EUROMOD Online Manual

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B2 – Fiscal Policy Analysis

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Summary

EUROMOD Online is a web platform that provides a simplified and user-friendly access to the EUROMOD microsimulation model. It allows the implementation of simple reforms on the Personal Income Tax (PIT), Social Insurance Contribution (SIC) and Family Benefits systems of the European Union (EU) Member States, and delivers their corresponding fiscal and distributional impacts. The current version runs on EUROMOD version I6.0+ and simulates the tax-benefit systems in force in 2023. Previous years are also available (2018 – 2022). Years 2018 and 2019, run on EUROMOD version I2.0+, year 2020 on version I3.0+, year 2021 on version I4.0+ and year 2022 on version I5.0+.

The EUROMOD microsimulation model is a static tax-benefit calculator that covers all the EU Member States. It enables researchers and policy analysts to simulate reforms of PIT, SIC and benefits, and to compute the budgetary and personal income implications of those reforms, based on microdata and existing national tax and benefit codes. The model allows for standardised analysis across EU countries´ tax and benefits systems.

EUROMOD was managed, maintained and developed by the Institute for Social and Economic Research (ISER) at the University of Essex, starting in 1996. From 2018, a phased transition process started, in which the responsibility for the regular updating and maintenance of EUROMOD was progressively transferred to the Fiscal Policy Analysis Unit of the Joint Research Centre. This transition process finalised by the end of 2020. EUROMOD is developed in collaboration with national experts who update the tax and benefit coding and provide reports on the tax and benefit system of each country, including the validation of the model against national statistics.

The European Commission Joint Research Centre adopted the EUROMOD model for its tax modelling activities since March 2013. EUROMOD Online is run and maintained at the Joint Research Centre in Seville. Following authorisation, the EUROMOD Online tool can be accessed via EU Login at https://euromod-web.jrc.ec.europa.eu/euromod-online/. The EU Login account can be easily created during the registration process if needed. Questions or suggestions can be sent at JRC-EUROMOD-ONLINE@ec.europa.eu.

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1. Overview of the EUROMOD microsimulation model

EUROMOD is a microsimulation model of all EU countries Personal Income Taxes (PIT), Social Insurance Contributions (SIC) and Family benefits. EUROMOD allows the simulation of tax and benefit reforms and provides their fiscal/macro impact – through the use of statistical weights, defined by EUROSTAT – as well as indicators on their distributional impact, by household/individual groups according to socio-economic variables of interest, e.g. level of income for analysing equity impact, at-risk-of-poverty, etc. EUROMOD can be used to analyse the first-round fiscal impact of tax and benefit reforms on government budgets and on disposable income, as well as the effect of contributions and social insurance regulations. When specific simulations are not feasible, some elements are taken directly from the input datasets and included in the concept of disposable income.

EUROMOD is a static model, i.e. simulations abstract from potential behavioural reactions. The essence of the model is to provide counterfactual analysis of the budgetary and disposable income direct impact of tax and benefit reforms. Examples of possible reforms are changes in the tax rates or in the definition of the tax base and changes in entitlement conditions for pensions and benefits. The implementation of such reforms can be done in a very precise manner, since the tax and benefit systems in EUROMOD reflect very closely the existing tax and benefit codes of the EU Member States. The model generates disposable individual and household income, applying countries' tax-benefit codes and calculating theoretical benefit entitlements and tax liabilities. Importantly, the EUROMOD model directly embeds the interactions between the tax code and benefit system, which are generally absent from other models.

The microdata behind EUROMOD come from the EU Statistics on Income and Living Conditions survey (EU-SILC) which is harmonised by Eurostat. To show the coverage of the EU-SILC databases used by EUROMOD, Table 2 in section 3 provides the sample size of households and individuals by country, which in any case are representative of the whole population because of the calibrated weights being used. EUROMOD takes some variables directly from the underlying EU-SILC data, such as demographic and labour market characteristics, gross market income and other incomes (pensions, incomes from other households, etc.), as well as some expenditures (housing costs including mortgage, life insurance payments, etc.).[1] EUROMOD simulates PIT and SIC liabilities and benefit entitlements to contributory and non-contributory social benefits, applying tax–benefit systems' rules. The simulations run on several alternative input microdata sets depending on the simulated policy year. The current version of the EUROMOD Online, system for 2023, uses datasets from 2021 (except EL, FR, LT, PL and SK which use 2020, and IT which uses 2019), where reported incomes correspond to 2020. Previous systems (2018-2022) use datasets from year t-2. While demographic and labour market characteristics remain the same, uprating factors are used to bring the income values from the survey reference period up to the level of the year in which the tax and benefit system is coded. These uprating factors are typically index variables taken from Eurostat or national statistical offices such as the consumer price index, earnings increase or other legal variations in benefit amounts.

[1] Typically each country system is covered for year t-1 in June of year t.

The model validation is made by comparing EUROMOD simulations with national estimates. The model validation exercise is available for each of the Member States in the EUROMOD Country Reports.[2] In most cases, the national tax and budget authorities or national statistical institutes provide the national estimates. The aggregate estimates for expenditure and number of recipients of each benefit (and revenue and number of taxpayers of each tax) are compared with the same information from external sources (e.g. administrative statistics and national microsimulation models, whenever available). Considering budgetary variables, the EUROMOD estimates are in general close to the national estimates in the case of PIT and employees' SIC, although in certain cases, especially in small Member States, the discrepancy can be significant. The worst replication is generally obtained for SIC paid by the self-employed. However, the replication of national estimates for households' disposable income and at-risk-of-poverty indicators is, in general, fairly good. The validation is also revised backwards when more recent datasets become available, reflecting socio-economic conditions in a more reliable way.

