Income tax reform to relieve middle income households

By Stefan Bach and Hermann Buslei

Completely eliminating the sharp rise in the tax rate for middle income households in Germany by changing personal income tax rates would mean estimated annual losses in tax revenue of 35 billion euros, or 1.1 percent of GDP. Taxpayers with high incomes would also benefit from this type of relief. The ten percent of the population with the highest income would have a relief of around 10.4 billion euros—over 2,000 euros per taxpayer on average—while middle income taxpayers would benefit to a much lesser extent. With regard to tax burdens or taxable income, the middle and higher income segments would experience more relief than the highest income segment. If high tax revenue losses ought to be avoided and the relief to be focused on middle income taxpayers, tax rates in the upper income segments must be raised. A moderate increase in maximum tax rates would only result in limited extra revenue.

Policy makers and the general public in Germany are expressing criticism of the high tax and social security contribution burden—particularly on the middle class—more and more vociferously. Personal income tax revenue has increased significantly in recent years, not only in absolute terms but also in relation to aggregate value added. The marginal tax rates at the lowest level of the tax tables have been rising sharply for some time, showing a belly-shaped curve (*Mittelstandsbauch*). Since personal income tax rates have only been reduced slightly since 2010 and nominal as well as real income increased, the tax burden on the lower and middle income segments has significantly increased.[1] These segments are viewed as the priority targets for tax relief. In view of the upcoming federal election, some politicians and associations are proposing tax relief with a magnitude of ten to 30 billion euros annually. However, the public budget has little room for maneuver; the structural budget surplus will probably drop to zero in the next few years.[2]

Studies on the distribution of the tax burden show that households with low and middle incomes pay relatively little income tax.[3] In these groups, indirect taxes and social security contributions make up the majority of the payment burden. This is why reducing the income tax rate for these households would not provide much relief, even if concentrated on the lowest levels of the tax tables. At the same time, rate reductions would go hand in hand with significant revenue losses because higher income households would also benefit from the cuts.

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1 Florian Dorn et al., Die Beseitigung des Mittelstandsbauchs – Varianten und Kosten, *ifo Forschungsberichte* 77 (2016) (available online); Florian Dorn et al., Heimliche Steuererhöhungen – Belastungswirkungen der Kalten Progression und Entlastungswirkungen eines Einkommensteuertarifs auf Rädern, *ifo Forschungsberichte* 76 (2016) (available online); Martin Beznoska, Die Belastungs- und Aufkommenswirkungen der kalten Progression, *FCN Working Paper* 14/2016 (2016) (available online).

2 Kristina van Deuverden, Nur geringer haushaltspolitischer Spielraum trotz hoher Überschüsse, *Zeitschrift für Wirtschaftspolitik* 66 (1) (2017): 50–60 (available online).

3 Stefan Bachet al., "Who bears the tax burden in Germany? Tax structure slightly progressive. *DIW Economic Bulletin* no. 51/52 (2016) (PDF, available online): 601–608. Roland Döhrn et al., Steuer- und Abgabenlast in Deutschland – Eine Analyse auf Makro- und Mikroebene, RWI Project Report (2017) (PDF, available online).

Table 1

Parameters of personal income tax rates 2017 and of reform scenarios

Parameters	Income tax rates status quo 2017	Basic reform scenarios		Current reform proposals			
		Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
		Linear-progressive rates up to 54,057 euros	Current tax table with increase top rate to 49%	"Bavarian tax table" Söder: Kink at 16,250 euros	Mittelstandsverein. Union Kink 20%, top rate 42% as of 60,000 euros	German Trade Union Confederation (DGB) income tax proposal	THE LEFT (DIE LINKE) income tax proposal
Basic allowance	8,820	8,820	8,820	8,820	8,820	11,000	12,600
First bracket of rate progression							
up to taxable income in euros	13,769	54,057	13,769	16,250	13,769	70,000	17,000
Lower marginal tax rate, percent	14.00	14.00	14.00	14.00	14.00	22.00	14.00
Upper marginal tax rate, percent	23.97	42.00	23.97	23.97	20.00	49.00	20.30
Second bracket of rate progression							
up to taxable income in euros	54,057	–	69,698	54,057	60,000	–	70,000
Lower marginal tax rate, percent	23.97	–	23.97	23.97	20.00	–	20.30
Upper marginal tax rate, percent	42.00	–	49.00	42.00	42.00	–	53.00
First top rate bracket							
up to taxable income in euros	256,303	256,303	256,303	256,303	256,303	125,000	260,532
Tax rate	42.00	42.00	49.00	42.00	42.00	49.00	53.00
Second top rate bracket							
up to taxable income in euros	–	–	–	–	–	–	1000,000
Tax rate	45.00	45.00	49.00	45.00	45.00	52.00	60.00
Third top rate bracket							
up to taxable income in euros	–	–	–	–	–	–	–
Tax rate	–	–	–	–	–	–	75.00

Source: Authors' own compilation.

