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The Evaluation of Fiscal Consolidation Strategies
APPENDIX

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A MODEL FRAMEWORK: DETAILS

A.1 Slovak tax and transfer system

The system is largely unified and its components are set mainly at the state level. Individuals are subject to the personal income tax (PIT) and the joint taxation of married couples is not permitted. PIT is levied on gross income including wages from employment, self-employment income, fringe benefits, capital, rental and interest income. Social and health insurance contributions (SIC) are exempt from the tax base which is given as gross earnings net of paid SIC. Deductions from the tax base include basic tax allowance, spouse tax allowance and child tax credit. Every individual is entitled to the basic tax allowance that is defined based on minimum subsistence level. A progressive reduction in its amount applies when earnings exceed the threshold value. If earnings of a spouse are under certain level, the tax payer can apply for a spouse tax allowance. In addition, one spouse may claim child tax credit, an allowance for every child in the household. Income tax is calculated by applying the appropriate tax rate schedule to tax base. Basic tax rate is set to 19 per cent and 25 per cent rate is applied to incomes exceeding the threshold. However, this threshold is sufficiently high, so the higher tax rate relates in our estimation sample to less than 1 per cent of employees.

The SIC payments are split between employer and employee. The assessment base for contributions differs from the base for computation of PIT and has a maximum. Payments by employers and employees consist of health, unemployment, sickness, disability, and old age insurance, but the two categories pay different percentages from the assessment base. Besides this, employers pay contributions to a reserve solidarity fund, accident insurance and guarantee insurance.

The Slovak benefit system consists of contributory benefits, social assistance and state social support. Each component consists of several programs.

a) Contributory benefits cover various pensions (old-age, disability, widower's, orphans), sickness benefit, maternity benefit and unemployment insurance benefit.
b) Social assistance program includes material needs benefit which is a means-tested transfer provided to families to provide them basic living standard if their income is below the minimum subsistence level.
c) The state social support program includes several family related benefits (e.g. child birth grant, child benefit, or parental allowance). Eligibility to these transfers does not depend on the contribution history and is not means-tested.

A.2 The labour supply model

We have adopted the microeconometric approach to model the labour supply behaviour such that two components are considered – the decision whether to actively participate in the labour market (extensive margin) and the decision about hours worked conditional on being employed (intensive margin).

We model individual participation decision about supplying labour following the methodology proposed by Benczur, Katay, Kiss, and Racz (2014). Their extension of the standard labour supply model built on the rationale of utility maximization (Hausman, 1981) allows to consider taxes and social transfers simultaneously. When using the categorization of labour supply models within microsimulation framework provided by Aaberge and Colombino (2014), it can be classified as a "marginalist" approach. Using this static setting, the savings behaviour is not modelled. The applied set up leads to a re-definition of the reservation wage (the threshold to accept a wage offer) at the cost that the participation decision is constrained to a full-time job. However, we argue that this assumption is in the context of Slovakia not a substantial restriction. As shown by EUROSTAT, Slovakia is the country with one of the lowest rates of part-time employment. In 2016 the share of part-time workers reached only 5.7 percent as opposed to 19 percent in the EU-28.

The individual takes the participation decision, or in other words becomes economically active, if the utility from working full-time exceeds the utility derived from being inactive (and receiving full amount of social transfers). Taking into account the corresponding budget constraints and assuming the additively separable utility function and the normality of error terms, the probability that an individual is economically active can be estimated by a probit equation (for the details of derivation, see Senaj et al., 2016):

$$\Pr(\text{activity}_i = 1) = \Phi(\gamma \log GTW_i + Z_i'\alpha - \psi \log NY_i). \quad (1)$$

Variables GTW_i and NY_i are of principal interest and for their construction a microsimulation tool is needed. GTW_i denotes the gains to work (or effective net wage) of the individual i, defined as the net wage $\widehat{w_i}$ minus the difference between social benefits received if not working and social benefits if working:

$$GTW_i = \widehat{w_i} - (SB^{NW} - SB^{W}) = \widehat{w_i} - \Delta SB. \quad (2)$$

Since income from employment is obviously unobservable for those who are unemployed or inactive, in the first step Heckman's sample selection methodology is applied to predict individual's gross wages. In the next step, the SIMTASK tax and benefit calculator is used to compute net wages from gross wages and to simulate the amount of social benefits an individual is entitled to when working (SB^{W}) and when not working (SB^{NW}), considering simultaneously the individual's characteristics as well as the characteristics of the household an individual belongs to. Using the details of the Slovak tax and transfer system, social benefits that are included in the variable GTW are the means-tested material needs benefit and its supplements allocated at the household level.

The non-labour income NY_i of the individual i sums three components, in particular the social transfers that one receives when not working, the non-labour income of all household members (including individual i) and the net labour income of other household members. Non-labour income includes pensions, income from property, dividend payments, and family-related benefits (these are not means-tested and their eligibility does not depend on whether a parent works or not) and the unemployment benefit (a contributory benefit that expires after six months, so we assume that this transfer does not affect the decision to work). Finally, the vector Z_i comprises a set of observable individual socio-demographic characteristics.