Discrepancies between the EUROMOD baseline and national statistics may come from different sources. One is survey income underreporting (respondents participating in the survey might not recall exact amounts of some type of incomes received or taxes paid, and usually declare net amounts, more easily memorized) and difficulties in capturing the top part of the income distribution. Moreover, although sampling weights are used to ensure that the sample is representative for the whole population, for some countries weights account only for demographic population characteristics, but not for distribution of various income components. Another important source of discrepancy derives from the non-take-up of social benefits or from tax evasion. EUROMOD baseline results do not comprehensively take these into account, though some approximations are available in the full model and in some countries. In countries characterised by high rates of benefit non-take-up (among others, Belgium, France, Greece, Ireland and Romania) a simple correction can be included in EUROMOD by considering the take-up proportions reported in external statistics. In countries where tax evasion is widespread (among others, Bulgaria, Greece and Italy), a simple correction is included in order to split income sources (generally employment and self-employment income) recorded in the survey into a first component which is assumed to be reported to the tax authority and in a residual component which is assumed to be partially evaded. In the full model, these corrections for benefit non-take-up and tax evasion are documented in the country reports and can be “switched off” or adapted by the users. The corrections for tax evasion and benefit take-up are not yet available in EUROMOD Online, however. Finally, although being very detailed, this microsimulation model is a simplification of existing tax policy rules. For example, because of complexity some tax credits cannot be simulated or can be simulated with some underlying assumptions (i.e., commuters tax credit in Austria cannot be fully simulated as it also depends on the distance between living and working place); simulation of property taxes sometimes requires information on houses' market values; maternity leave benefits, although simulated in most

[2] These country reports also contain background information on the tax-benefit system, a detailed description of all tax-benefit components simulated in EUROMOD, a general overview of the input data (including information on sample quality, weights, data adjustment, imputations and assumptions) and an extended explanation of the validation process.

cases under certain assumptions, would require information on in-work history and contributory periods from previous year; etc.

2. EUROMOD Online: a user-guide

2.1. General description

EUROMOD Online is a web application developed in Java, using Oracle database and secured using EU Login authentication, which provides a simplified access to EUROMOD and allows the analysis of the fiscal and distributional impacts of tax reforms. EUROMOD Online utilises the full tax-benefit rules stored in EUROMOD, allowing the user to simulate non-complex reforms of PIT, SIC and Family benefits, without prior knowledge of EUROMOD.[3] Although the user can only change a limited number of parameters, the full version of EUROMOD runs behind, leading to interactions between policies.[4] After EUROMOD Online runs, the user gets several aggregated indicators summarising the results of the simulated reform, which are produced using Stata and exported to Microsoft Excel workbooks. However the user cannot access the EU-SILC-based output microdata, since a specific authorisation is required.

Currently users can run simulations for policy years 2023, and 2018 to 2022. However, results from different years should not be compared between them. Comparison across years would violate ceteris paribus assumption as the aggregate results would reflect not only the changes in tax parameters, but also would encompass year to year changes in income amounts and tax-benefit policies and changes in demographic and labour market characteristics, if different input datasets are used.

As a general rule, the user can modify most monetary parameters related to PIT, SIC and Family benefits. For taxes it is possible to change/add/remove rates and brackets, and to modify amounts and thresholds of allowances and tax credits. The number of brackets that can be added to each schedule may vary depending on the country. Additionally, due to technical limitations and to maintain the systems coherent, users may not be able to remove some of the brackets or they may only be allowed to add new brackets in specific places within the schedule. Regarding allowances and tax credits, EUROMOD Online offers the possibility of changing amounts and thresholds in six categories: (1) personal, (2) family, (3) work-related, (4) housing, (5) education, and (6) health.[5] Rates, schedules and thresholds of SIC can be changed for employees, employers and self-employed.

[3] Up to now EUROMOD Online does not allow simulating reforms on benefits. Regarding PIT and SIC, the options offered are necessarily limited to maintain the tool user-friendly. Examples of reforms that can be simulated with the full model but not with EUROMOD Online include changes in the definition of income lists (aggregations of monetary variables used to calculate tax bases or means-tests for benefits), changes in the definition of assessment units (individuals, households or other groupings of individuals) and policy swapping between countries (effects on country A of adopting a policy measure currently effective in country B).

[4] For instance, a change in SIC may affect PIT (because the contributions are deductible from the tax base) or benefits (because they may affect income concept taken into account in the means-test).

[5] Pension-related tax expenditures reforms are not offered in EUROMOD Online due to the complexity of simulating them as well as of interpreting their results.

Finally, EUROMOD Online enables users to modify rates and amounts related to Family benefits, which are categorized in three groups: 1) Family related benefits, 2) Childbirth related benefits and 3) Education related benefits.

EUROMOD Online can be accessed at https://euromod-web.jrc.ec.europa.eu/euromod-online/. Before logging in, the user will see the homepage, see Figure 1. Once logged, the user will have access to the map shown in Figure 2, where the country of interest has to be chosen. For each country the user has a set of modifiable parameters classified in different categories, as illustrated in Figure 3 for the case of Slovenia. Once the user changes these parameters and submit them, the system will run EUROMOD and compute several tables which summarize the impact of the reform with respect to the baseline, as described in the following section.