Income tax tables: high marginal tax rates, lower average tax rates

Table 1 describes the parameters of and reform scenarios for the 2017 personal income tax tables, and Figure 1 shows the marginal and average tax rate trends up to a taxable income of 80,000 euros. The marginal tax rates, i.e., the tax burden for one extra taxable euro, and the average tax rates with regard to the income to be taxed, i.e., taxable income after deducting professional expenses, costs of doing business, provident expenses and other special expenses, extraordinary expenses, and child allowances, if any, are illustrated. The figure does not show the current tax rate for the wealthy or increases in the maximum tax rates for higher levels of income for individual scenarios.

The basic personal allowance of 8,820 euros exempts the minimum subsistence level from tax payments. Thus, the personal income tax burden is worth mentioning starting at the level of median gross monthly income. The lowest tax rate is 14 percent, and as income rises the marginal tax rates in the first (small) tax bracket rise sharply in order to reach 24 percent for taxable incomes just below 14,000 euros. Marginal tax rates rise much more slowly in the second tax bracket until reaching the first maximum tax rate of 42 percent at 54,057 euros. The rate remains constant in the first upper bracket. For incomes of 256,303 euros and higher, the maximum tax rate jumps to 45 percent (tax rate for the wealthy). When the splitting method is used to tax married couples, the basic personal exemption and income limits are doubled. This relieves the tax burden of couples with single earners and is more beneficial than individual taxation for couples whose income levels are significantly different.

The taxable income of most taxpayers is between 10,000 and 30,000 euros. In this range, marginal tax rates can be up to 30 percent, which is already rather high. The

corresponding burden for extra income is relevant for economic decisions, such as changes in working hours and job function, education and training, and changing jobs. Average tax rates—i.e., the tax burden with regard to total taxable income—also rise sharply, but because the personal exemption and lower marginal tax rates provide relief, they are still significantly below the marginal tax rates. In the highest income segments, average tax rates steadily approach the maximum tax rate. Average tax rates determine income effects, meaning how much of their income taxpayers owe the state. They are relevant for burden and distribution effects.

When determining the effective burden, the 5.5 percent solidarity surcharge on the personal income tax burden must be considered. It increases the marginal and average tax rates accordingly, although an exemption limit applies for low income tax burdens.

The sharp rise in marginal tax rates until the "kink" between the first and second bracket has a special name in German: *Mittelstandsbauch*, as above, belly-shaped curve. The term originated decades ago, when marginal tax rates were defined using quadratic equations with concave curves that rose sharply at the beginning and continued at slower rates.[4] As of 1990, a linear progressive marginal tax function has been applied to the entire bracket with rising marginal tax rates. When the federal government lowered the maximum tax rate from 53 percent to 42 percent in 2001, the lowest tax rate was supposed to be lowered significantly as well. However, since broader reductions in the rate function would trigger high revenue losses in the middle income segment—as will be shown in the following—the tax tables were only adjusted for the lowest tax rate.