Both variables GTW_i and NY_i after their values are simulated are divided by the households' effective value-added tax rate $eVAT$. This adjustment $\frac{GTW_i}{1+eVAT}$ and $\frac{NY_i}{1+eVAT}$ is technically a re-scaling of the two variables that affects the real disposable income of an individual, but it does not affect the decision to work. The effective VAT rate is defined as the share of revenues from VAT paid

to total households' expenditures. To simulate VAT, in the first step we create a combined dataset that integrates the information on households' expenditures from the Slovak Household Budget Survey (HBS) and the disposable income covered in SILC database. We apply a parametric imputation technique using the methodology developed by Decoster et al. (2014). Engel curves relating consumption expenditures to disposable income are estimated at the household level using the data from HBS 2015. Coefficient estimates are then used to impute the information on consumption to the underlying SILC dataset. In the next step, VAT liabilities are simulated using the imputed household consumption. For details, the interested reader is referred to our discussion paper by Siebertova et al. (2018).

Equipped with the vectors gains to work and non-labour income, the probit model of participation decision is estimated separately for males and females on the pooled sample of SILC data from 2012-15 (Table A.1). The estimated results are statistically significant and have the expected sign. An increase in gains to work increases the individuals' probability of participation, on the other hand an increase in non-labour income decreases motivation to be economically active.

Table A.1: Point estimates of probit model (pooled regression 2012-15)

Dependent variable ACTIVE	**Females**			**Males**		
logGTW	0.314	***	(0.043)	0.248	***	(0.054)
logNY	-0.201	***	(0.018)	-0.181	***	(0.023)
EDU: Secondary	0.586	***	(0.033)	0.626	***	(0.039)
EDU: Tertiary	0.760	***	(0.042)	0.843	***	(0.051)
Parent with child under 3y.	-2.159	***	(0.037)	0.450	***	(0.087)
Parent with child over 3y.	0.075	**	(0.029)	0.413	***	(0.044)
Fam: Married	-0.070	*	(0.036)	-0.076	*	(0.045)
Fam: Divorced / Widowed	0.121	***	(0.040)	-0.002		(0.066)
Has working partner	0.229	***	(0.034)	0.289	***	(0.042)
Chronic disease	-0.728	***	(0.025)	-1.162	***	(0.032)
Student	-2.042	***	(0.038)	-2.240	***	(0.040)
Pensioner	-2.465	***	(0.034)	-2.873	***	(0.047)
Year 2013	-0.072	**	(0.030)	0.054		(0.038)
Year 2014	-0.103	***	(0.030)	0.051		(0.038)
Year 2015	-0.107	***	(0.030)	0.036		(0.038)
Constant	0.090		(0.367)	0.580		(0.479)
Observations	27 682			24 057		
R2 pseudo	0.538			0.638		

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Reference categories for the dummies: Education (ref. Elementary), Family status (ref. Single), Year (ref. 2012).

Estimated coefficients of the probit model directly enter to the assessment of the participation effect of the consolidation strategies. The gains to work and non-labour income are simulated for

every individual in baseline and consolidation scenario. In addition, coefficient estimates of Engel curves are used to calculate households' consumption both in baseline and scenario and the effective VAT rate is simulated for every household. The adjusted gains to work and non-labour income are used to evaluate individual participation probabilities $\widehat{p_i} = \Phi\left(\hat{\gamma}\log W_i + Z_i'\hat{\alpha} - \hat{\psi}\log NY_i\right)$ both in baseline and scenario cases.

The second labour supply decision refers to the number of hours worked, conditional on working. For this intensive margin response, the baseline and scenario changes in the effective average ($AETR$) and marginal ($METR$) tax rates need to be evaluated. Using a variant of Gruber and Saez (2002) original approach, Bakos et al. (2008) derived the relationship between income growth $\widehat{w}$ and tax rates

$$\Delta\ln(\widehat{w}) = \varepsilon_m \Delta\ln(1 - METR) + \varepsilon_a \Delta\ln(1 - AETR). \tag{3}$$

The parameter ε_m is the effective marginal net-of-tax rate elasticity (substitution effect) and ε_a represents the effective average net-of-tax rate elasticity (income effect). Since appropriate data to estimate these elasticities is not available, we use calibrated values. Following Kiss and Mosberger (2015) estimation for Hungary, ε_m is set to 0.2 for the top 20 percent of the income distribution and ε_a is set to zero. In our implementation, hours worked in baseline is set to 1. The response of an individual at the intensive margin is the relative change in the effective hours worked. After some manipulations it can be expressed as a function of the marginal and the average effective tax rates and income growth:

$$\widehat{\mathrm{h}} = \frac{h_{sc}}{h_{ba}} = 1 + \xi\left\{e^{[\varepsilon_m \Delta\ln(1-METR) + \varepsilon_a \Delta\ln(1-AETR) + (\varepsilon_m+\varepsilon_a)\widehat{w}]} - 1\right\}, \tag{4}$$

where ξ stands for the correction term function that is assumed to be close to one ($\xi \approx 1$).

