance tax, fire brigade tax	12.8	1.8
Real property tax	13.2	1.9
Real property transfer tax	11.2	1.6
Motor vehicle tax	8.8	1.2
Taxes on alcoholic beverages	2.7	0.4
Betting and lottery tax	1.7	0.2
Other taxes of local authorities	1.4	0.2
Other federal taxes	2.4	0.3
Customs duties	5.2	0.7
Total taxes	713.8	100.0
Social contributions, government	501.2	
Actual social contributions	466.6	
Imputed social contributions	34.5	
For information: Renewable energy surcharge (revenue)	22.0	

Sources: Federal Statistical office, revenue statistics, national accounts; Federal Ministry for Economic Affairs and Energy.

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We adopted standard assumptions the literature makes on the effective burden of taxes and social security contributions (*tax incidence*): indirect taxes are completely shifted to consumer expenditure, and employees also bear the part of social security contributions nominally paid by employers (see box).⁵ The tax burden is calculated as a percentage of current gross household income. For the distribution analyses according to income level, we used gross household income adjusted for household size using the new OECD scale.

The richest ten percent pay almost three-fifths of income taxes but only one-fifth of indirect taxes

Table 2 compares the relative distribution of gross household income, direct and indirect taxes, and social security

contributions in 2015. Direct taxes—personal income tax including capital and corporate income taxes—are highly concentrated in the upper income segments. The population in the lower half of the income distribution generates slightly below four percent of the total income tax revenues; the upper ten percent is responsible for 59 percent and the upper one percent for 26 percent. On the other hand, the lower half of the population earns only 24 percent of the total gross income, while the upper ten percent's share is almost one-third. Income is highly concentrated, but to a considerably lesser extent than the income tax. The income tax burden is indeed progressive (see below).

The converse is true for indirect taxes, which comprise almost half of total tax revenues. The bottom income decile pays five percent of all indirect taxes, but obtains less than three percent of total gross income. The top income decile is responsible for 20 percent of the indirect taxes but obtains one-third of the total income.

Overall, the top income decile bears 42 percent of the total tax revenues and 33 percent of the total tax and social security contribution revenues. The top one percent of the population contributes 16 and ten percent respectively. The bottom income decile bears two percent of the total tax revenues and almost the same share when social security contributions are included.

Total tax burden changes from regressive to progressive with increasing income

In Figure 1 and Table 3, the average tax and social security contribution burdens are presented for 2015 in relation to gross income. According to the usual definition, a tax is *progressive* if the average tax burden increases with rising income, and *regressive* if the average burden falls with rising income.

German lawmakers intended to create a progressive income and corporate tax system, and they clearly succeeded. Most of the lower income households are exempted from paying taxes by the deduction of allowable expenses and the basic personal allowance. Statutory pensions are partially tax exempt. Income and corporate taxes do not pose any significant burden until the middle-income segments. The median income's burden is five percent. The distinctly progressive income tax rate raises the effective average tax rate to almost 25 percent in the top decile and 35 percent for the top one percent. For the overall population, the average income tax rate is 13 percent of gross income.

Indirect taxes, on the contrary, are clearly regressive. People in the bottom decile spend 23 percent of their gross income on indirect taxes, while the top decile only spends

⁵ Bach et al., "Wer trägt die Steuerlast in Deutschland?" 72 et seq.

seven percent. The progressive income tax burden and social security contributions are one reason for this effect. They reduce disposable income at the top much more than at the bottom of the gross income distribution. The other reason is that savings rates of high-income households are much higher than those in the lower income deciles, where they are, on average, zero or even negative. As a result, the propensity to consume in relation to current gross income falls significantly and with it, the burden of indirect taxes. Based on consumption expenditures, however, indirect taxes largely have a proportional effect.

Indirect taxes are paid by companies and shifted to consumer spending. In doing so, they also burden the subsistence level. In the case of value-added tax, there are reduced rates for food and public transportation or exemptions without input tax deduction for housing costs or health services—none of which systematically relieves households with low incomes. And unlike other countries, there are no full exemptions or zero tax rates with input tax deduction in Germany.⁶

Taxes on tobacco, alcohol, and gambling are especially regressive. The lower income segments spend a larger portion of their money on them relative to people with higher incomes. Energy taxes and the renewable energy surcharge also burden the lower income segments. For property taxes, we assumed that half of the revenues are shifted to housing costs, and therefore also affect renters.

