Tax reforms and their varying impacts on private households in Germany

Socio-economic modelling opportunities in a macro-econometric input-output model.

Thomas Drosdowski

Britta Stöver

Impressum

AUTHORS

Dr. Thomas Drosdowski,

Tel: +49 (541) 40933-220, Email: drosdowski @ gws-os.com

Britta Stöver,

Tel: +49 (541) 40933-250, Email: stoever @ gws-os.com

TITLE

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1   INTRODUCTION

Taxation of incomes generated by economic agents is a main pillar of redistributive social policies undertaken by the government in Germany. In 2015, private households received 1,545 bn Euro gross income from wages and salaries as well as 386 bn Euro property income (StBA 2016). In the process of redistribution taking into account various exemptions they paid a total of 282 bn Euro income taxes (ibid.), amounting to 14,6 % of their total gross income. From 1991 to 2005 private household income from wealth and wages on the average grew faster than income taxes: while property income and gross income from wages and salaries increased by 3.4 % and, respectively, 2.1 % p. a., income taxes increased by only 1.5 % p. a. (ibid.). The reason for this in principle household-benefitting divergence between income and taxation developments were mostly discretionary tax reforms reducing marginal tax rates as well as increasing the basic tax allowance to provide fiscal subsistence (Hechter et al. 2013). In the period thereafter (2005-2015) the apparent lack of sufficient adjustments of the tax schedule has led to higher average annual growth rates in taxes (4.2 % p. a.) than in income (0.2 % p. a. for property income and 3.1 % p. a. for labour income) (StBA 2016). This development has triggered a public dispute about alleged bracket creep, i.e. inflationary-caused nominal income increase pushing taxable income into higher tax bracket, which apparently poses higher tax burden especially among households with small and medium incomes (for a discussion cf. Hechter et al. 2012, Lühn 2013, Breidenbach 2014).

The aim of this paper is an analysis of the effects of a permanent proportional income tax reduction on the total economy as well as on the income situation of different household types, against the background of repeated public demands for tax reliefs resulting from increased tax burdens in recent years. These burdens may currently appear to be excessive, as the condition of the government budget in Germany is sound, the macroeconomic outlook is good and the interest rates low or even negative. Such an optimistic outlook provides a rationale for an absence of explicitly offsetting financial measures in the assumed scenario such as larger spending cuts or increases of other taxes. However, it should be clear that deficit-widening tax-cuts are no panacea for appropriate macroeconomic policy and should not be universally recommended at all times..

The taxation scenario is not calculated on a microeconomic level but uses a macro-econometric approach instead, in order to give a broad overview over a wide variety of effects. By combining the macro-econometric input-output model INFORGE with the socio-economic system DEMOS containing household-specific income and consumption information we can assess how a simple fiscal measure would affect the economy on the aggregate level. Moreover, different household types, i.e. which households would benefit most and how their income would change in short, medium and long term. Issues concerning the inequality of disposable incomes across households are addressed as well.

It can be shown that a tax reduction has a positive aggregate effect throughout the economy in all years of the tax reform. Working households with high incomes profit most from simple tax cuts. Non-working households, however, are faced with comparably smaller positive

deviations in income, which exacerbates the projected distance between household incomes and contributes to further increasing inequality.

The remainder of the paper is structured as follows. Section 2 gives a short overview of the modelling context and the scenario settings. Section 3 encompasses the results on aggregate and household-specific level. The conclusion is given in Section 4.

2 MODEL AND SCENARIO SETTING

The effects of a simple income tax reform on the overall economy and the income situation of different household types are shown using the macro-econometric input-output model INFORGE in combination with the socio-economic module DEMOS. The modelling background and the scenario setting are briefly described in the next subsections.

2.1 MODELLING BACKGROUND

The economic framework is represented by the macro-econometric input-output model IN-FORGE (INterindustryFORecastingGErmany) (see Figure 1). The model has been frequently used for economic forecasts, projections and scenario analyses for Germany (e. g. Drosdowski et al. 2016, Bünemann & Stöver 2015, Maier et al. 2015). It is established among European input-output models (EUROSTAT 2008) and well documented (Distelkamp et al 2003, Ahlert et al 2009) .