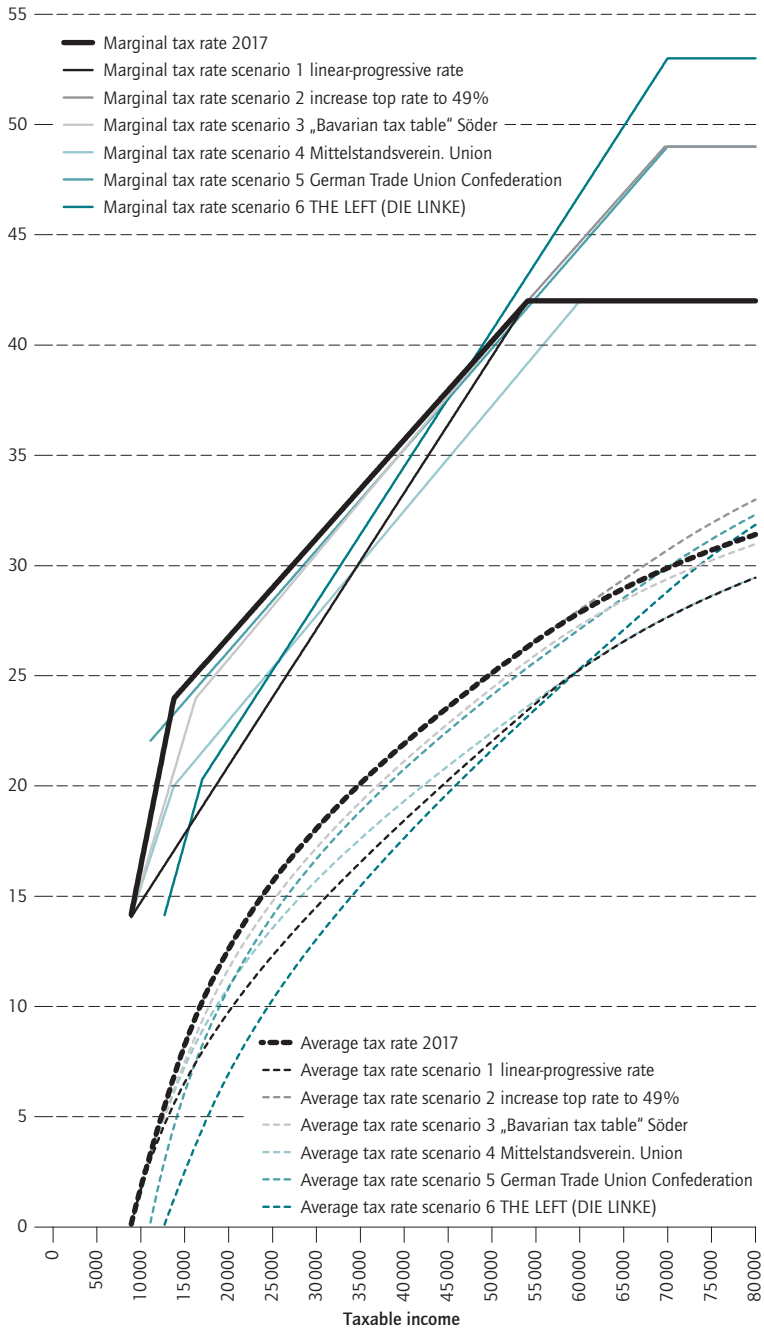
Reform options: Tax reduction for lower and middle income segments with possible increase in maximum tax rates

The following section contains our analysis of two basic reform options (Scenarios 1 and 2) and four detailed reform proposals from the discussion in recent months about tax policy (Scenarios 3 to 6).

In Scenario 1, we flattened the belly-shaped curve by simulating marginal tax rates with a constant, linear progressive slope between the lowest tax rate of 14 percent and the first maximum tax rate of 42 percent. This resulted in a significant drop in marginal and average tax rates for lower and middle income segments. As of a taxable income of 54,000 euros, the marginal tax rate of 42 per-

Figure 1

Marginal and average tax rates of the current income tax table 2017 in comparison to the various reform options
In percent of general taxable income



Source: Authors' own calculations.

The sharp rise in marginal tax rates causes a belly-shaped curve (Mittelstandsbauch).

4 The income tax tables from 1958 to the present are documented on the Federal Ministry of Finance's website Wage and income tax calculator (available online, in German only) in the section "Wage and income tax calculator".

cent applied. This income level marked the beginning of the maximum tax relief of 1,562 euros per year. For married couples filing joint tax returns this relief doubles for double taxable income. As a result, the average burden was also below the status quo for higher incomes and for very high incomes, it continued to approach the status quo.

If relief is provided to the lower and middle income segments and at the same time overall revenue losses ought to be limited, the higher income segments must be burdened. Based on the current tax tables, scenario 2 raised the maximum tax rate to 49 percent by "extending" the bracket's linear progressive marginal tax rate function beyond the 54,057-euro income limit without changing its slope. In this case, the marginal tax rate of 49 percent was reached at a taxable income of just below 70,000 euros. The marginal and average tax burden did not rise until the 54,057-euro level. In this scenario, the tax rate for the wealthy should also be raised to 49 percent but without any change in slope.