Figure 1: EUROMOD Online homepage

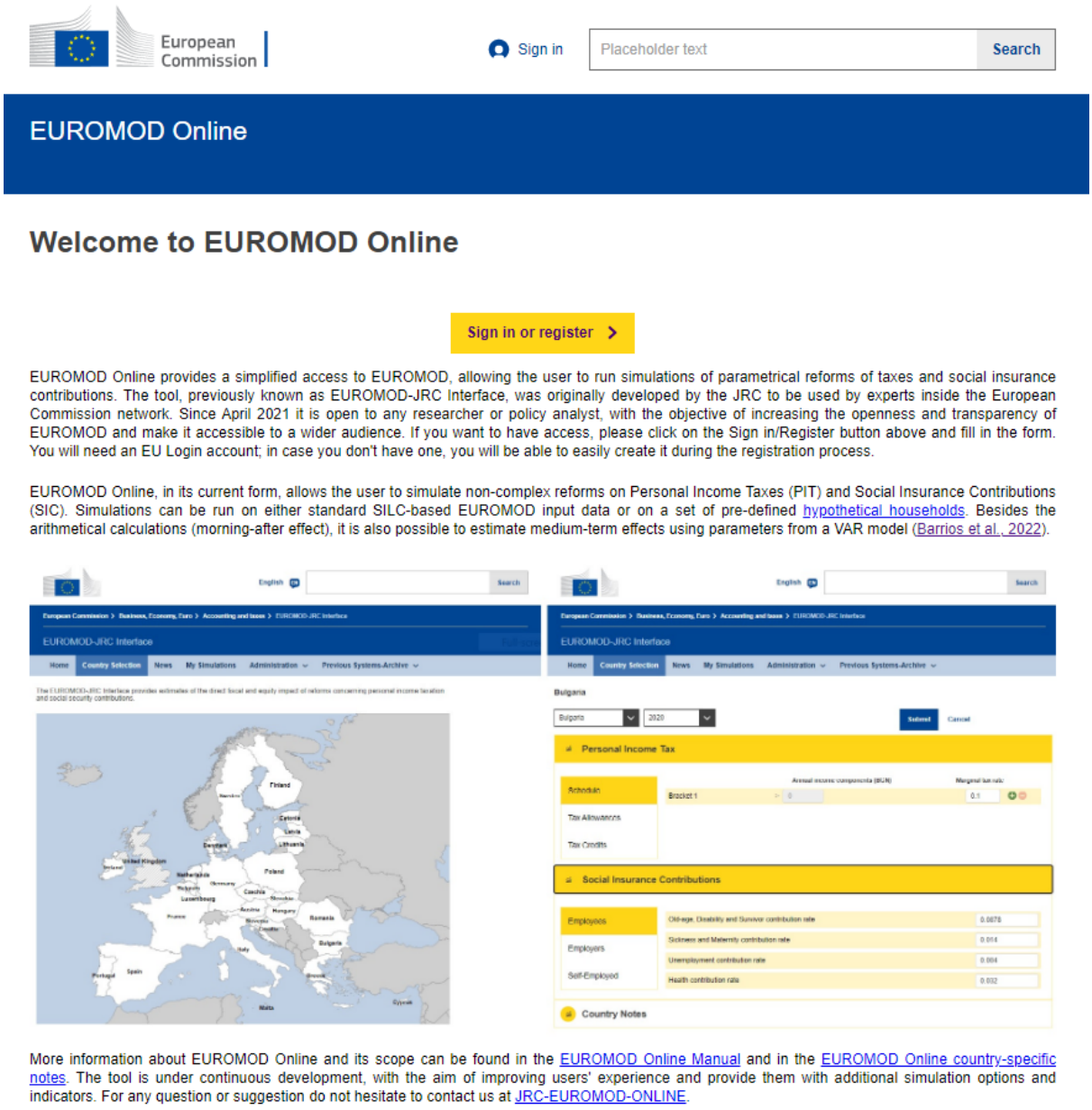
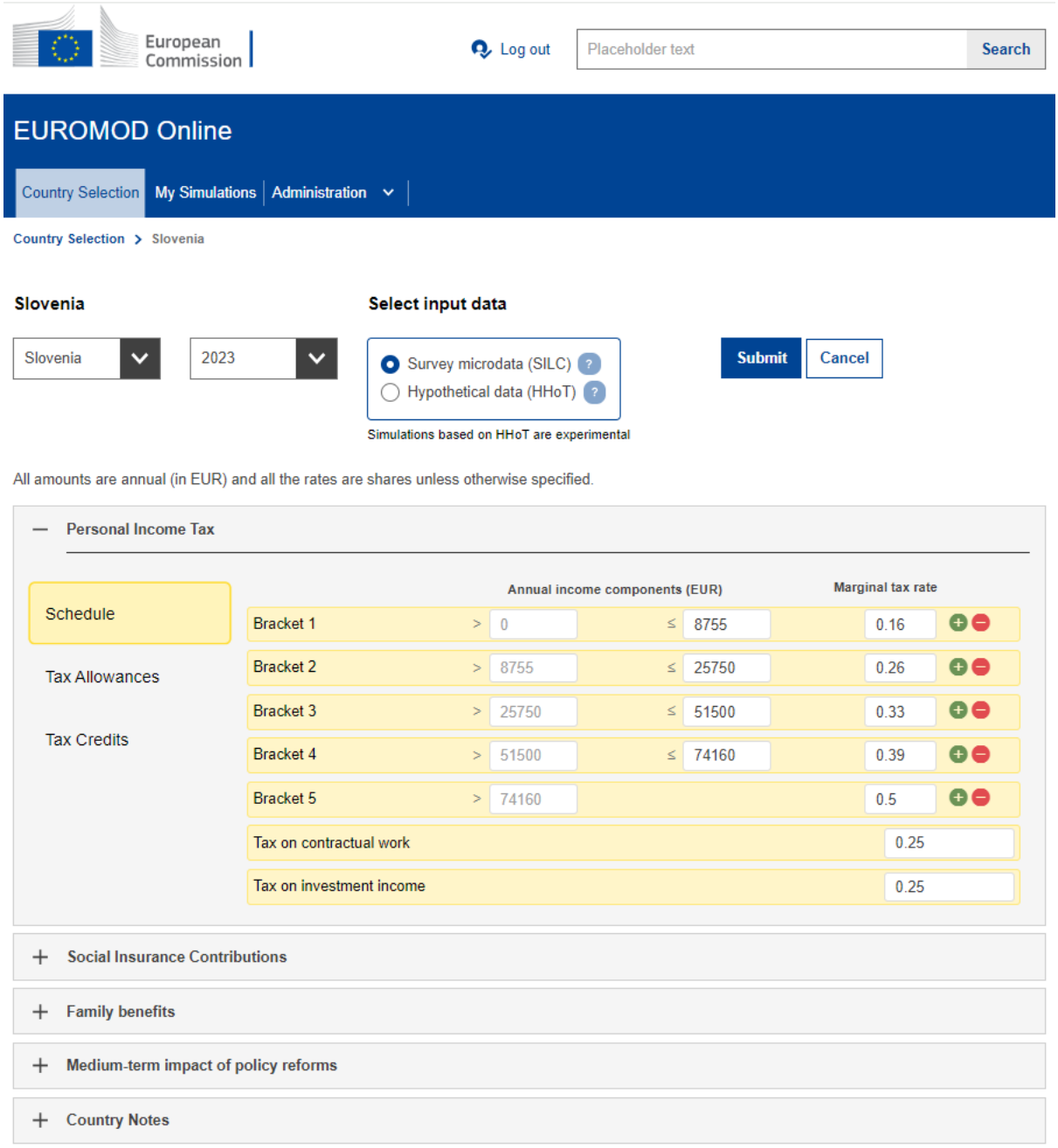