Indirect taxes cause the overall tax burden to have a regressive effect in the lower income segments. Here they dominate the tax burden distribution, since these households pay almost no income tax. The overall tax burden drops from an average of 23 percent in the bottom decile to almost 18 percent in the fifth decile. The rising income tax burden does not make itself felt until the higher income ranges, and the overall tax burden becomes progressive. However, the average tax burden does not exceed the burden on the first decile until the ninth decile. The tax burden rises to an average 31 percent in the top decile and is almost 40 percent in the top one percent of the distribution.

Social security contributions (including the employer's contribution) comprise a large portion of the overall tax and social security contribution burden. In relation to the average gross income their progressive effect ex-

⁶ Although deviating from the general regulations in the Sixth EU Value-Added Tax Directive, individual countries may continue to permit tax breaks, such as a zero tax rate for individual products, on which companies can also claim input tax deduction. This avoids the tax burden completely. In Germany there are only exemptions without input tax deduction, i.e., value-added tax charged upstream in the value-added chain will not be refunded. See OECD iLibrary, *Consumption Tax Trends 2016: VAT/GST and excise rates, trends and policy issues* (2016), 85 et seq.

Table 2

Distribution of gross household income, taxes, and social security contributions, 2015

Quantiles of equalized gross household income ¹	Gross household income	Personal and corporate income tax ²	Indirect taxes	Social security contributions	Total	
					Taxes	Taxes and social security contrib.
percent						
Bottom 5 %	1.1	0.0	2.6	0.2	1.2	0.7
1 st decile	2.6	0.0	5.4	0.7	2.4	1.6
2 nd decile	3.7	0.1	6.3	2.6	2.9	2.7
3 rd decile	4.9	0.5	7.3	4.3	3.5	3.9
4 th decile	5.7	1.1	8.3	5.8	4.3	5.0
5 th decile	7.0	2.1	9.0	7.7	5.2	6.3
6 th decile	8.0	3.9	9.4	9.6	6.4	7.9
7 th decile	9.7	6.6	10.2	12.1	8.2	10.1
8 th decile	11.7	10.3	11.7	15.5	10.9	13.1
9 th decile	14.5	16.1	12.7	19.0	14.6	16.6
10 th decile	32.1	59.1	19.7	22.8	41.5	32.8
Top 1 %	9.9	25.8	4.4	1.7	16.3	9.5
Top 0.1 %	4.3	12.1	1.6	0.1	7.4	4.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ Equalized by new OECD scale.

² Projected from wage and income tax statistics 2007–08, data research centers.

Source: Integrated data base (SOEP, EVS, income tax statistics); projected to 2015.