To complete the micro part, a note on the model of employment is discussed. We model the employment such that the labour supply model of individual participation decision is combined with a rationing risk model (Bargain, Caliendo, Haan, & Orsini, 2005). In the standard labour supply models, it is assumed that individuals can find an employment with certainty. If this assumption is relaxed, there exist individuals who want to work but do not find an employment, thus they are involuntary unemployed. The risk of rationing - an individual probability of being involuntary unemployed - can be estimated as a probit specification

$$\Pr(\mathrm{IUNEMP}_i = 1) = \Phi^R(X_i'\beta). \tag{5}$$

IUNEMP is a binary variable that equals one if an individual is involuntary unemployed and zero otherwise, X contains individual and local labour market characteristics (demand side variables) that influence the probability of rationing. In our representation, individual characteristics include education, age and labour market experience in the quadratic form, dummies for no work history and unfavourable health status. Controls for local labour market characteristics include dummy for the density of settlement and regional unemployment rate. Detailed specification and estimation results are available upon request.

If it is assumed that there exist individuals who are involuntarily unemployed, the decision process of an individual can be described as a double-hurdle. First, decision whether to participate in the labour market or to stay inactive should be taken. Second hurdle concerns the probability of being involuntarily unemployed if the person is active. Therefore, individual can be found in one of the following 3 states: being inactive, being active and involuntarily unemployed and finally, active and working full-time. Under the assumption that the two processes are independent, the probit equations can be estimated separately. The probability of being employed considered in the second hurdle is estimated such that probabilities of the standard model are multiplied by the probabilities implied by the rationing risk model:

$$\Pr(\text{emp}_i = 1) = \Phi\left(\hat{\gamma} \log GTW_i + Z_i'\hat{\alpha} - \hat{\psi} \log NY_i\right)\left(1 - \Phi^R\left(X_i'\hat{\beta}\right)\right). \quad (6)$$

Finally, individual employment probabilities in the sample are summed up to get an estimate of the aggregate employment rate.

A.3 The *what_if* model

The labour supply model described above allows us to assess the partial equilibrium effects of the proposed policy reform. However, our intention is to evaluate the general equilibrium short- and long-run effects as well. Therefore, we embed our labour supply micro block into a small general equilibrium model. The macroeconomic block defines labour demand and the capital supply-demand equilibrium given a wage level. Another way of looking at our approach is to take Farmer (2013, 2016) and think about the behavioural microsimulation exercise as a mechanism performing the task of equilibrium selection.

Our theoretical macroeconomic model is a neo-classical model with simple search and matching frictions, as in Pissarides (2000). The model is consistent with the existence of involuntary unemployment, and so we can calibrate it to match the empirical ratios seen in the micro-data we use, and thus ensure consistency.

We assume that production of goods is given by a standard CES production function which combines effective labour and capital. In the model, it takes time for an unemployed to find a job and also the process of searching for new employees is costly. The representative firm then maximizes its profit:

$$\max_{K,L,v} E_t \sum_{j=t}^{\infty} \beta^{j-t} \lambda_j^c \left[Y_j - (1+\tau_w) w_j N_j - \frac{r_j}{1-\tau_k} K_j - c v_j \right] \tag{7}$$

Total labour cost per unit of labour is given by $w_j(1+\tau_w)$, where w_j denote gross wages and τ_w is the payroll tax paid by employers. The net user cost of capital K_j is $r_j/(1-\tau_k)$, where r_j is the price of capital, and τ_k denotes the effective corporate tax rate. Hiring costs are given by the expression cv_j, where v_j is the vacancy rate and c is the corresponding cost parameter.

The optimization process is constrained by the following three conditions:

1. Production function in standard CES form combines capital and effective labour:

$$Y_j = \left[\alpha K_j^{\sigma} + (1-\alpha) L_j^{\sigma} \right]^{\frac{1}{\sigma}} \tag{8}$$

2. Growth of employment. The variable *q* is the probability of filling a vacancy:

$$N_j = (1-\lambda) N_{j-1} + v_j q \tag{9}$$

3. The relationship between effective labour and employment:

$$L_j = \chi N_j \tag{10}$$

In what follows, we set out the relationships characterizing the long-run steady state of our economy which together give us the set of equations channeling the labour supply shock coming from the microsimulation exercise.

The optimality conditions from the firms' problem link the price of labour and capital to the capital and labour. In the steady state we have:

$$(1-\alpha) L^{(\sigma-1)} (\alpha K^{\sigma} + (1-\alpha) L^{\sigma})^{\left(\frac{1}{\sigma}-1\right)} = \frac{(1+\tau_w) w}{\chi} + \frac{c}{\chi q} (1 - (1-\lambda)\beta\lambda^c) \tag{11}$$

$$\alpha K^{(\sigma-1)} (\alpha K^{\sigma} + (1-\alpha) L^{\sigma})^{\left(\frac{1}{\sigma}-1\right)} = \frac{r}{1-\tau_k} \tag{12}$$

The Slovak economy is a very open one with much of private investment taking the form of foreign direct investment. This, we believe, allows us to assume perfect capital mobility.