The detailed reform proposals from the discussion on tax policy in recent months prompted us to run the following scenarios:

Bavarian Minister of Finance, Markus Söder, proposed a "Bavarian tax table" in which the kink in the belly-shaped curve, currently at a marginal tax rate of 23.97 percent and a taxable income of 13,769 euros, would be shifted to the right and end up at a taxable income of 16,250 euros (Scenario 3).[5] This primarily caused the marginal and average tax rates to fall in the lower and middle income segments—but they still remained considerably higher than if the "belly" had been completely eliminated from the curve. This scenario yielded a maximum relief of 347 euros per year, doubled for married couples.
The small and medium-sized business association of the CDU/CSU parties (*Mittelstands- und Wirtschaftsvereinigung der CDU/CSU*, MIT), proposed to leave the kink in the curve at a taxable income of 13,669 euros and lower the marginal tax rate instead from 23.97 to 20 percent (Scenario 4).[6] In this case, the first maximum tax rate of 42 percent was reached at a taxable income of just below 60,000 euros. This would almost completely flatten the belly-shaped curve, and the "shift to the right" in the income limit for the first maximum tax rate would relieve the higher income segments to a somewhat greater extent than in Scenario 1. This scenario yielded a maximum relief of 1,551 euros per year, doubled for married couples. The MIT also proposed an increase in the lump-sum deduction for work-related expenses to 2,000 euros, an increase in the child allowance to the level of the basic personal exemption, and a corresponding increase in the child benefit rate of 36 euros per child per month. We did not take the latter into consideration in our revenue and distribution analyses (see below).

According to the income tax reform proposal of the German Trade Union Confederation (*Deutsche Gewerkschaftsbund*, DGB), the basic personal exemption should be raised to 11,000 euros (Scenario 5).[7] The linear progressive marginal tax tables would start at a minimum tax rate of 22 percent and rise, peaking at 49 percent for a taxable income of 70,000 euros. The tax rate for the wealthy would be raised to 52 percent and apply to taxable incomes of 125,000 euros and upwards. In the second bracket, the marginal burden curve was just below that of the status quo. Considerably higher, the basic personal exemption relieved the lower income segment in particular. The tax burdens were significantly higher than the status quo in the higher income segments.

In a current reform proposal for the election agenda, the Left Party (*DIE LINKE*) wants to raise the personal exemption to 12,600 euros (Scenario 6).[8] The lowest tax rate would remain at 14 percent and with a slight kink, rise across two brackets to 53 percent at a taxable income of 70,000 euros. The proposal also includes a tax rate for the wealthy of 60 percent from a taxable income of 260,532 euros and upward, and a second tax rate for the wealthy of 75 percent from a taxable income of 1 million euros. Due to the dramatic increase in the basic personal exemption and retention of the current lowest tax rate of 14 percent, the marginal and average tax burdens resulting from this proposal would be considerably lower than those of the status quo. For the high and highest income segments, the tax rates would rise sharply.

The personal income tax has a highly progressive effect

We analyzed the revenue and distribution effects of the personal income tax as per the current law as well as the 2017 reform scenarios using the DIW Berlin Personal Income Tax Microsimulation Model (EStM), which is based on projected individual data from the wage and personal income tax statistics (see box). Table 2 displays the

5 Christian Social Union Party (CSU), Söder stellt "Bayern-Tarif" vor. Mega-Entlastung für Bürger, Press release, July 21, 2016 (in German only) (available online); Reuters, CSU will Soli abschaffen und Geringverdiener entlasten, July 21, 2016 (available online, in German only); Florian Dorn et al., 2016, loc. cit..

6 Also see Fabian Peters and Bernd Raffelhüschen, Aufkommenswirkung einer umfassenden Steuerreform in 3 Stufen: Zum Vorschlag der Mittelstands- und Wirtschaftsvereinigung der CDU/CSU, *Forschungszentrum Generationenverträge der Albert-Ludwigs-Universität Freiburg Discussion Papers* 62 (2016) (PDF, available online).