Figure 2: EUROMOD Online - country selection

Figure 3: Example of country menu: Slovenia 2023 - Main menu



2.2. Tables provided to the user

Results for fiscal impact, distributional effect by deciles and inequality and at-risk-of-poverty are produced and saved in an Excel file that the user can download. The results contain point estimates for baseline and reform, and the difference between the two results. The standard error and 95% confidence intervals for the differences between baseline and reform are also reported.

Furthermore, a metadata sheet with basic information about the simulation: name of the country, date, time and characteristics of the sample is included. This sheet also contains basic country

statistics including GDP, Gross public debt, Net lending, Population and Unemployment, withdrawn from the AMECO website[6]. Finally, an additional worksheet provides the list of parameters used in the corresponding simulations, for both the baseline and the reform scenarios.

A detailed description of the tables provided and their contents can be found in Table 1.

Table 1. Tables provided by EUROMOD Online

Worksheet	Table	Description
Simulation parameters	Simulation parameters	Values of all the parameters available in EUROMOD Online, with the values used in the simulation for the baseline (EUROMOD default) and reform scenarios (introduced by the user)
1. Fiscal	1.1. Aggregate revenue and expenditure	Aggregate revenue and expenditure for all taxes, SIC and benefits included in EUROMOD
2. Distributional	2.1. Taxpayers by decile A. Total number of households paying income taxes and/or Social Insurance Contributions, by decile B. Share of households paying income taxes and/or Social Insurance Contributions, by decile (%)	Number and shares of households paying taxes over deciles defined in the baseline scenario
	2.2. Total annual income taxes + Social Insurance Contributions paid, by decile	Total annual taxes and SIC (except employer) paid by deciles as defined in the baseline scenario
	2.3. Mean annual income taxes + Social Insurance Contributions paid at household level, by decile	Mean annual taxes and SIC (except employer) paid by decile as defined in the baseline scenario
	2.4. Income taxes + Social Insurance Contributions as a share of market income + benefits, by decile (%)	Average tax burden, measure as the share of the sum of PIT and SIC over the sum of market income and benefits, by decile as defined in the baseline scenario
	2.5. Mean annual disposable income at household level, by decile	Mean annual household disposable income, over deciles defined in the baseline scenario
	2.6. Mean annual equivalised disposable income at individual level, by decile	Mean annual individual equivalised disposable income, over deciles defined in the baseline scenario
	2.7. Winners (individuals whose equivalised disposable income increases with the reform) A. Total number of winners, by decile B. Share of winners, by decile (%)	Number and shares of individuals whose equivalised disposable income increases in the reform with respect to the baseline, over deciles defined in the baseline scenario
	2.8. Losers (individuals whose equivalised disposable income decreases with the reform) A. Total number of losers, by decile B. Share of losers, by decile (%)	Number and shares of individuals whose equivalised disposable income decreases in the reform with respect to the baseline, over deciles defined in the baseline scenario
3. Inequality and Poverty	3.1. Inequality and redistributive effect of the tax-benefit system	Gini coefficient of four pre-defined equivalised income concepts; redistribution index (Gini equivalised market income minus Gini equivalised disposable income); social welfare index (mean equivalised disposable income times one minus Gini equivalised disposable income); income quintile share ratio (total

