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The microsimulation toolkit of the Council for Budget Responsibility

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Part I

BACKGROUND

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Microsimulations at Fiscal Council ?

Mandate of the CBR

Draw up its own opinions on the legislative proposals submitted to the Parliament

Current situation (budget proposal 2020-2022)

Proposals changing both tax and social system: decrease tax revenues or increase public expenditures

- increase of basic tax allowance
- decreased tax rate for corporate tax and for the self-employed
- decreased VAT for the selected food items
- increase of parental allowance

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Background

Evaluating suggested policy measures requires a tool that

- Captures national policy environment in fine **detail**
- Is based on good quality and well-adjusted micro **data**
- Generates outcomes that provide a good **match** with administrative data on aggregate

The CBR's microsimulation tool aims to cover mentioned issues

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Simulation model at a glance

w_hat if model

(1) SIMTASK: static tax-benefit calculator

- Simulation of direct taxes and transfers
- Linked to indirect tax simulation module
- Runs on SK-SILC data

(2) Labour supply model

(3) Integrated into a general equilibrium macro model

w_hat if is an analytical toolbox that can be used for

- Evaluation of counterfactual tax and transfer system changes
- Costing of government reform proposals

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Part II

OUR APPROACH

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Data & SIMTASK

Re-weighting of the underlying micro-data

More detailed control of selected categories

- income distribution
- children-age cohorts

Microsimulation tool SIMTASK

Runs on SK-SILC

Inspired by EUROMOD: tailored to country-specific conditions

Involves a maximum degree of user control —>

can be incorporated within other models used by Slovak CBR

New approach improves the fit between **simulated output** and **official statistics**

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SIMTASK: Slovak Tax-Transfer Microsimulation Model

SIMTASK simulates for every individual and policy scenario

Personal income tax

Social and health security contributions paid by employers, employees and self-employed

Social transfers

- Family related transfers: child birth grant, child benefit, parental allowance
- Social assistance: material need benefit
- Unemployment benefit

Net income

VAT paid by households is simulated in a separate block

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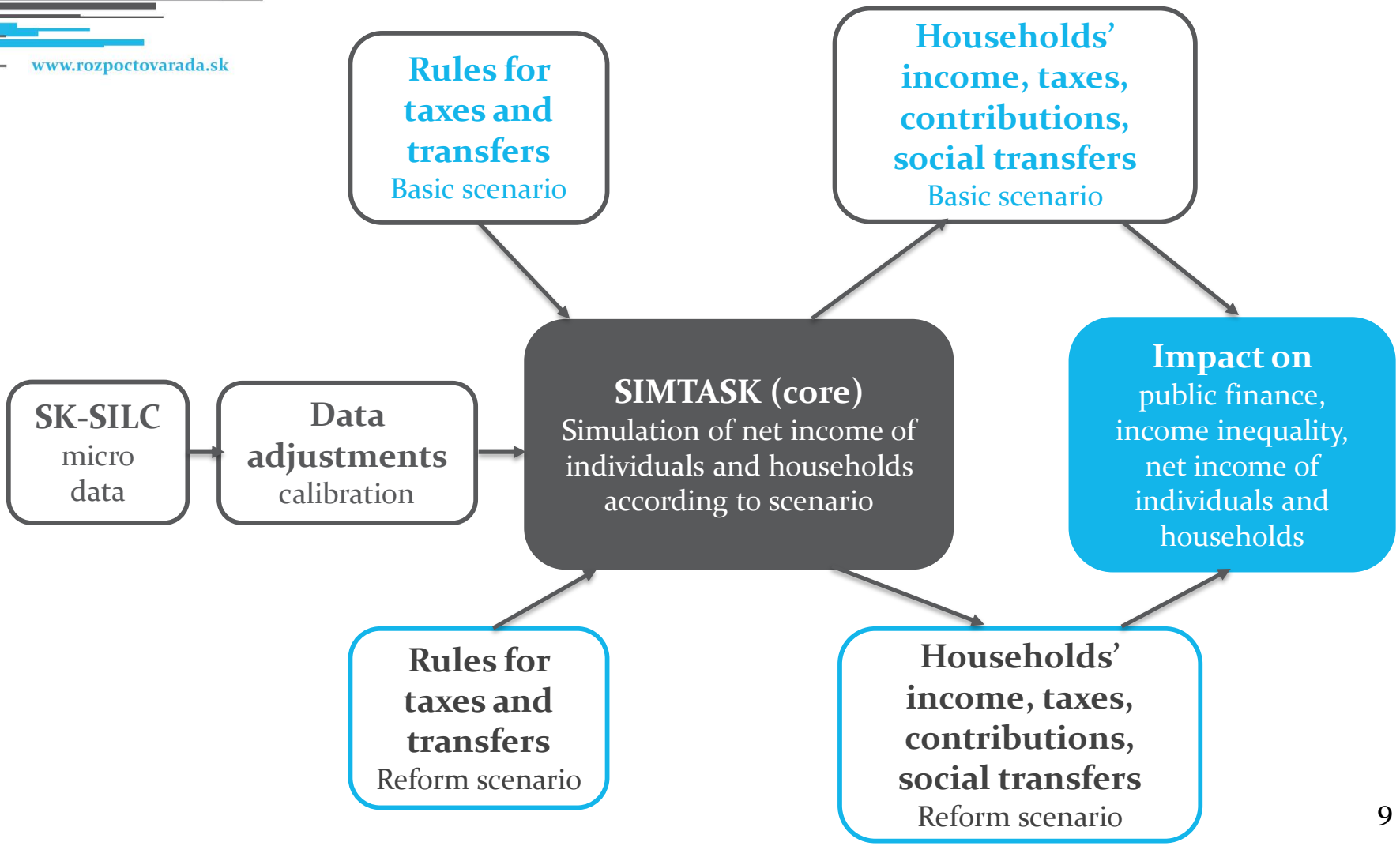
SIMTASK
How does it work ?