We use a standard Cobb-Douglas matching function:

$$m = \mu u^{\xi} v^{(1-\xi)} \tag{13}$$

where, μ and ξ are parameters. Employment N in this economy at any point in time equals past employment less separations plus new hires. In the steady state, this implies the following expression where λ is the separation rate.

$$N = \frac{vq}{\lambda} \tag{14}$$

Steady-state unemployment rate is given simply as follows:

$$u = 1 - N \tag{15}$$

Finally, the probability of filling a vacancy and the probability of being matched with a job are defined as follows

$$q = \frac{m}{v} \tag{16}$$

$$p = \frac{m}{u} \tag{17}$$

The steady state equations (11) – (17) form the macroeconomic block of the model used for simulation of long run effects. Parameter values are summarized in Table A.2.

Table A.2: Summary of the parameters used in the macro block of the model

Parameter	Value	Description / Source
α	0.43	Share of labour in CES production function estimate (Bencik, 2008)
σ	(0.48-1)/0.48	Transformed elasticity of substitution (Bencik, 2008)
β	0.99	Discount factor
λ	0.004	Job separation rate (Labour Market Developments in Europe 2013, EC, 2013)
ξ	0.8	Match elasticity of the unemployed (Zeleznik, 2012 or Nemec, 2013)
μ	0.05	Scaling factor of matching function - efficiency of the process (calibrated)
c	1.00	Vacancy posting costs (calibrated)
r	0.01	Quarterly interest rate - price of capital (calibrated)
τ_K	0.172	Effective corporate income tax rate (calibrated)

A.4 Linking micro and macro block of the model

To link the two parts of the model, the micro and macro part, we employ a version of an iterative procedure known in the literature as a top-down/bottom-up approach. In the micro (bottom-up

part), aggregate labour supply (L), social insurance contributions paid by employers (τ_w) and effective employment (N) are estimated and serve as an input to macro model:

$$L = \frac{1}{s}\sum_{i=1}^{s} \frac{Pr(\text{emp}_i = 1)\ hours_i\ prod_i}{\frac{1}{s}\sum_{i=1}^{s} Pr(\text{activity}_i = 1)\ [w_i]}\ [w_i] \tag{18}$$

where $Pr(\text{emp}_i = 1)$ and $Pr(\text{activity}_i = 1)$ denote the probability that an individual i is employed/active, $hours_i$ are hours worked and $prod_i$ measures the individual productivity proxied by the normalized labour income (computed as the share of individual wage to average wage). In other words, we treat the wage distribution as an approximation of the distribution of productivity (see, for example, Heathcote and Tsujiyama, 2015). The number of individuals in the sample is s and w_i is the population weight.

$$\tau_w = \frac{1}{s}\sum_{i=1}^{s} \left(\frac{SIC\ and\ HIC\ of\ employers}{gross\ labour\ income}\right)_i [w_i] \tag{19}$$

$$N = \frac{1}{s}\sum_{i=1}^{s} \frac{Pr(\text{emp}_i = 1)}{\frac{1}{s}\sum_{i=1}^{s} Pr(\text{activity}_i = 1)\ [w_i]}\ [w_i] \tag{20}$$

In the macro model, aggregate change in gross wages is computed and serves as an input to micro model (top-down part). This process is repeated until converge is reached, i.e. the change in gross wages computed in macro part is sufficiently small.

B SIMULATION RESULTS

Table B.1-1: Simulated short-term effects in %

			SIC and HIC paid by								Inequality	
	Fiscal effect	**Fiscal revenues**	**PIT**	**employees**	**employers**	**self-empl**	**VAT**	**CIT**	**Fiscal expend**	**Post VAT income**	**GINI**	**Kakwani**
baseline, 2018	**9 284**	**17 851**	**2 414**	**2 616**	**6 922**	**1 108**	**3 115**	**1 676**	**8 567**	**1 192**	**27.4**	**6.4**
PIT - 1 p.p. increase in the standard rate	**1.40**	0.73	5.70***	0.00	0.00	0.00	-0.25***	0.00	0.00	-0.49***	-0.12	0.24
PIT - one tax rate	**4.11**	2.14	16.76***	0.00	0.00	0.00	-0.73***	0.00	0.00	-1.44***	-0.35	0.61
PIT - decreasing tax allowances	**0.84**	0.44	3.44***	0.00	0.00	0.00	-0.16**	0.00	0.00	-0.29***	0.00	-0.30
HIC - 1 p.p. increase in the rate paid by employers	**1.76**	0.92	0.00	0.00	2.69***	0.00	0.00	-1.34	0.00	0.00	0.00	0.00
HIC - 1 p.p. increase in the rate paid by employees	**1.52**	0.79	-1.50***	7.12***	0.00	0.00	-0.28***	0.00	0.00	-0.53***	-0.08	-0.05
VAT - 1 p.p. increase in the standard rate	**1.34**	0.70	0.00	0.00	0.00	0.00	3.99***	0.00	0.00	-0.47	0.00	0.00
VAT - abolition of reduced rate	**0.94**	0.49	0.00	0.00	0.00	0.00	2.80***	0.00	0.00	-0.33	0.00	0.00
CIT - 1 p.p. increase in the rate	**0.84**	0.44	0.00	0.00	0.00	0.00	0.00	4.65	0.00	0.00	0.00	0.00
Reduction of family related transfers and credits	**1.52**	0.24	2.10***	0.00	0.00	0.05	-0.30***	0.00	-1.16***	-0.56***	-0.20	0.16
Reduction of material need benefits	**0.40**	-0.02	0.00	0.00	0.00	0.00	-0.12*	0.00	-0.48***	-0.15*	0.16	-0.03