Figure 1: THE MACRO-ECONOMETRIC MODEL INFORGE
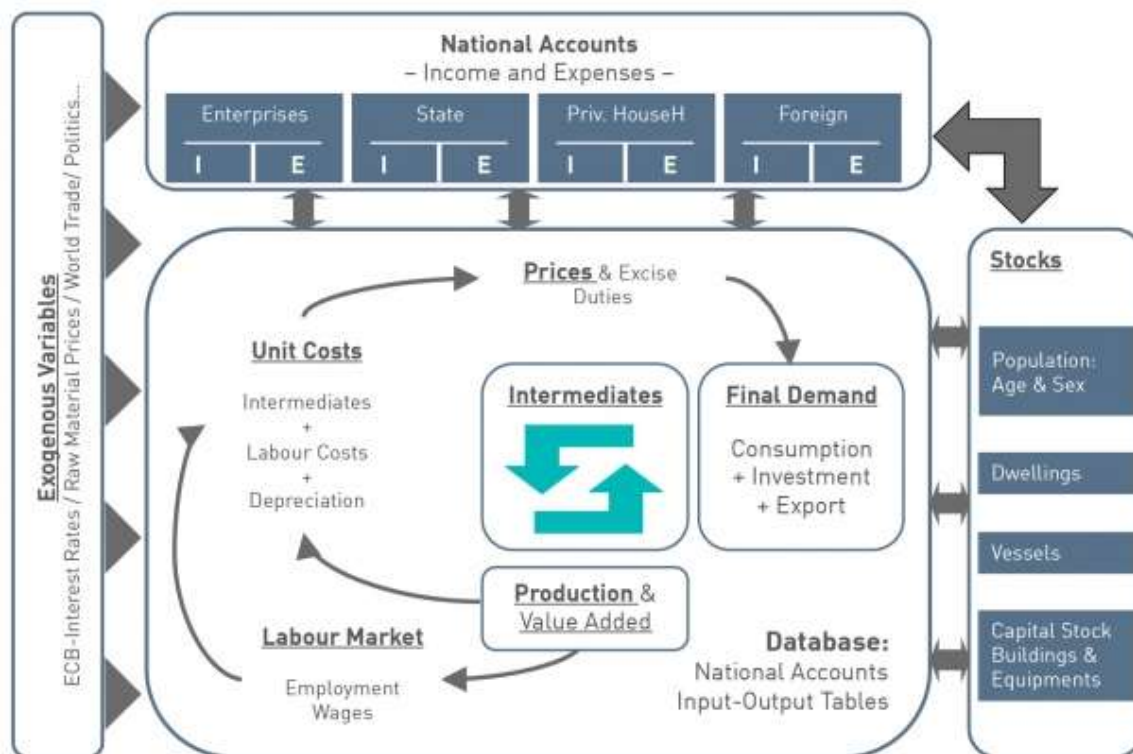
Source: own figure.

In INFORGE, each industrial sector is modelled individually and macro-economic variables are calculated through explicit aggregation (bottom up). This way, industrial interdependencies are explicitly incorporated and used to explain economic interactions. The model is based on the System of National Accounts and Balancing items (SNAB) including input-output tables as its economic core. Both the demand and the supply side are equally well considered by taking into account the interacting relationship between production sectors, private household demand and price effects. In addition, bounded rationality and the existence of imperfect markets are allowed. The model is annually updated and often combined with modules to deal with specific questions and objectives concerning energy and environment, labour market, world trade or regional aspects. Currently, the model calculates projections until the year 2035.

Some of its variables are set exogenously reflecting adequate assumptions. This is the case for fiscal policy instruments such as tax, interest and exchange rates. The projection of the German population bases on Variant 2 ("continued trend based on higher immigration") of the 13th coordinated population projection (StBA 2015) and includes an adjustment for the high net migration of the recent years.[1] The development of the population influences the evolution of households and has a major impact on the labour market, the real estate market, private consumption (esp. durables such as passenger cars) and the supply of public goods (government consumption expenditures).

INFORGE is a powerful tool to analyse a wide variety of socio-economic issues on the aggregate level and to generate numerous socio-economic indicators related to income generation, distribution and use. Although its basic version is not designed to trace developments on the household level, one of its extensions, DEMOS, focuses on income and private consumption differentiated by household groups, using more disaggregated data. The household module DEMOS was already successfully used within the project *soeb 2* (Drosdowski & Wolter 2012), as well as in studies related to distributional effects of environmental policies (Blobel et al. 2011, EEA 2011). Currently, the results of its newest version is being used in the third report on the socioeconomic development in Germany (soeb 3). Figure 2 provides a simplified overview of the functional relationship between INFORGE and the socio-economic module DEMOS. The development of incomes and consumption expenditures for different household types can be projected until 2035, including household composition changes due to demography (e.g. increasing number of pensioner households). Details about the structure and features of DEMOS are given in Drosdowski et al. (2015).