[6] Source: AMECO Online

Worksheet	Table	Description
		equivalised disposable income of the top two deciles over total equivalised disposable income of the bottom two deciles); Inter-decile ratio D5/D1
	3.2. Progressivity and redistributive effect of income taxes + Social Insurance Contributions on market income + pensions + other benefits	Gini coefficients of equivalised gross income (sum of market income and benefits) and equivalised net income (gross income minus PIT and SIC); Reynolds-Smolensky index (difference between the two Gini coefficients); Kakwani decomposition of the Reynolds-Smolensky index (Kakwani index, net average tax rate, re-ranking effect)
	3.3. FGT(0) at-risk-of-poverty rates (%) for different anchored poverty lines and different definitions of income	FGT(0) at-risk-of-poverty rates for four pre-defined income concepts and for three poverty lines (40%, 50% and 60% of median equivalised disposable income)
	3.4. FGT(1) at-risk-of-poverty gaps (%) for different anchored poverty lines and different definitions of income	FGT(1) at-risk-of-poverty rates for four pre-defined income concepts and for three poverty lines (40%, 50% and 60% of median equivalised disposable income)

Notes:

- Equivalisation of income: EUROSTAT glossary, https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Equivalised_disposable_income [retrieved 29/03/2019].
- Construction of deciles: EUROSTAT glossary, https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Income_quintile_group (the same procedure is used, but for ten groups instead of five) [retrieved 29/03/2019].
- Income quintile share ratio: EUROSTAT glossary, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Income_quintile_share_ratio [retrieved 29/03/2019].
- Gini coefficient: Gini (1921)
- Social Welfare Index: Sen (1973)
- Reynolds-Smolensky index: Reynolds & Smolensky (1977)
- Kakwani decomposition: Kakwani (1977)
- At-risk-of-poverty indices: Foster, Greer & Thorbecke (1984)

As a way to illustrate the use of EUROMOD Online and the interpretation of the results provided, the following section explains in detail the example of a reduction of the employee health contribution in Slovenia. The example considers year 2018, however the procedure followed applies also to years 2019-2023.

2.3. Example: Reducing employee health contributions in Slovenia

Suppose the Slovenian authorities plan to implement a one percentage point reduction of the health contribution paid by employees. In order to implement this policy in EUROMOD Online, we need to go to the Country selection menu and choose Slovenia in the map (Figure 2), then click on the Social Insurance Contributions tab and change the corresponding value from 0.0636 to 0.0536 (Figure 4). Then we just have to click on “Submit”.

EUROMOD Online will deliver a downloadable Excel file with four worksheets for the simulation parameters (0), fiscal impact (1), distributional effects (2) and inequality and at-risk-of-poverty (3), containing the tables described in Table 1. Additionally, a metadata file with the parameters used in the simulation is produced (4). Below we analyse the results provided in each of these files.

2.3.1. Simulation Parameters [Simulation parameters worksheet]

This workbook presents all the parameters offered to the user in EUROMOD Online for the chosen country, organised in two columns: one for PIT and another one for SIC. The original and modified values are displayed for each parameter, as presented in Figure 5. In the example, the "Health contribution rate" field is changed and highlighted.