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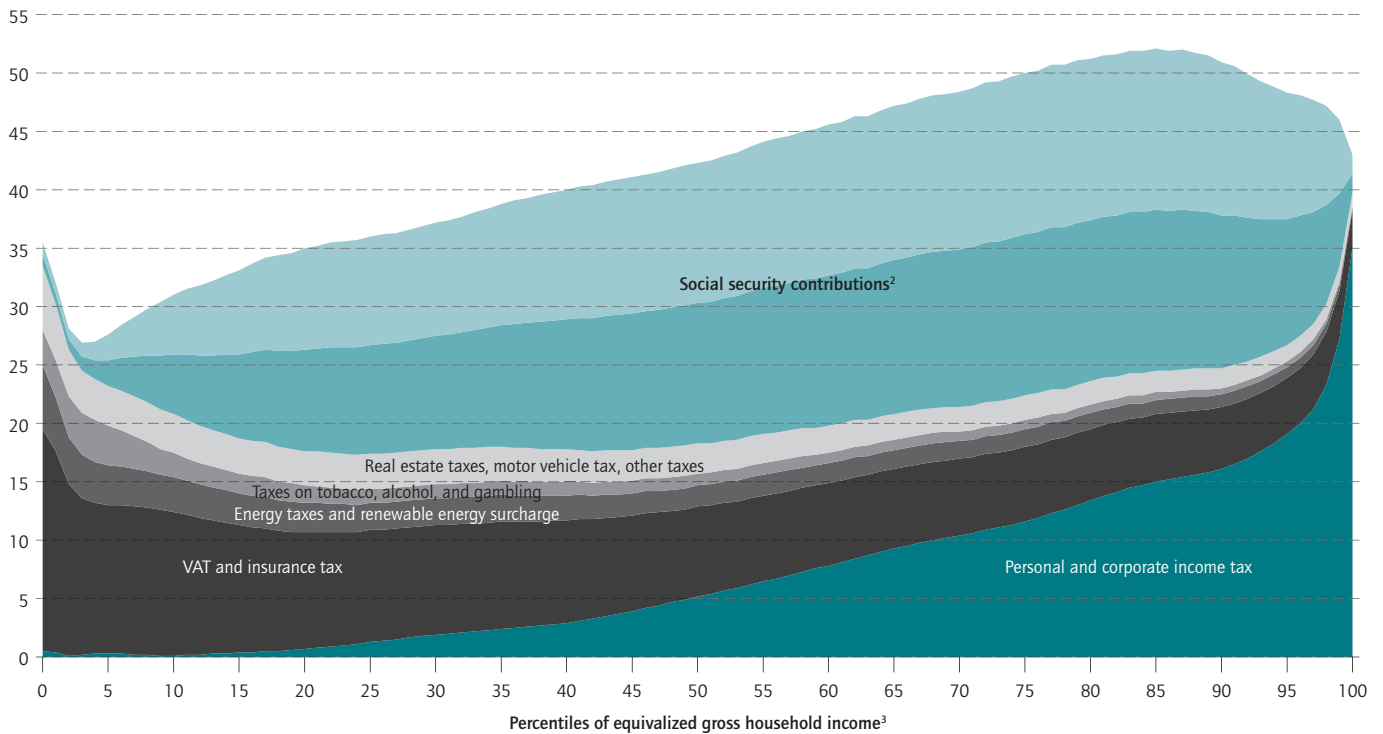
tends into the upper income range. This is because pensioners and other unemployed persons who make only minimal social security contributions dominate the lower income segments. On the other hand, individuals pay social security contributions proportionally on the liable earned income or retirement income up to the legal contribution limit. In the middle-income segments up to the ninth decile, the burden of social security contributions exceeds the tax burden. In the top decile, the burden of social security contributions declines due to the legal contribution limit.

In Germany, social security contributions are considered a specific public levy. Unlike taxes, they provide government services that can be apportioned individually. To some extent, they could be considered insurance contributions that replace private provisions. To an appreciable extent, however, the statutory health and nursing care insurance systems are to a large extent redistributive. They collect income-related contributions even though their services are not tied to income. These two insurance systems were responsible for two-fifths of the overall social security contribution in 2015. Furthermore, the public pension and unemployment insurance systems also contain extraneous benefits for which tax-financed federal subsidies do not compensate. In this respect, these social security contributions are of a similar nature as taxes.

Figure 1

Taxes and social security contributions as percent of gross household income, 2015¹

Integrated data base (SOEP, EVS, income tax statistics)



¹ Polynomial fitting.

² Half apportionment of social security contributions.

³ Equivalized by new OECD scale.

Source: Integrated Data Base (SOEP, EVS, income tax statistics); projected to 2015.

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Up to high incomes the tax burden is slightly progressive, while it is regressive for lower incomes.

Under the simplifying but not implausible assumption that half of the social security contributions resemble taxes, the tax burden on middle- and high-income households rises significantly up to the legal contribution limit (Figure 1). The overall tax burden becomes more progressive in the middle of the income distribution, while it becomes less progressive at the top.⁷

**Discussion:
Potential biases in estimated tax burdens**

The presented results on the overall tax burden are partially based on data or estimates that could be blurred by measurement or estimation errors. Furthermore, they

refer to a particular year and could differ if the observation period was extended over longer periods of time.

For example, the progressive nature of the income and corporate tax structures is probably exaggerated for the top one and, in particular, for the top 0.1 percent. First, we could not take the effect of tax avoidance into account, which is especially important at the top. And second, the underlying personal income tax statistics do not report retained corporate earnings. There is no statistical information on either their distribution or their effective tax burden at the household level.⁸ Our calculations could only take into account the dividend payments reported

⁷ Here it should be taken into account that the benefits of the statutory pension and unemployment insurance systems are also restricted according to the legal contribution limit.

⁸ See the estimates on top wealth distribution: Stefan Bach et al., "The Top Tail of the Wealth Distribution in Germany, France, Spain, and Greece," *DIW Berlin Discussion Paper*, no. 1502 (2015); Christian Westermeier and Markus M. Grabka, "Große Unsicherheit beim Anteil der Top-Vermögenden in Deutschland," *DIW Wochenbericht*, no. 7 (2015).