Taxes enter the socio-economic modelling as a layer between net income and disposable income for each of the household types. They are calculated by using the initial shares of taxes in their primary income which are multiplied with current income for a given year and adjusted in accordance with projected tax developments on the aggregate level reflecting the bracket creep.

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[1] In Variant 2 it is assumed that the average annual birth rate will be 1.4 children per woman, that life expectancy will increase by seven years (men) and six years (women) as well as that net annual migration will fall from the initial level of 500,000 to 200,000 by 2021 and afterwards remain at that level.

**Figure 2: Socio-economic modelling combining the macro-econometric model INFORGE with module DEMOS**
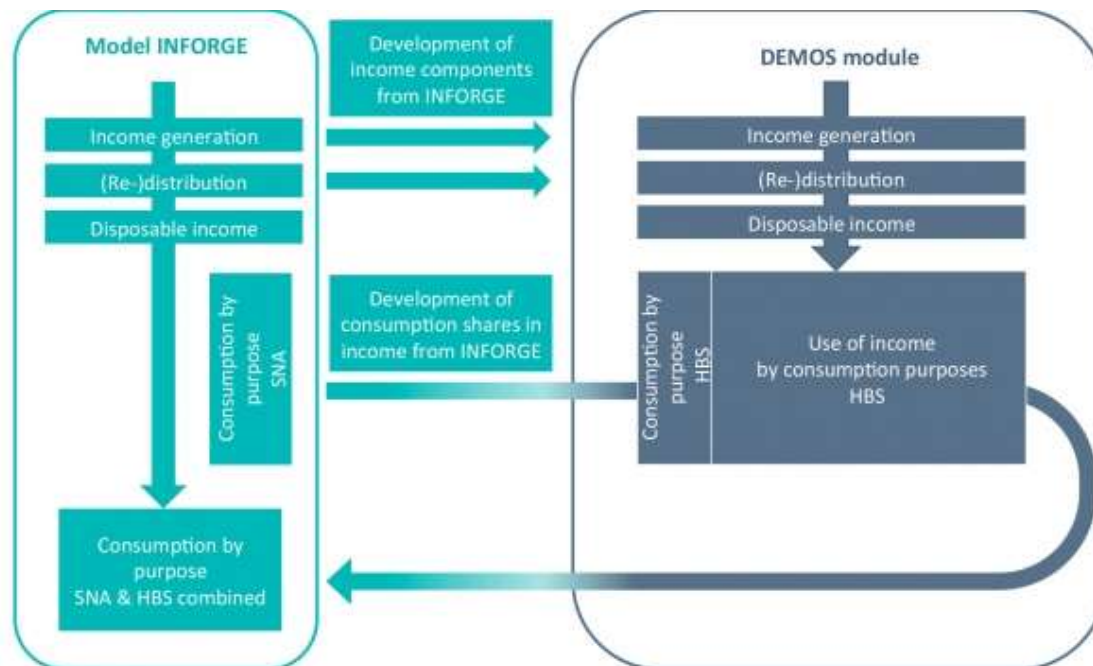
Source: own figure.

2.2 SCENARIO SETTING

In order to examine the impact of a simple income tax reform consisting of a permanent proportional tax cut, a scenario analysis is undertaken using the modelling system described above. In contrast to the reference (blue line in Figure 3), in the scenario (turquoise line in Figure 3) it is assumed that the total level of tax payments of private households on income and wealth observed in 2015 is maintained in the following year, resulting in a tax burden reduction in comparison with the projected reference outcome by 3.1 % for 2016. This proportional reduction is maintained for each year of the projection (see grey bars in Figure 3)., i.e. the difference between reference and scenario remains permanent.

The assumed shift in the projected path of income taxation of private households is mirrored in the modelling of private household groups. In the reference, the changes in taxes paid by each household type (differentiated by occupational status and household size and then aggregated by size) are essentially obtained by applying the aggregate growth rate of taxes to them in a proportional way, which, technically speaking, requires an additional adjustment of the tax shares in their primary incomes. Due to this mechanism, the differences in tax payments in the tax scenario are mainly driven by the initial structural differences between households. Thus, it is expected that working households carrying the bulk of the taxation burden also experience the highest tax reliefs, while households at the receiving end of redistribution are less affected.