Notes: First row (baseline) represents direct output from the simulation model; monetary variables in mil. euros.
Subsequent rows display changes in % from baseline values. In case of inequality measures the numbers express changes in percentage points.
SIC - social insurance contributions, HIC - health insurance contributions, PIT - personal income tax, VAT - value added tax, CIT - corporate income tax
*, **, *** denote statistically significant difference between baseline and scenario at 10%, 5% and 1% levels, respectively. Standard errors are computed conventionally. Thus, the statistical significance reflects sampling error, rather than modelling uncertainty. Statistical significance is displayed for PIT, SIC&HIC, VAT, fiscal expenditures and disposable income. CIT is computed directly using the effective tax rate. Post-VAT income reflects households' disposable income minus VAT expenses.

Table B.1-2: Simulated behavioural effects in %

			SIC and HIC paid by								Inequality	
	Fiscal effect	**Fiscal revenues**	**PIT**	**employees**	**employers**	**self-empl**	**VAT**	**CIT**	**Fiscal expend**	**Post VAT income**	**GINI**	**Kakwani**
baseline, 2018	**9 284**	**17 851**	**2 414**	**2 616**	**6 922**	**1 108**	**3 115**	**1 676**	**8 567**	**1 192**	**27.4**	**6.4**
PIT - 1 p.p. increase in the standard rate	**1.23**	0.64	5.51***	-0.12	-0.12	0.00	-0.28***	0.06	0.00	-0.55***	-0.14	0.24
PIT - one tax rate	**3.58**	1.86	16.20***	-0.34***	-0.34***	-0.22	-0.85***	0.17	0.00	-1.65***	-0.41	0.68
PIT - decreasing tax allowances	**0.81**	0.43	3.45***	-0.01	-0.01	0.00	-0.16**	0.00	0.02	-0.30***	0.01	-0.30
HIC - 1 p.p. increase in the rate paid by employers	**1.76**	0.92	0.00	0.00	2.69***	0.00	0.00	-1.34	0.00	0.00	0.00	0.00
HIC - 1 p.p. increase in the rate paid by employees	**1.29**	0.68	-1.67***	6.96***	-0.16**	0.00	-0.32***	0.08	0.03	-0.61***	-0.07	-0.06
VAT - 1 p.p. increase in the standard rate	**1.34**	0.70	0.00	0.00	0.00	0.00	3.99***	0.00	0.00	-0.47	0.00	0.00
VAT - abolition of reduced rate	**0.94**	0.49	0.00	0.00	0.00	0.00	2.80***	0.00	0.00	-0.33	0.00	0.00
CIT - 1 p.p. increase in the rate	**0.84**	0.44	0.00	0.00	0.00	0.00	0.00	4.65	0.00	0.00	0.00	0.00
Reduction of family related transfers and credits	**1.51**	0.23	2.09***	-0.01	-0.01	0.05	-0.30***	0.00	-1.16***	-0.56***	-0.21	0.15
Reduction of material need benefits	**0.79**	0.10	0.01	0.23***	0.23***	0.00	-0.05	-0.12	-0.64***	-0.05	0.03	0.00

Notes: First row (baseline) represents direct output from the simulation model; monetary variables in mil. euros.
Subsequent rows display changes in % from baseline values. In case of inequality measures the numbers express changes in percentage points.
SIC - social insurance contributions, HIC - health insurance contributions, PIT - personal income tax, VAT - value added tax, CIT - corporate income tax
*, **, *** denote statistically significant difference between baseline and scenario at 10%, 5% and 1% levels, respectively. Standard errors are computed conventionally. Thus, the statistical significance reflects sampling error, rather than modelling uncertainty. Statistical significance is displayed for PIT, SIC&HIC, VAT, fiscal expenditures and disposable income. CIT is computed directly using the effective tax rate. Post-VAT income reflects households' disposable income minus VAT expenses.

Table B.1-3: Simulated long term effects in %

	Fiscal effect	Fiscal revenues	SIC and HIC paid by						Fiscal expend.	Post VAT income	Inequality	
			PIT	employees	employers	self-empl	VAT	CIT			GINI	Kakwani
baseline, 2018	**9 284**	**17 851**	**2 414**	**2 616**	**6 922**	**1 108**	**3 115**	**1 676**	**8 567**	**1 192**	**27.4**	**6.4**
PIT - 1 p.p. increase in the standard rate	**1.24**	0.64	5.60***	-0.07	-0.07	0.03	-0.26***	-0.36	0.00	-0.52***	-0.13	0.23
PIT - one tax rate	**3.63**	1.89	16.51***	-0.17**	-0.17**	-0.12	-0.80***	-1.12	0.01	-1.55***	-0.40	0.67
PIT - decreasing tax allowances	**0.84**	0.45	3.52***	0.04	0.04	0.03	-0.15**	-0.26	0.02	-0.27***	0.01	-0.30
HIC - 1 p.p. increase in the rate paid by employers	**1.10**	0.57	-0.87***	-0.53***	2.15***	-0.47	-0.17**	-0.08	0.00	-0.32***	-0.05	0.04
HIC - 1 p.p. increase in the rate paid by employees	**1.32**	0.70	-1.52***	7.06***	-0.06	0.03	-0.30***	-0.59	0.03	-0.55***	-0.07	-0.06
VAT - 1 p.p. increase in the standard rate	**1.35**	0.70	0.02	0.01	0.01	0.01	4.00***	-0.05	0.00	-0.46	0.00	0.00
VAT - abolition of reduced rate	**0.94**	0.49	0.01	0.00	0.00	0.00	2.80***	-0.02	0.00	-0.33	0.00	0.00
CIT - 1 p.p. increase in the rate	**0.76**	0.40	-0.14	-0.08	-0.08	-0.05	-0.03	4.96	0.00	-0.05	-0.01	0.00
Reduction of family related transfers and credits	**1.48**	0.21	2.02***	-0.05	-0.05	0.03	-0.31***	0.21	-1.16***	-0.58***	-0.21	0.16
Reduction of material need benefits	**0.60**	0.00	-0.51***	-0.09	-0.09	-0.34	-0.15**	1.79	-0.64***	-0.24***	0.00	0.04