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Model of labour supply

Extensive margin response

Method to assess how the tax-benefit system affects motivation to work

Participation decision of individuals on the labour market is examined by comparing two states:

Being economically active vs. Being inactive

Probit model for economic activity

Estimated as a pooled regression 2012-15 separately for males and females

Most responsive groups were found *females* and *low-educated*

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Labour supply model (contd.)

Intensive margin response

Change in hours worked

It can be expressed as a function of net-of-tax rates, marginal and average elasticities

Response calibrated based on estimations for Hungary (Kiss and Mosberger, 2015)

Marginal net-of-tax rate elasticity 0.2 for top 20% earners

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Macro model

Neoclassical model

- General equilibrium model
- CES production function for firms combines capital and labour
- Capital supply is very elastic (small open economy)
- Labour supply comes from micro block

Interaction with the micro part

- Aggregate labour supply schedule is based on individual decisions coming from empirical decision functions

Combines empirical work with calibration

- A number of macro model parameters calibrated in line with external data and literature

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How does *w_hat if* work?

Micro block

For baseline and scenario compute *net wages* (observed/predicted for employed/unemployed) and *transfers* (if employed/inactive) using SIMTASK

For baseline and scenario evaluate *probability of being economically active/employed* and *effective hours* worked (if employed) using elasticities

Effective labour supply shock is the sum of individual adjustments at extensive and intensive margin

Macro block

Labour supply shock from micro part enters to macro block

Macro block generates new wage shock

Model solution

New wage shock feeds back to micro block and process repeats until convergence

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Interpretation of results

Presentation of policy simulation results

- **Direct output from the model**

  Simulated scenario compared to baseline (% change)

  Pros: Results document channels and relations in model

  Cons: Questionable correspondence to economic reality

- **Re-scaling of the results**

  Simulated baseline outcomes from the model are compared to the official statistics

  Scaling coefficient: ratio of the official statistics to simulated outcome from the model

  Pros: Quantification of effects

  Cons: Imprecision

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Interpretation of results: Scaling coefficients

Consolidation instrument	Scaling coefficient	Source of the official statistics for 2018
Personal income tax	1.17	Committee for the tax forecasts (Ministry of Finance)
Social and health insurance contributions	1.04	Committee for the tax forecasts (Ministry of Finance)
Social transfers	1.07	Information system on Government Budget
Value added tax	1.97	Committee for the tax forecasts (Ministry of Finance) When scaling the VAT, only the part paid by households is taken into account.

Note: Scaling coefficient is given as the ratio of the official statistics to simulated outcome from the model. Official statistics for every consolidation instrument is a forecasted value.