7 German Trade Union Confederation (DGB), Gerecht besteuern, in die Zukunft investieren. Steuerpolitische Eckpunkte des DGB zur Bundestagswahl 2017, National DGB Board Resolution of December 6, 2016 (available online).

8 The Left Party, Entwurf des Bundestagswahlprogramms (Leitantrag an den Hannoveraner Parteitag), Draft, April 3, 2017, page 57, lines 1258–1280.

Box

The DIW Berlin Income Tax Microsimulation Model (EStM)

The DIW Berlin Income Tax Microsimulation Model[1] (EStM) analyzes the direct revenue and distribution effects of current personal income tax law and tax reforms. The model is based on a representative ten-percent sample from individual data in the 2007 wage and personal income tax statistics database and the 2008 annual personal income tax statistics (business statistics). The data sets are used in the federal states' research data centers via controlled remote data processing.

A detailed simulation program determines the revenue and distribution effects of the stipulated income tax, including unassessed payroll tax, withholding tax, and the solidarity surcharge on these taxes. It maps the tax laws to the prevailing legislation in 2017. Initially, the adjustments in taxpayer behavior triggered by changes in the tax laws were not taken into consideration.

An extrapolation module takes important taxpayer changes by employment status and family structure (structural projection, "static aging") and the key income variables and expenditure items (level projection) until 2017 into consideration. The projection to 2016 is primarily supported by information from the national accounts, the microcensus, revenue statistics, employment statistics, and annual population projections. For the projection period until 2017, we used current forecasts on population, the labor market, and macroeconomic development.

Since the wage and personal income tax statistics only collect tax-related data on an estimated 80 percent of households in Germany, for our distribution analyses we used information from the Socio-Economic Panel (SOEP) on households with low taxable incomes or no income at all. This allowed us to present the distribution effects for the total population.

Distribution analyses

We displayed the distribution effects of the simulation results on income tax revenue by level of total income, i.e., taxable gross income. We converted this income variable into equivalent income adjusted for household size[2] to render all taxpayers comparable. Next, we sorted the taxpayers in ascending order according to equivalent income levels and divided them into deciles of the same size. The tenth decile is also be divided into the five percent and one percent of the population with the highest incomes.

Further, we calculated relevant analytical measurements of income concentration (Gini index) and tax progression (Suits index).[3] Our calculations refer to gross income adjusted for household size. Above and beyond the total amount of income, we also included non-taxable gross income such as non-taxable portions of pensions or tax-exempt foreign income and wage-replacement benefits.

The Gini index was derived from the Lorenz curve illustration. It has a value range of 0 (equal distribution) to 1 (total income is concentrated on one person).

Progression indexes measure the concentration of income tax in relation to gross income. In paticular, the Suits index measures tax burden concentration in relation to the concentration of gross income. It has been standardized as +1 for complete tax progression and −1 for complete tax regression.

1 For information on the microsimulation models, see the term in the DIW Glossary *Mikrosimulationsmodelle in der Politikberatung* (available online, in German only).

2 To do this, the total amount of income is divided by the sum of the equivalence weights of the household members to be considered. This income variable represents per capita gross income modified from a household size perspective. According to the conventional international equivalence scale ("new" or "modified" OECD scale, available online), the head of household receives a weight of 1 and the other adults in the household and children 14 and over a weight of 0.5. Children under 14 receive a weight of 0.3. We assumed a decreasing cost trend in larger households due to joint household management and differences in children's needs. Only the household types recorded in the income tax statistics were included: single taxpayers and married couples or registered partners with their dependents. Unmarried partners, children in the household with their own taxable income or additional household members such as grandparents or other persons were excluded.

3 See Richard Ochmann and Andreas Peichl, Measuring Distributional Effects of Fiscal Reforms, (Working Paper, FiFo Institute for Public Economics, University of Cologne, no. 06–9, 2006 (with literature review; PDF, available online, in German only)). We used the PROGRES STATA module for our calculations (available online).