Notes: First row (baseline) represents direct output from the simulation model; monetary variables in mil. euros.
Subsequent rows display changes in % from baseline values. In case of inequality measures the numbers express changes in percentage points.
SIC - social insurance contributions, HIC - health insurance contributions, PIT - personal income tax, VAT - value added tax, CIT - corporate income tax
*, **, *** denote statistically significant difference between baseline and scenario at 10%, 5% and 1% levels, respectively. Standard errors are computed conventionally. Thus, the statistical significance reflects sampling error, rather than modelling uncertainty. Statistical significance is displayed for PIT, SIC&HIC, VAT, fiscal expenditures and disposable income. CIT is computed directly using the effective tax rate. Post-VAT income reflects households' disposable income minus VAT expenses.

Table B.2-1: Simulated short-term effects in mil. EUR

	Fiscal effect	Fiscal revenues	SIC and HIC paid by PIT	employ-ees	employ-ers	self-empl.	VAT		CIT	Fiscal expend.
re-scaled baseline, 2018	**13 096**	**22 278**	**2 829**	**2 822**	**7 465**	**1 195**	**5 393**		**2 575**	**9 182**
PIT - 1 p.p. increase in the standard rate	**147.8**	147.8	161.09	0.00	0.00	0.00	-13.30		0.00	0.0
PIT - one tax rate	**434.6**	434.6	474.03	0.00	0.00	0.00	-39.38		0.00	0.0
PIT - decreasing tax allowances	**88.7**	88.7	97.33	0.00	0.00	0.00	-8.68		0.00	0.0
HIC - 1 p.p. increase in the rate paid by employers	**166.4**	166.4	0.00	0.00	200.97	0.00	0.00		-34.6	0.0
HIC - 1 p.p. increase in the rate paid by employees	**143.4**	143.5	-42.45	200.98	0.00	0.00	-15.04		0.00	0.1
VAT - 1 p.p. increase in the standard rate	**245.6**	245.6	0.00	0.00	0.00	0.00	245.59	*	0.00	0.0
VAT - abolition of reduced rate	**172.2**	172.2	0.00	0.00	0.00	0.00	172.21	*	0.00	0.0
CIT - 1 p.p. increase in the rate	**119.8**	119.8	0.00	0.00	0.00	0.00	0.00		119.8	0.0
Reduction of family related transfers and credits	**136.8**	44.1	59.52	0.00	0.00	0.64	-16.06		0.00	-92.7
Reduction of material need benefits	**15.7**	-6.7	0.00	0.00	0.00	0.00	-6.70		0.00	-22.4

Notes: First row represents the re-scaled baseline values for fiscal variables; monetary variables in mil. euros. For VAT, baseline value is the estimated amount of VAT paid by households. Subsequent rows display difference in mil. euros compared to re-scaled baseline values.
* For scenarios involving the change of VAT rate the baseline is rescaled to the total amount in the economy (6 149.8 mil. euros).
SIC - social insurance contrib., HIC - health insurance contrib., PIT - personal income tax, VAT - value added tax, CIT - corporate income tax

Table B.2-2: Simulated behavioural effects in mil. EUR

	Fiscal effect	Fiscal revenues	SIC and HIC paid by PIT	employ-ees	employ-ers	self-empl.	VAT		CIT	Fiscal expend.
re-scaled baseline, 2018	**13 096**	**22 278**	**2 829**	**2 822**	**7 465**	**1 195**	**5 393**		**2 575**	**9 182**
PIT - 1 p.p. increase in the standard rate	**130.1**	130.1	155.94	-3.39	-8.94	-0.06	-14.99		1.5	0.0
PIT - one tax rate	**378.9**	379.1	458.26	-9.57	-25.31	-2.68	-45.98		4.4	0.2
PIT - decreasing tax allowances	**86.8**	87.8	97.51	-0.28	-0.74	0.00	-8.87		0.1	0.9
HIC - 1 p.p. increase in the rate paid by employers	**166.4**	166.4	0.00	0.00	200.97	0.00	0.00		-34.6	0.0
HIC - 1 p.p. increase in the rate paid by employees	**120.7**	121.9	-47.32	196.26	-11.58	-0.03	-17.45		2.0	1.2
VAT - 1 p.p. increase in the standard rate	**245.6**	245.6	0.00	0.00	0.00	0.00	245.59	*	0.0	0.0
VAT - abolition of reduced rate	**172.2**	172.2	0.00	0.00	0.00	0.00	172.21	*	0.0	0.0
CIT - 1 p.p. increase in the rate	**119.8**	119.8	0.00	0.00	0.00	0.00	0.00		119.8	0.0
Reduction of family related transfers and credits	**135.3**	42.6	59.04	-0.28	-0.74	0.63	-16.20		0.1	-92.7
Reduction of material need benefits	**48.6**	18.3	0.32	6.44	17.33	0.00	-2.83		-3.0	-30.3