Figure 4: Reducing employee health contributions in Slovenia – Country menu

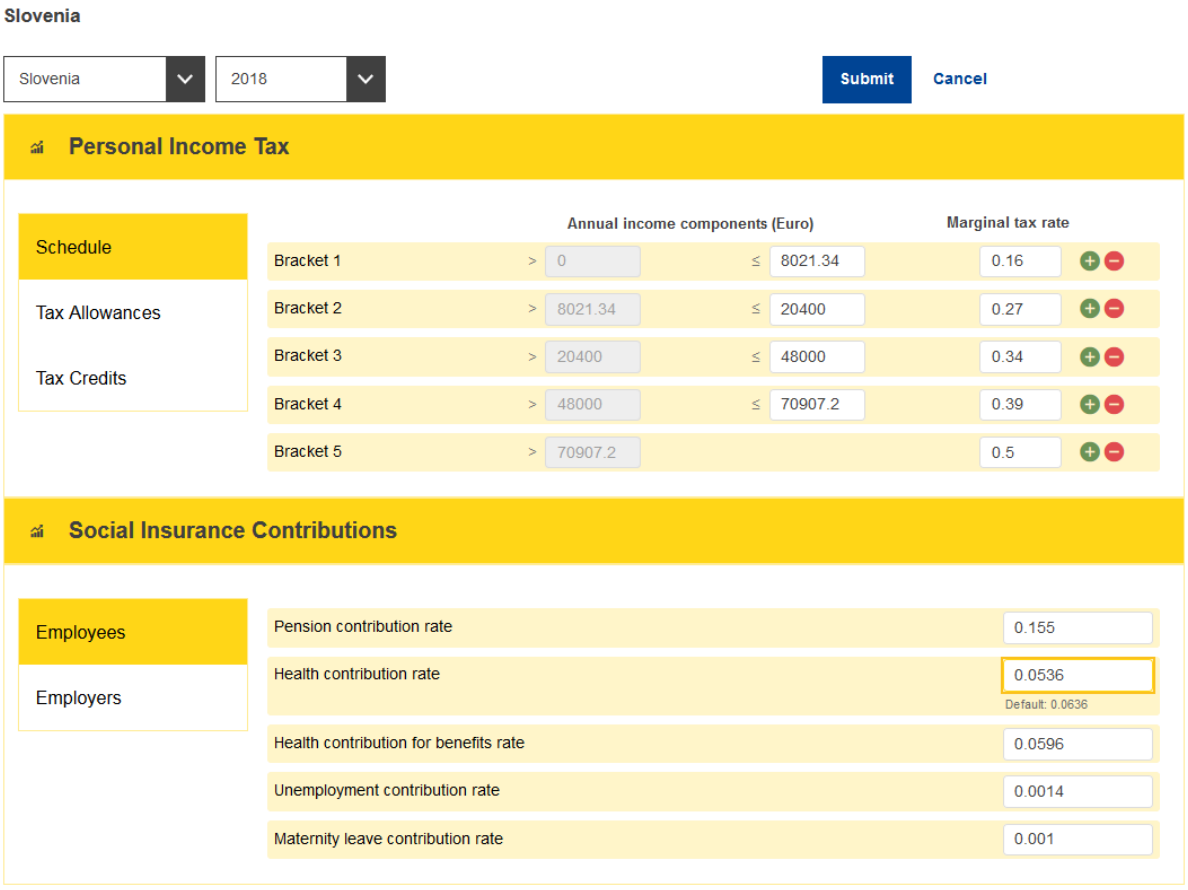


Figure 5: Reducing employee health contributions in Slovenia – Simulation parameters

SIMULATION PARAMETERS - SI
27 Mar 2019 10:36:57

PERSONAL INCOME TAX

Schedule

Field	Original Value	Modified Value
Bracket 1 - Marginal tax rate	0.16	0.16
Bracket 1 - Upper threshold	8021.34	8021.34
Bracket 2 - Marginal tax rate	0.27	0.27
Bracket 2 - Upper threshold	20400	20400
Bracket 3 - Marginal tax rate	0.34	0.34
Bracket 3 - Upper threshold	48000	48000
Bracket 4 - Marginal tax rate	0.39	0.39
Bracket 4 - Upper threshold	70907.2	70907.2
Bracket 5 - Marginal tax rate	0.5	0.5

Tax Allowances

Field	Original Value	Modified Value
Personal - General - 1st band	6519.82	6519.82
Personal - General - upper limit 1st band	11166.37	11166.37
Personal - General - upper limit 2nd band	13316.83	13316.83
Personal - General - 3rd band	3302.7	3302.7
Personal - Students	3302.7	3302.7
Family - Dependant family member	2436.92	2436.92
Family - Deduction - 1 child	2436.92	2436.92
Family - Deduction - 2 children	5086.16	5086.16
Family - Deduction - 3 children	9504.7	9504.7
Family - Deduction - 4 children	15692.55	15692.55
Family - Deduction - 5 children	23649.69	23649.69
Family - Deduction - 6 children	33376.12	33376.12
Family - Deduction - 7 children	44871.84	44871.84
Family - Deduction - 8 children	58136.85	58136.85
Family - Deduction - 9 children	73171.15	73171.15
Family - Deduction - 10 children	89974.74	89974.74

Work-related - No tax allowances reforms are offered for Work-related.
Housing - No tax allowances reforms are offered for Housing.
Education - No tax allowances reforms are offered for Education.
Health - No tax allowances reforms are offered for Health.

SOCIAL INSURANCE CONTRIBUTIONS

Employees

Field	Original Value	Modified Value
Pension contribution rate	0.155	0.155
Health contribution rate	0.0636	0.0536
Health contribution for benefits rate	0.0596	0.0596
Unemployment contribution rate	0.0014	0.0014
Maternity leave contribution rate	0.001	0.001

Employers

Field	Original Value	Modified Value
Pension contribution rate	0.0885	0.0885
Health contribution rate	0.0656	0.0656
Health contribution for unemployment benefits rate	0.0596	0.0596
Occupational diseases contribution rate	0.0053	0.0053
Unemployment contribution rate	0.0006	0.0006
Maternity leave contribution rate	0.001	0.001

2.3.2. Fiscal impact [1. Fiscal worksheet]

Figure 6 shows the results provided in the worksheet 1. Fiscal. The level of disaggregation of taxes and benefits is the one used in EUROMOD for the corresponding country, the only exception being SIC, where only four broad groups are shown (employees, employers, self-employed and others). The variable names used in EUROMOD are shown mostly to inform the user about whether the variable is simulated by EUROMOD (with suffix _s at the end) or taken directly from SILC data (with no suffix). Group variables with the ils_ prefix are just sums of other variables, and in the case of SIC they are mostly simulated. Totals are aggregated figures for the whole population (i.e., using EU-SILC sampling weights) and all values are annual.