Table 2

Revenue and distribution of personal income tax and reform scenarios 2017

Equivalized[1] adjusted gross income		Income tax revenue[2] status quo 2017	Impact reform scenarios		Impact current reform proposals			
			Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Quantiles	Upper income limit, euros		Linear-progressive rates up to 54,057 euros	Current tax table with increase top rate to 49%	"Bavarian tax table" Söder: Kink at 16,250 euros	Mittelstandsverein. Union Kink 20%, top rate 42% as of 60,000 euros	German Trade Union Confederation (DGB) income tax proposal	THE LEFT (DIE LINKE) income tax proposal
		Tax revenue, billion euros						
1st decile	1,121	0	0	0	0	0	0	0
2nd decile	7,481	34	−5	0	−2	−11	−13	−22
3rd decile	11,821	328	−47	0	−20	−102	−182	−268
4th decile	16,333	2,477	−429	0	−183	−574	−1,068	−1,944
5th decile	21,213	7,582	−1,619	1	−605	−1,460	−1,832	−4,555
6th decile	26,578	14,256	−3,159	0	−1,003	−2,565	−2,162	−6,550
7th decile	32,845	22,816	−4,792	1	−1,316	−3,826	−2,383	−8,067
8th decile	41,199	34,655	−6,571	3	−1,633	−5,489	−2,648	−9,484
9th decile	55,962	53,731	−8,505	15	−1,989	−7,803	−2,978	−10,924
10th decile	.	172,984	−10,377	10,491	−2,322	−11,483	9,765	13,520
91%-95% percentile	73,792	42,788	−5,100	147	−1,148	−5,317	−1,548	−5,656
96%-99% percentile	147,371	62,877	−4,259	2,988	−948	−4,943	1,566	148
Top 1% percentile	.	67,319	−1,018	7,356	−226	−1,224	9,747	19,028
Total	**.**	**308,863**	**−35,505**	**10,510**	**−9,074**	**−33,314**	**−3,501**	**−28,294**
		Tax liability per taxpayer, euros						
1st decile	1,121	0	0	0	0	0	0	0
2nd decile	7,481	6	−1	0	0	−2	−2	−4
3rd decile	11,821	62	−9	0	−4	−19	−34	−51
4th decile	16,333	540	−94	0	−40	−125	−233	−424
5th decile	21,213	1,893	−404	0	−151	−365	−457	−1,137
6th decile	26,578	3,539	−784	0	−249	−637	−537	−1,626
7th decile	32,845	5,448	−1,144	0	−314	−914	−569	−1,926
8th decile	41,199	7,864	−1,491	1	−371	−1,245	−601	−2,152
9th decile	55,962	11,935	−1,889	3	−442	−1,733	−661	−2,426
10th decile	.	39,867	−2,392	2,418	−535	−2,646	2,250	3,116
91%-95% percentile	73,792	19,144	−2,282	66	−514	−2,379	−693	−2,531
96%-99% percentile	147,371	36,663	−2,483	1,742	−553	−2,881	913	86
Top 1% percentile	.	173,056	−2,619	18,915	−582	−3,147	25,064	48,930
Total	**.**	**6,650**	**−764**	**226**	**−195**	**−717**	**−75**	**−609**
		Tax liability as percent of taxable income						
1st decile	1,121	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2nd decile	7,481	0.00	−0.04	0.00	−0.01	−0.08	−0.09	−0.15
3rd decile	11,821	0.01	−0.15	0.00	−0.06	−0.33	−0.58	−0.86
4th decile	16,333	0.04	−0.76	0.00	−0.32	−1.02	−1.89	−3.44
5th decile	21,213	0.09	−1.90	0.00	−0.71	−1.71	−2.15	−5.35
6th decile	26,578	0.13	−2.81	0.00	−0.89	−2.28	−1.92	−5.83
7th decile	32,845	0.16	−3.37	0.00	−0.93	−2.69	−1.68	−5.67
8th decile	41,199	0.19	−3.69	0.00	−0.92	−3.08	−1.49	−5.33
9th decile	55,962	0.23	−3.67	0.01	−0.86	−3.37	−1.29	−4.72
10th decile	.	0.33	−2.00	2.02	−0.45	−2.21	1.88	2.61
91%-95% percentile	73,792	0.27	−3.22	0.09	−0.73	−3.36	−0.98	−3.57
96%-99% percentile	147,371	0.33	−2.20	1.54	−0.49	−2.56	0.81	0.08
Top 1% percentile	.	0.40	−0.61	4.40	−0.14	−0.73	5.83	11.39
Total	**.**	**0.23**	**−2.60**	**0.77**	**−0.67**	**−2.44**	**−0.26**	**−2.07**
		Distribution and progression measures						
Distribution measure Gini after income tax	.	0.4273	0.0023	−0.0037	0.0003	0.0027	−0.0051	−0.0085
Progression measure Suits index	.	0.3176	0.0382	0.0172	0.0108	0.0301	0.0491	0.1300

1 Equivalized by new OECD scale.
2 Assessed personal income tax, non- assessed wage tax and withholding capital income tax, solidarity surcharge on income taxes.