Notes: First row represents the re-scaled baseline values for fiscal variables; monetary variables in mil. euros. For VAT, baseline value is the estimated amount of VAT paid by households. Subsequent rows display difference in mil. euros compared to re-scaled baseline values.
* For scenarios involving the change of VAT rate the baseline is rescaled to the total amount in the economy (6 149.8 mil. euros).
SIC - social insurance contrib., HIC - health insurance contrib., PIT - personal income tax, VAT - value added tax, CIT - corporate income tax

Table B.2-3: Simulated long term effects in mil. EUR

	Fiscal effect	Fiscal revenues	SIC and HIC paid by						Fiscal expend.
			PIT	employ-ees	employ-ers	self-empl.	VAT	CIT	
re-scaled baseline, 2018	**13 096**	**22 278**	**2 829**	**2 822**	**7 465**	**1 195**	**5 393**	**2 575**	**9 182**
PIT - 1 p.p. increase in the standard rate	**128.5**	128.5	158.53	-1.90	-5.04	0.31	-14.09	-9.3	0.0
PIT - one tax rate	**375.7**	375.9	467.12	-4.91	-13.01	-1.43	-43.02	-28.8	0.2
PIT - decreasing tax allowances	**88.2**	89.1	99.69	1.02	2.69	0.35	-8.07	-6.6	0.9
HIC - 1 p.p. increase in the rate paid by employers	**103.8**	103.9	-24.65	-14.94	160.34	-5.67	-9.03	-2.2	0.1
HIC - 1 p.p. increase in the rate paid by employees	**119.3**	120.7	-43.00	199.11	-4.65	0.31	-15.96	-15.1	1.4
VAT - 1 p.p. increase in the standard rate	**246.0**	246.0	0.46	0.27	0.72	0.08	245.80*	-1.3	0.0
VAT - abolition of reduced rate	**172.4**	172.4	0.17	0.10	0.28	0.04	172.28*	-0.5	0.0
CIT - 1 p.p. increase in the rate	**113.2**	113.3	-3.90	-2.35	-6.19	-0.62	-1.44	127.8	0.0
Reduction of family related transfers and credits	**133.8**	41.1	57.26	-1.35	-3.56	0.35	-16.86	5.3	-92.7
Reduction of material need benefits	**40.7**	10.4	-14.47	-2.58	-6.39	-4.09	-8.23	46.2	-30.3

Notes: First row represents the re-scaled baseline values for fiscal variables; monetary variables in mil. euros. For VAT, baseline value is the estimated amount of VAT paid by households. Subsequent rows display difference in mil. euros compared to re-scaled baseline values.
* For scenarios involving the change of VAT rate the baseline is rescaled to the total amount in the economy (6 149.8 mil. euros).
SIC - social insurance contrib., HIC - health insurance contrib., PIT - personal income tax, VAT - value added tax, CIT - corporate income tax

Table B.3: Changes in probabilities of being economically active (in p.p.)

	All	**Age**				**Parent with child up to 3 years**	
		15-24	**25-50, female**	**25-50, male**	**50+**	**Female**	**Male**
baseline probabilities, 2018	**64.06**	**35.13**	**74.69**	**92.88**	**50.17**	**26.56**	**97.24**
PIT - 1 p.p. increase in the standard rate	**-0.014**	-0.007	-0.008	-0.006	-0.025	-0.017	-0.002
PIT - one tax rate	**-0.043**	-0.024	-0.024	-0.020	-0.077	-0.051	-0.007
PIT - decreasing tax allowances	**-0.012**	-0.022	-0.014	-0.007	-0.010	-0.020	-0.003
HIC - 1 p.p. increase in the rate paid by employers	**0.000**	0.000	0.000	0.000	0.000	0.000	0.000
HIC - 1 p.p. increase in the rate paid by employees	**-0.027**	-0.035	-0.036	-0.013	-0.027	-0.063	-0.007
VAT - 1 p.p. increase in the standard rate	**-0.002**	-0.004	-0.004	0.001	-0.002	-0.010	0.000
VAT - abolition of reduced rate	**-0.001**	-0.002	-0.003	0.002	-0.001	-0.006	0.000
CIT - 1 p.p. increase in the rate	**0.000**	0.000	0.000	0.000	0.000	0.000	0.000
Reduction of family related transfers and credits	**0.008**	0.021	0.016	0.005	0.001	0.073	0.014
Reduction of material need benefits	**0.093**	0.086	0.176	0.064	0.065	0.107	0.051

Notes: First row represents probabilities of being economically active simulated by the model. Subsequent rows express the changes in percentage points from baseline probabilities for different population groups.