Table 3

Taxes and social security contributions as percent of gross household income, 2015

Integrated data base (SOEP, EVS, income tax statistics)

Quantiles of equivalized gross household income ¹	Personal and corporate income tax ²	Indirekte Steuern						Social security contributions	Total	
		Total	VAT, insurance tax	Energy taxes, renewable energy surcharge	Taxes on tobacco, alcohol, gambling	Real estate taxes, motor vehicle tax, other taxes	On business inputs ³		Taxes	Taxes and social security contributions
as percent of gross household income										
Bottom 5 %	0.3	24.8	13.8	3.8	3.4	1.2	2.6	3.0	25.1	28.1
1 st decile	0.2	22.9	13.0	3.4	2.9	1.2	2.4	5.7	23.1	28.9
2 nd decile	0.4	18.3	10.9	2.6	1.7	1.0	2.0	14.6	18.6	33.3
3 rd decile	1.4	16.2	9.6	2.4	1.3	1.1	1.9	18.7	17.5	36.2
4 th decile	2.5	15.5	9.1	2.2	1.2	1.1	1.8	21.2	18.0	39.2
5 th decile	4.0	13.8	8.1	1.9	1.0	1.1	1.6	23.0	17.8	40.7
6 th decile	6.6	12.5	7.3	1.8	1.0	1.0	1.4	25.1	19.1	44.2
7 th decile	9.2	11.4	6.7	1.6	0.9	0.9	1.3	26.4	20.5	47.0
8 th decile	11.8	10.7	6.4	1.5	0.8	0.9	1.2	27.7	22.5	50.2
9 th decile	14.8	9.4	5.7	1.2	0.6	0.8	1.1	27.5	24.2	51.7
10 th decile	24.6	6.6	4.2	0.6	0.4	0.7	0.6	14.9	31.2	46.1
Top 1 %	34.8	4.8	3.2	0.2	0.1	0.8	0.4	3.5	39.6	43.1
Top 0.1 %	38.1	4.1	2.7	0.1	0.1	0.8	0.4	0.7	42.2	42.9
Total	13.4	10.8	6.5	1.4	0.8	0.9	1.2	21.0	24.1	45.2

1 Equivalized by new OECD scale.

2 Projected from wage and income tax statistics 2007–2008, data research centers.

3 Indirect taxes on business inputs, shifted to final consumption.

Source: Integrated data base (SOEP, EVS, income tax statistics); projected to 2015.

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in the personal income tax statistics until 2008. And we had to assume that distributed profits were taxed at the firm level (local business tax, corporate tax, and solidarity surcharge) at the statutory rate of 30 percent. In actual practice, many larger family-owned businesses and the super rich leave a major portion of their annual income in their companies or plow it back into holding companies, trusts, family offices, or similar vehicles. This income is not recorded on their personal income tax returns and therefore, is not progressively taxed. Initially, retained earnings are only taxed at the firm level and become subject to the flat rate capital income tax rate of 25 percent only when paid out and thereby entering the personal sphere. If retained earnings could be taken into account, the effective income tax burden of the top one and 0.1 percent of taxpayers would be appreciably lower.⁹ After all, foreign profits are usually taxed at a lower rate and the effective tax burden of domestic profits is often lower than the statutory rate—insofar as tax avoidance strategies are used. Taking these considerations into account, the tax burden on the middle-income segments is not significantly lower, especially when the tax burden includes a share of the social security contributions.

The regressive burden of indirect taxes is exaggerated to the extent that it is related to the income of the current period. In reality, income and consumption are often temporally deferred due to saving, asset liquidation, and debt. For example, the lower income segments will finance particular phases of consumer spending by going into debt or liquidating assets, and the middle-income segments will go into debt for their home and “save” for it over longer periods of time with their repayments. The middle- and upper-income segments save higher shares of their income, but spend part of it again later, for example, in old age.¹⁰

Tax burden analyses based on annual cross-sectional data are unable to take long-term effects like these into account, but they should be kept in mind when interpreting the distributional effects of consumption taxes. When observed over a long period of time, indirect taxes are less regressive than they appear to be. Yet this effect does not occur in the very high-income segments if assets are accrued over the entire life cycle. However, asset transfers to the next generation may be subject to the inheritance tax.

10 In relation to current consumer spending that excludes savings, the value-added tax burden is mainly proportional. However energy taxes and most notably tobacco, alcohol and gambling taxes have a regressive effect in relation to consumer spending.