For this specific case we see that the net budgetary effect is approximately -112 million EUR. This amount is achieved through three channels: directly via SIC, and indirectly via PIT and means-tested benefits. The direct impact corresponds mostly to employee SIC (-151 million EUR) and marginally to self-employed SIC (-10 million), who are also affected by the reform because the rates they face are the sum of employee and employers SIC. The SIC reduction has also a large impact on PIT (+39 million), since SIC payments are deductible from the tax base, so a SIC decrease leads to an increase in the tax base. The impact on benefits is smaller, ranging between -174,000 EUR for the large-family supplement and -6.5 million EUR for social assistance. Again, when SIC payments are subtracted in the means-test of a specific benefit, the increase of the assessed income may make some individuals non-eligible for the benefit.[7]

[7] Note however that if a specific benefit is not simulated (e.g., Other social assistance, bsaot) these interactions are not captured even if the benefit actually includes SIC in its means-test.

Confidence intervals of the values are also reported on Table 1.1 Aggregate revenue and expenditure (EUR), as shown in Figure 6. We can see, for example, that the net budgetary cost of the measure ranges between -115 and -108 million EUR. Some specific changes (e.g., SIC employees) show broader intervals, but they are somehow compensated by changes in the opposite direction. However all changes are statistically significant here, since they do not contain the zero between the bounds. If any of them were non-significant, the corresponding point estimate would be highlighted in grey in the summary sheet. For an accurate interpretation of the confidence intervals see section 3.

Figure 6: Reducing employee health contributions in Slovenia – worksheet 1. Fiscal – Table 1.1. Aggregate revenue and expenditure (EUR)

Table 1.1. Aggregate revenue and expenditure (EUR)

		Baseline	Reform	Difference (EUR)				Difference (% of Baseline)			
						95% confidence interval			Standard	95% confidence interval	
Concept	EUROMOD variable	Total	Total	Total	Standard error	Lower bound	Upper bound	Total	error	Lower bound	Upper bound
Personal income tax	tin00_s	1,831,564,937	1,871,528,136	39,963,198	770,511	38,452,368	41,474,028	2.2	0.0	2.2	2.2
Tax on investment income	tinkt_s	103,620,687	103,620,687	0	-	-	-	0.0	-	-	-
Property tax (davek na premoženje)	tpr	70,852,077	70,852,077	0	-	-	-	0.0	-	-	-
Total taxes	**ils_tax**	**2,006,037,701**	**2,046,000,899**	**39,963,198**	**770,511**	**38,452,368**	**41,474,028**	**2.0**	**0.0**	**2.0**	**2.0**
SIC employees	ils_sicee	3,329,760,681	3,178,164,538	-151,596,143	2,490,868	-156,480,273	-146,712,014	-4.6	0.0	-4.6	-4.5
SIC employers	ils_sicer	2,423,907,843	2,423,907,843	0	-	-	-	0.0	-	-	-
SIC self-employed	ils_sicse	378,696,286	368,777,871	-9,918,415	457,243	-10,814,983	-9,021,847	-2.6	0.0	-2.6	-2.6
SIC others	ils_sicot	105,817,419	105,817,419	0	-	-	-	0.0	-	-	-
Total SSC	**ils_sic**	**6,238,182,228**	**6,076,667,670**	**-161,514,558**	**2,579,263**	**-166,572,015**	**-156,457,102**	**-2.6**	**0.0**	**-2.6**	**-2.6**
Basic disability pension	pdi00	442,564,445	442,564,445	0	-	-	-	0.0	-	-	-
Basic old age pension	poa00	3,766,195,338	3,766,195,338	0	-	-	-	0.0	-	-	-
Basic survivor pension	psu00	373,676,447	373,676,447	0	-	-	-	0.0	-	-	-
Total pensions	**ils_pen**	**4,582,436,229**	**4,582,436,229**	**0**	-	-	-	**0.0**	-	-	-
Social assistance (socialna pomos)	bsa_s	436,820,823	430,233,337	-6,587,486	381,894	-7,336,310	-5,838,662	-1.5	0.1	-1.7	-1.3
Charity	bsacm	4,506,366	4,506,366	0	-	-	-	0.0	-	-	-
Child benefit (otroški dodatek)	bchmt_s	263,034,091	260,515,986	-2,518,105	360,735	-3,225,438	-1,810,771	-1.0	0.1	-1.2	-0.7
Large-family supplement (dodatek za veliko družino)	bchlg_s	10,662,358	10,488,110	-174,248	71,967	-315,362	-33,134	-1.6	0.7	-2.9	-0.3
Income support	bsapm_s	53,248,511	52,775,085	-473,426	103,405	-676,184	-270,668	-0.9	0.2	-1.3	-0.5
Housing benefit (subvencija najemnine)	bho_s	14,240,158	14,240,158	0	-	-	-	0.0	-	-	-
Other social assistance ((ostala plačila csd)	bsaot	46,958,995	46,958,995	0	-	-	-	0.0	-	-	-
Total means tested benefits	**ils_benmt**	**829,471,302**	**819,718,037**	**-9,753,264**	**526,230**	**-10,785,104**	**-8,721,425**	**-1.2**	**0.1**	**-1.3**	**-1.1**
Compensation for lost income due to care for child	bcrsvcc	7,077,278	7,077,278	0	-	-	-	0.0	-	-	-
Attendance supplement	bdica	40,687,891	40,687,891	0	-	-	-	0.0	-	-	-
Birth grant (pomos ob rojstvu otroka)	bchba_s	4,376,709	4,376,709	0	-	-	-	0.0	-	-	-
Parental allowance (starševski dodatek)	bmanc_s	7,919,298	7,919,298	0	-	-	-	0.0	-	-	-
Wage compensation for disabled workers (denarna	bdirw	143,532,469	143,532,469	0	-	-	-	0.0	-	-	-
Scholarships (štipendija)	bed	95,544,203	95,544,203	0	-	-	-	0.0	-	-	-
Wage compensation for sick leave (bolniško	bhl	460,567,761	460,567,761	0	-	-	-	0.0	-	-	-
Childcare supplement	bchcc	8,448,306	8,448,306	0	-	-	-	0.0	-	-	-
Disability supplement for disabled (invalidnina)	bdixp	26,535,832	26,535,832	0	-	-	-	0.0	-	-	-
Maintenance replacement	bcham	4,327,199	4,327,199	0	-	-	-	0.0	-	-	-
Maternity benefits	bmact_s	147,235,432	147,235,432	0	-	-	-	0.0	-	-	-
Paternity benefit	bcrbafh_s	17,501,714	17,501,714	0	-	-	-	0.0	-	-	-
Simulated unemployment benefits	bunct_s	0	0	0	-	-	-	-	-	-	-
Or non-simulated unemployment benefit (whichever	bunct	172,291,436	172,291,436	0	-	-	-	0.0	-	-	-
Total non-means tested benefits	**ils_bennt**	**1,136,045,527**	**1,136,045,527**	**0**	-	-	-	**0.0**	-	-	-
Net budgetary effect		**1,696,266,871**	**1,584,468,775**	**-111,798,096**	**1,849,953**	**-115,425,511**	**-108,170,680**	**-6.6**	**0.6**	**-7.7**	**-5.5**