Table B.3 (continue): Changes in probabilities of being economically active (in p.p.)

	All	Education (age 25-50)			Distribution effects (income quintiles)				
		Prim.	Sec.	Univ.	Q1	Q2	Q3	Q4	Q5
baseline probabilities, 2018	**64.06**	**69.48**	**85.77**	**83.84**	**81.34**	**87.99**	**92.45**	**95.84**	**96.63**
PIT - 1 p.p. increase in the standard rate	**-0.014**	-0.003	-0.006	-0.010	0.005	-0.004	-0.009	-0.010	-0.009
PIT - one tax rate	**-0.043**	-0.011	-0.019	-0.029	0.015	-0.012	-0.026	-0.031	-0.028
PIT - decreasing tax allowances	**-0.012**	-0.006	-0.012	-0.008	-0.015	-0.025	-0.011	-0.005	-0.002
HIC - 1 p.p. increase in the rate paid by employers	**0.000**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HIC - 1 p.p. increase in the rate paid by employees	**-0.027**	-0.081	-0.020	-0.019	-0.014	-0.015	-0.017	-0.011	-0.007
VAT - 1 p.p. increase in the standard rate	**-0.002**	0.000	-0.001	-0.003	-0.005	-0.005	-0.003	-0.002	-0.001
VAT - abolition of reduced rate	**-0.001**	0.002	0.000	-0.001	-0.002	-0.003	-0.001	-0.001	0.000
CIT - 1 p.p. increase in the rate	**0.000**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Reduction of family related transfers and credits	**0.008**	0.000	0.008	0.017	0.006	0.006	0.009	0.008	0.029
Reduction of material need benefits	**0.093**	0.461	0.108	0.056	0.361	0.102	0.047	0.033	0.026

Notes: First row represents probabilities of being economically active simulated by the model. Subsequent rows express the changes in percentage points from baseline probabilities for different population groups.

Table B.4: Long-term changes in macroeconomic indicators

	employ-ment (p.p.)	work inten-sity (p.p.)	eff. labour (p.p.)	gross wages (%)	net wages (%)	output (%)	unemp. rate (p.p.)
PIT - 1 p.p. increase in the standard rate	-0.02	-0.03	-0.08	0.05	-0.39	-0.08	0.02
PIT - one tax rate	-0.06	-0.09	-0.22	0.14	-1.18	-0.23	0.06
PIT - decreasing tax allowances	-0.02	0.00	-0.01	0.04	-0.32	-0.01	0.02
HIC - 1 p.p. increase in the rate paid by employers	0.00	-0.01	-0.02	-0.45	-0.38	-0.03	0.00
HIC - 1 p.p. increase in the rate paid by employees	-0.03	-0.03	-0.08	0.08	-0.48	-0.08	0.03
VAT - 1 p.p. increase in the standard rate	0.00	0.00	0.00	0.01	0.01	0.00	0.00
VAT - abolition of reduced rate	0.00	0.00	0.00	0.01	0.01	0.00	0.00
CIT - 1 p.p. increase in the rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reduction of family related transfers and credits	0.00	0.00	0.00	-0.07	-0.06	-0.04	0.00
Reduction of material need benefits	0.01	0.00	0.00	-0.03	-0.16	0.00	-0.01

Notes: employment - employment rate, work intensity - intensive margin response, effective labour - total labour supply, gross wages - gross wages of working population, net wages - gross wages of working population net of social and health insurance contributions, output – GDP.

Table B.4 (continue): Long-term changes in macroeconomic indicators

	capital (%)	SIC&HIC paid by employ-ers (p.p.)	CIT (%)	gross profit (%)	net profit (%)	unit labour costs (%)
PIT - 1 p.p. increase in the standard rate	-0.08	0.00	-0.36	-0.36	-0.36	0.04
PIT - one tax rate	-0.23	0.01	-1.12	-1.12	-1.12	0.13
PIT - decreasing tax allowances	-0.01	0.00	-0.26	-0.26	-0.26	0.04
HIC - 1 p.p. increase in the rate paid by employers	-0.03	0.58	-0.08	-0.08	-0.08	0.01
HIC - 1 p.p. increase in the rate paid by employees	-0.08	0.00	-0.59	-0.59	-0.59	0.07
VAT - 1 p.p. increase in the standard rate	0.00	0.00	-0.06	-0.06	-0.06	0.01
VAT - abolition of reduced rate	0.00	0.00	-0.05	-0.05	-0.05	0.01
CIT - 1 p.p. increase in the rate	0.00	0.00	-0.02	-0.02	-0.02	0.00
Reduction of family related transfers and credits	-0.50	0.00	4.96	0.30	-0.67	-0.03
Reduction of material need benefits	0.00	0.00	0.21	0.21	0.21	-0.03

Notes: capital - capital stock, CIT - corporate income tax, gross profit - gross profit of firms, net profit - profit of firms net of taxes, unit labour costs – total labour costs per one unit of output, SIC - social insurance contributions, HIC - health insurance contributions, CIT - corporate income tax.