Sources: German research data centers of the statistical offices; microsimulation analysis based on income tax return data and Socio-economic Panel (SOEP) data, projected to 2017.

results of the equivalence-weighted sums of the incomes by deciles and some percentiles at the top of the income distribution.

Totaling 309 billion euros (including unassessed payroll tax, withholding tax, and solidarity surcharge),[9] personal income tax revenue is highly concentrated on the upper income segments. While the poorest 50 percent of the population only contribute a good ten billion euros, or 3.4 percent of the total income tax revenue, the richest ten percent pay 173 billion euros, or 56 percent of the total income tax revenue, amounting to an average of 40,000 euros per taxpayer per year. The richest one percent of the population alone pays 67 billion euros (on average, 173,000 euros per taxpayer per year).

However, the income of the well-to-do and the wealthy is also considerably higher than that of the lower income segments, so it makes sense that they pay more taxes. But as the average tax rates show, the tax burden is highly progressive in relation to income. With regard to effective economic income, however, the burdens are lower compared to taxable income. On the one hand, a variety of deductions reduce the ratio of gross income to taxable income. And on the other, tax breaks and tax avoidance can reduce the amount of income recorded for tax purposes.

Flattening the curve provides more absolute relief to higher income segments

Completely flattening the belly-shaped curve in the tax rates (Scenario 1) would lead to a reduction in tax revenue of 35.5 billion euros per year not taking aggregate feedback effects into account. The loss is equal to 1.1 percent of GDP in 2017. Of the total, 10.4 billion euros or 29 percent would go to the richest ten percent. The ninth income decile would be responsible for another 8.5 billion euros or 24 percent of the total. And the lower 80 percent of the income distribution would receive less than half of the total relief volume. This is because higher and high earners also benefited from tax relief, which rose to a maximum of 1,562 euros per year for single taxpayers and double the amount for married taxpayers. The relief per taxpayer in the upper deciles and percentiles was correspondingly high.

Relative to taxable income, taxpayers in the sixth to ninth deciles received the greatest amount of relief. In the upper percentiles, relative relief steadily decreased because the relief is subject to an absolute upper limit. Accordingly, the tax became slightly more progressive, as displayed in the progression index. However, the redistribution effect of the tax system was diminished due to high tax revenue losses. The Gini index after taxes rose slightly, reflecting a slight increase in income inequality. The implication here is that the tax revenue losses associated with this scenario would have to be made up by raising other taxes and social contributions or curtailing benefits, triggering other distribution effects in turn.

The CDU/CSU business association's proposal (Scenario 4) would have a similar effect on revenue and distribution effects. At 33 billion euros annually, the loss in revenue is somewhat lower than that of Scenario 1. And as a result of the shift to the right in the income limit for the first maximum tax rate, the relief effect is a bit more concentrated on the high income segment. Accordingly, the increase in the progression indexes is a bit lower and the rise in the Gini index somewhat more pronounced. The table does not reflect the effect of the proposed increase in the child benefit. This would augment revenue losses by eight billion euros, relieving families with children distributed evenly throughout all income segments.[10] When the larger child benefit is included, the proposal would mean annual revenue losses of 41 billion euros.

The Bavarian proposal is much more inexpensive: it would yield revenue losses of nine billion euros per year. It only shifts the kink in the curve somewhat to the right (Scenario 3). This move would have a greater relief effect on lower income segments compared to scenario 1. The progressive income tax effect would only increase slightly. The significantly lower level of relief would cause the tax system's redistribution effect to decrease minimally, resulting in a slight increase in the Gini index.