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Interpretation of results: Case of VAT

	Total cons.	0%	10%	20%	VAT paid
(1) Final consumption of private households	35 310	9 760	861	24 689	5 024
(2) Public sector consumption	2 565	392	102	2 071	424
(3) Gross fixed capital formation	1 400		1	1 399	280
…	…	…	…	…	…
TOTAL (sum of all components)	56 340	20 976	1 141	34 223	6 959

Source: Statistical Office SR, 2015. Amounts in mil. €

Share of VAT paid by (1): 87%

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Part III

COSTING OF RECENT REFORM PROPOSAL

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Reform costing: VAT reduction on food in 2020

Reform proposal: reduction of VAT on selected food items from 20% to 10%

VAT rate	0%	10%	20%	0%	10%	20%
Expenditure categories	**Baseline 2020**			**Scenario**		
(1) Food and non-alcoholic beverages	-	16	84	→	87	13
(2) Alcoholic beverages and tobacco	-	-	100	-	-	100
(3) Garments and shoes	-	-	100	-	-	100
(4) Electricity and other fuels	19	-	81	19	-	81
(5) Household services	-	-	100	-	-	100
(6) Health	47	40	13	47	40	13
(7) Transport	-	-	100	-	-	100
(8) Communication	29	-	71	29	-	71
(9) Recreation and culture	9	13	78	9	13	78
(10) Education	100	-	-	100	-	-
(11) Restaurants and hotels	-	50	50	-	50	50
(12) Other goods and services	54	-	46	54	-	46
Durables	2	-	98	2	-	98
Total	14.1	7.3	78.6	14.1	21.1	64.9

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Reform costing: VAT reduction on food in 2020

Evaluation of the proposal in our simulation framework:

- Monetary values (labour income, transfers) are uprated to 2020 values (forecasts)
- Baseline results are re-scaled to match the official statistics (forecast)
- The effect of the change is the difference between scenario and baseline values

Estimated costs of the reform proposal:

467 mil. eur lower VAT revenue, negative impact on the balance of 0.5% GDP.

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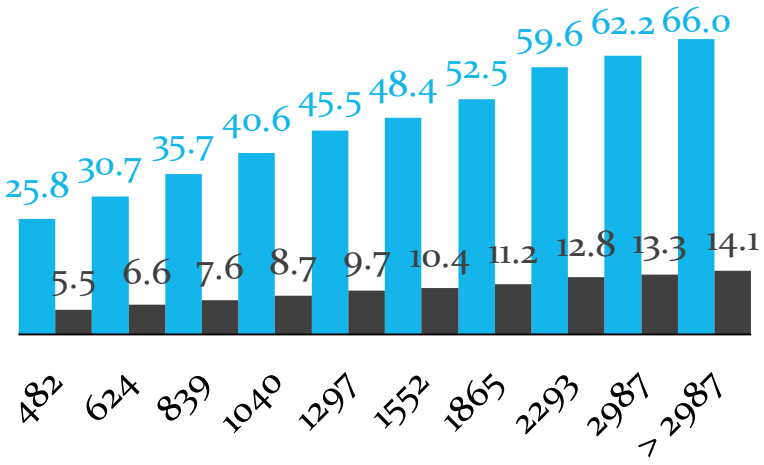
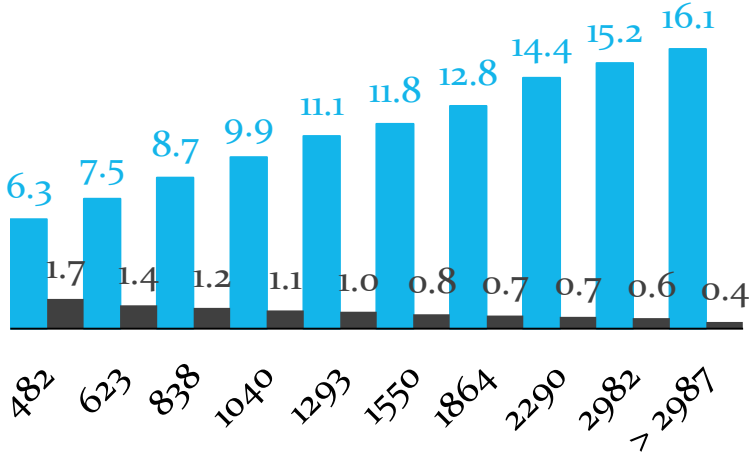
Distributional impact of the reform on households

VAT revenue dropout
in mil. €, in %



VAT saved (share of disp. income)
in €, in %



Note: Numbers on x-axis denote upper border of households' monthly disposable income

Households would save on average 0.7% (11 eur) of their disposable income monthly.
Households in top income decile would save 2.5 more than low income households.

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Part IV

MAKING THE TOOL ACCESSIBLE

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Online tool

SIMTASK on web

- on-line version of the simulation model
- tool to assess immediate fiscal and distributional effects of reforms, impact on inequality
- targeted to public: analysts, journalists, students

available at http://simtask.rozpoctovarada.sk

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Thank you for your attention

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