9 See the sensitivity simulations in Bach et al., “Wer trägt die Steuerlast in Deutschland?” 56 et seq.

The finding that the middle-income segments have a lower tax burden on average than households in the first and second decile is noteworthy. The low burden in the middle range of the income distribution is partially the result of its composition: pensioners and the unemployed comprise the majority in this range. Their income is only partially subject to income tax or not at all. Fully employed low-wage earners pay moderate income taxes, since marginal tax rates rise quickly above the basic personal exemption. This applies especially to single persons and single parents who do not benefit from income splitting under the German system of joint taxation or the partial exemption of low-paying jobs from social security contributions.

Furthermore, it should also be noted that the bottom decile's income mainly consists of needs-tested social benefits (basic income assistance, housing benefit, and child benefit supplement) or is supplemented by them. They compensate for this segment's high burden of indirect taxes. However, many low-income households do not take advantage of these social benefits (*non-take-up*).¹¹ In these cases, there is no compensation, and indirect taxes burden the subsistence level to an appreciable extent.

The progression and redistribution effects of the German tax and transfer system have weakened since the end of the 1990s.¹² The burden has obviously shifted from income taxes to indirect taxes. Income tax and corporate tax reforms have led to appreciable relief in the upper range of the income distribution in particular. The various indirect tax increases have enhanced the burden's regressive effect. In turn, this has slightly enhanced net household income inequality.

Conclusion

The high burden that indirect taxes place on lower and middle incomes identified in this study is of high importance to the current fiscal policy debate. They effectively tax the subsistence level of households with low incomes, contradicting the "ability to pay principle," which

¹¹ Kerstin Bruckmeier et al., "Simulationsrechnungen zum Ausmaß der Nicht-Inanspruchnahme von Leistungen der Grundsicherung," *IAB Forschungsbericht*, no. 5 (2013); Irene Becker, "Die Grundsicherung: Seit 2003 das unterste Auffangnetz im Alter und bei Invaldität," *Deutsche Rentenversicherung*, no. 68, 2 (2013), 121-38.

¹² See the simulation calculations in Bach et al., "Wer trägt die Steuerlast in Deutschland?" 56 et seq.

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says that only disposable income above and beyond the subsistence level should be taxed—emphasized by tax lawyers and experts in constitutional law. Implementing systematic relief for low income households by social transfers would, however, require complex administration and is fiscally expensive.¹³

The marginal income tax rate rises quickly above the basic personal exemption, which increases the average burden on middle and higher incomes and triggers *fiscal drag*. Flattening out the steep rise in the tax rate for middle-income households, as proposed in the current fiscal policy debate, would only relieve the burden on middle-income segments slightly, because their average tax burden is already quite low.¹⁴

Another means of relieving middle-income households would be to reduce the "tax share" of social security contributions and make up the difference with a higher income tax. However, large-scale relief from social security contributions would lead to high revenue losses for the social insurance systems. Policy makers are also discussing an a basic allowance for social security contributions or a partial credit to the personal income tax, as they have in Austria, as a means of relieving low earners.

In the high-income segments, the tax burden is distinctly progressive as a result of the personal income tax and corporate taxes. At the very high-income level, however, our analysis probably exaggerates the tax burden as we could not take into account tax avoidance and retained corporate earnings due to the lack of statistics. Reduced tax rates for plowing profits back into companies instead of paying dividends were an explicit goal of the 2001 and 2008 corporate tax reforms. Higher personal taxation of this income could make the tax burden in the top income bracket progressive again but would also raise the corporate tax burden at the same time—which might be detrimental in view of international tax competition.¹⁵

¹³ Stefan Bach, "Der Mehrwertsteuer-Bonus: Eine Alternative zu ermäßigten Mehrwertsteuersätzen," *DIW Wochenbericht*, no. 24 (2011).

¹⁴ Martin Beznoska, Clemens Fuest, and Thilo Schaefer, "Wirkungen einer Beseitigung des 'Mittelstandsbauchs' im Einkommensteuertarif," *Wirtschaftsdienst*, no. 9 (2016).

¹⁵ Stefan Bach, "Erbchaftsteuer, Vermögensteuer oder Kapitaleinkommensteuer: Wie sollen hohe Vermögen stärker besteuert werden?" *DIW Discussion Paper*, no. 1619 (2011).

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