Raising the maximum tax rate would reduce tax revenue losses

The revenue and distribution effect of only raising the maximum tax rate to 49 percent (without a differentiated rise in the tax rate for the wealthy) is shown in Scenario 2. This would yield ten billion euros of extra tax revenue without taking behavioral adjustments and aggregate feedback effects into consideration. Of course this would only burden high-income taxpayers. The upper one percent of the population with the highest income would bear around 70 percent of the tax increase. In this scenario, both the progressive nature of the income tax and its redistribution effect would increase. Increasing the maximum income tax rate further would yield 1.6 bil-

9 Based on data collected on all personal income tax payments from domestic private households, i.e., income tax determined by personal tax assessment and the stipulated solidarity surcharge, unassessed payroll tax and unassessed withholding tax on the capital gains of domestic private households, and the solidarity surcharge on the unassessed payroll and withholding taxes.

10 For details on the child benefit distribution, see Stefan Bachet al., Tax and Transfer System: Considerable Redistribution Mainly via Social Insurance, *DIW Economic Bulletin* no. 8 (2015): 103–111 (PDF, available online).

lion euros in extra tax revenue per percentage point. A separate increase in the tax rate for the wealthy would yield another 0.5 billion euros in extra tax revenue. The latter change would burden the richest percent of the population only.

It is apparent that a moderate increase in the maximum tax rate would only yield limited extra tax revenue and therefore could not finance sweeping tax relief for the lower and middle income segments. To achieve that goal, the maximum tax rate would have to be raised higher and begin at a relatively low income, causing the marginal tax rate to rise significantly in the second bracket.

The DGB and the Left Party proposals would provide more relief to taxpayers in the lower and middle income segments via large increases in the basic personal exemption (Scenarios 5 and 6). The DGB scenario would result in low tax revenue losses of 3.5 billion euros annually, since it calls for only moderate reductions in the marginal tax rate for the two brackets. In this proposal, taxpayers up to the 95th percentile would experience a relief of just under 15 billion euros, while the wealthiest five percent of taxpayers would have a burden of 11 billion euros—almost ten billion euros of which would be borne by the richest one percent. The Left Party would also lower the marginal tax rates in the lower segment to the extent that taxpayers up to the 95th percentile would experience a significant relief. In this scenario, taxpayers up to the 95th percentile would have a relief of as much as 47.5 billion euros, while the wealthiest five percent of taxpayers would have a burden of 19 billion euros, almost all of which would be borne by the richest one percent. However, this would yield a tax revenue loss of 28 billion euros. The progression and redistribution effects of income taxes would be heightened considerably in both scenarios. The Left Party's proposal would make the progression increase much more pronounced, and the redistribution effect would increase to a lesser extent since the tax revenue loss is much higher than that inherent in the DGB scenario.

Other aggregate feedback effects triggered by the income effects and possible taxpayer behavioral adjustments were not included in the simulation. A short-term feedback effect would directly result for indirect taxes to the extent that income tax relief or increases led to increases or decreases in taxpayer expenditure, in turn triggering further aggregate effects on demand. Furthermore, tax increases or decreases could increase or decrease avoidance reactions, changing tax revenue and impacting welfare and growth. In the longer term, changes in income distribution could also influence economic growth.[11]

Conclusion

The structural reforms to the personal income tax table being discussed in Germany right now all aim to provide relief to the middle income segment. As a result of deductions, the basic personal exemption, and the tax tables themselves, income taxes are highly progressive in Germany. This is why low income segments are hardly burdened and middle income ones moderately burdened, while high earners pay high taxes. Taxpayers with high incomes also benefit from relief measures in the lowest rungs of the tax tables, which result in considerable tax revenue losses. If these losses ought to be reduced, tax rates in the upper income segments must be raised. However, significantly raising the maximum tax rate could intensify tax-avoidance behavior, thus reducing the amount of extra revenue.

Other taxes could be raised to make up for tax revenue losses. Indirect taxes pose a relatively heavy burden for the lower and middle classes, making the tax burden distribution less progressive. Higher corporate taxes, capital gains taxes, or wealth taxes would have the reverse effect, easily triggering aggregate disadvantage and resistance from the economic elite. In the medium term, public budgets could only make do with less money to spend by either curtailing social transfers and subsidies or investment. However, these strategies typically have unfavorable distribution effects and longer-term economic disadvantages as a consequence. The remaining tax revenue losses would lower the financial balance of public budgets, resulting in lower levels of government spending or higher tax payments and social contributions in future periods.

11 Also see Hanne Albig et al., Increasing Inequality Reduces Long-term Growth. German Economic Analysis Using a Macroeconomic Structural Model, (PDF, Friedrich Ebert Foundation, 2016) (available online).

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