Figure 3: Tax payments of private households on income and wealth in the reference and the scenario (in bn Euro, left axis) and the percentage deviation between reference and scenario (right axis)
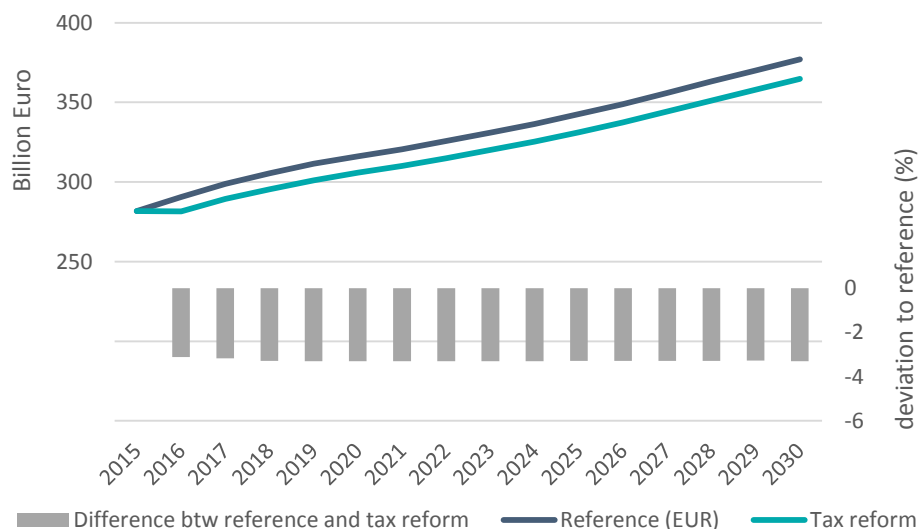
Source: INFORGE

3 RESULTS

The impact of the tax reform is analysed by comparing the scenario results to the reference in both absolute and percentage terms. To understand the mechanisms of changes associated with the assumed tax cuts it is instructive to discuss the quantitative effects on the total economy and its components at first, and subsequently the consequences for different household types.

3.1 AGGREGATE ECONOMIC CONSEQUENCES OF AN INCOME TAX REFORM

Table 1: Difference between reference and scenario for GDP and its main components

	deviation in bn Euro			deviation in %		
	2016	2023	2030	2016	2023	2030
GDP	5,8	9,4	10,3	0,2	0,3	0,3
Private consumption	7,4	12,0	13,8	0,4	0,6	0,6
Government consumption	-0,3	0,2	0,3	0,0	0,0	0,0
GFCF in machinery and equipment	0,7	1,1	1,2	0,2	0,3	0,3
GFCF in construction	0,6	1,0	1,1	0,2	0,3	0,3
Export	0,0	0,0	0,0	0,0	0,0	0,0
Import	2,9	4,9	6,0	0,2	0,3	0,3

Source: INFORGE

The aggregate results in Table 1 are given for the years 2016, 2023 and 2030 corresponding to short, medium and long term. In the year of the tax reform the impact on the economy

is slightly positive: the GDP is 0.2 % or 5.8 bn Euro higher than in the reference. As private households have to pay 9.1 bn Euro less taxes and hence have more income to their disposal they boost their spending: the main fraction of the extra money is spent on consumption amounting to 7.4 bn Euro or 0.4 % of the reference value. The rest of the additional funds is saved, resulting in an increase in the savings rate of 0.1 %-points. Due to the fact that consumer goods consist of a large part or completely of imported intermediate components or final goods, imports show the second highest positive deviation of the GDP components. Through the intersectoral interdependence of the producing economic activities the other GDP components increase as well. Only government consumption is slightly lower than in the reference, as. the income tax revenues are reduced by 8.8 bn Euros or 2.3 %.[2] Parts of the losses in income tax revenues are compensated by additional receipts from higher wages and employment (35 thousand more persons) as well as increases from VAT revenues (0.7 bn Euros equivalent to 0.3 %). Nevertheless, given the absence of compensatory financial measures, the public budget deficit increases.

The positive impact of the tax reform is lasting, as GDP and its components increase over time in nominal terms in comparison with the baseline. These positive changes are slightly less positive over time in case of GDP in real terms, as the price level increases due to higher demand. However, private consumption becomes higher even in real terms, although the increases from mid-term to long-term level are rather negligible. The differences between diminishing real GDP gains and increasing consumption gains are caused by increasing real imports.

3.2   IMPACT ON DISPOSABLE INCOME OF DIFFERENT HOUSEHOLD TYPES

Table 2: Difference between reference and scenario for the monthly household income of different household types

	deviation in Euros (per month and household)			deviation in % (per month and household)		
	2016	2023	2030	2016	2023	2030
farmer	25,2	40,0	50,1	0,6	0,8	0,7
other self-employed	39,1	47,1	52,5	0,8	0,9	0,9
public servant (Beamter)	31,0	48,6	57,2	0,6	0,8	0,8
white-collar worker	27,7	39,9	46,3	0,7	0,9	0,9
blue-collar worker	16,2	25,4	29,2	0,5	0,6	0,6
unemployed	1,9	4,5	4,9	0,1	0,3	0,3
pensioner	3,2	8,9	9,3	0,1	0,3	0,3
non-working population	3,2	8,6	9,1	0,1	0,3	0,3
average	18,7	26,7	29,7	0,6	0,7	0,7

Source: DEMOS

In 2016 – but also in the following years– working households benefit most from an income tax reform consisting of a permanent proportional tax cut (Table 2). The higher the income

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[2] Note that the deficit in income taxes received by the government is lower than the taxes not paid by private households in Germany. This small deviation reflects the difference between income taxes paid abroad by domestic residents and taxes paid at home by foreign residents.

(other self-employed and public servants) the higher is the gain induced by the lower income taxation. Accordingly, households of blue-collar workers whose market incomes are situated at the lower end of the primary income spectrum show the lowest deviations from the baseline among the working households. The disposable income of the other household types show positive deviations from the reference as well. The households whose main income earner is unemployed can only generate the lowest absolute increases in income. Other non-working households are also barely affected by the tax cut.

Table 3: Difference between reference and scenario for inequality measured as distance to average income for different household types

	distance to average income in % (reference)			deviation from average in %-points		
	2016	2023	2030	2016	2023	2030
farmer	22,7	36,4	59,2	0,1	0,1	0,1
other self-employed	38,1	35,2	34,1	0,4	0,3	0,3
public servant (Beamter)	56,2	60,4	66,7	0,1	0,2	0,2
white-collar worker	18,0	19,9	22,2	0,2	0,2	0,2
blue-collar worker	5,6	7,2	9,0	-0,1	-0,1	-0,1
unemployed	-58,1	-58,9	-59,6	-0,2	-0,2	-0,2
pensioner	-21,6	-20,7	-22,4	-0,3	-0,3	-0,3
non-working population	-24,8	-23,8	-25,0	-0,3	-0,3	-0,3
average	0,0	0,0	0,0	0,0	0,0	0,0

Source: DEMOS

As the left part of Table 3 shows, working households' disposable incomes are above average and the non-working households below average in the reference. The highest negative distance to average is represented by the unemployed with an income in the reference that is 58 % lower than the average income. The highest positive distance constitutes the income of the public servants being 56 % higher than average. These disparities are growing over time in most of the cases.

Inequality becomes slightly higher in the scenario compared to the reference, as seen by the results given in the right part of Table 3. Almost all incomes above average are increasing the positive distance to the average, the exception being those of blue-collar workers which are moving closer to the average. The incomes below average experiencing only modest gains by the tax cut also widen their distance to the average by developing further in the negative direction.

4   CONCLUSION

On the aggregate level, the economy will profit from an income tax reform consisting of a permanent proportional tax cut not financed by offsetting fiscal measures. The initially positive effects also persist in the years after the reform, as the GDP level is permanently higher following a singular spike of its growth rate. The results are not to be interpreted as an

evidence that tax cuts promote growth, anyway . Rather, the short analysis provides an assessment in the specific German context, characterized by a macroeconomic environment of low inflationary pressures, low interest rates, low budget deficits and strong labour market allowing for fiscal experiments in a certain range.

All considered household types have a higher disposable income in the tax reform scenario than in the reference. In nominal terms, an average household gains 19 Euros per month in the year of the reform's introduction, and the difference to the baseline scenario reaches 30 Euros per month in 2030. However, given the absence of complementary fiscal measures, only the working households benefit significantly, as non-working households are usually not as much subject to income taxation.

Hence, given the proposed proportional tax cuts, the already unequal development of disposable incomes in the base projection becomes even larger and their distribution becomes more skewed towards the working households. A more complex change in the tariff system or decidedly progressive tax reductions could possibly generate fairer outcomes.

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