2.3.3. Distributional effects [2. Distributional worksheet]

All tables in this workbook offer results for the whole population (row labelled All) and by income decile (rows labelled 1 to 10). Deciles are defined as groups of individuals with equal population size sorted by their equivalised disposable incomes in the baseline scenario. This means that the first decile represents 10% of the population with the lowest equivalised disposable income in the baseline, and the tenth decile represents 10% of the population with the highest income in the baseline. Equivalised incomes are calculated by dividing household incomes by the modified OECD equivalence scale, which is in turn obtained by summing 1 (for the household head) plus 0.5 for each person aged 14 or more plus 0.3 for each children under 14. All monetary values shown in the table are annual.[8]

Figure 7 shows Table 2.1, which displays the number (panel A) and horizontal share (panel B) of households for which the sum of the PIT liabilities and SIC of their members is positive.

[8] For simplicity we always show a summary of the tables. As explained for Table 1.1., standard errors and confidence intervals are also offered on each table.

Figure 7: Reducing employee health contributions in Slovenia – worksheet 2. Distributional – Table 2.1 (summary).

Table 2.1. Taxpayers by decile

A. Total number of households paying income taxes and/or Social Insurance Contributions, by decile

	Total		Diff. w.r.t. Baseline	
Decile	Baseline	Reform	Decile	Reform
1	62,355	62,355	1	0
2	64,639	64,639	2	0
3	62,080	62,080	3	0
4	69,117	69,117	4	0
5	67,609	67,609	5	0
6	67,963	67,963	6	0
7	71,628	71,628	7	0
8	69,177	69,177	8	0
9	72,306	72,306	9	0
10	75,541	75,541	10	0
All	682,415	682,415	All	0

B. Share of households paying income taxes and/or Social Insurance Contributions, by decile (%)

	Share		Diff. (% of Baseline)	
Decile	Baseline	Reform	Decile	Reform
1	50.6	50.6	1	0.0
2	74.5	74.5	2	0.0
3	73.3	73.3	3	0.0
4	86.7	86.7	4	0.0
5	86.8	86.8	5	0.0
6	94.6	94.6	6	0.0
7	97.6	97.6	7	0.0
8	98.5	98.5	8	0.0
9	99.9	99.9	9	0.0
10	98.9	98.9	10	0.0
All	83.6	83.6	All	0.0

All the numbers are the same for both the baseline and the reform scenarios, since the reform only affects the level of contributions paid by individuals, not the rules that make them pay or not. We can see that almost 700,000 households fulfil this condition in Slovenia, being the numbers in general higher in higher deciles. These differences translate into much larger differences in the shares. This happens because, although the number of individuals is by definition the same in each decile, the number of households is not, because the average household size is lower in the lower deciles. This is why 62,355 households represent only 50.6% of the households in the first decile, while 75,541 represent almost 100% in the upper deciles. These numbers are probably correlated with a high number of one-member pensioner households in the first deciles.

Figure 8 shows the results offered in Table 2.2: the aggregate revenue collected from PIT and SIC by deciles.

Figure 8: Reducing employee health contributions in Slovenia – worksheet 2. Distributional – Table 2.2 (summary).

Table 2.2. Total annual income taxes + Social Insurance Contributions paid, by decile (EUR)

	Total		Diff. w.r.t. Baseline		Diff. (% of Baseline)	
Decile	Baseline	Reform	Decile	Reform	Decile	Reform
1	116,270,767	113,213,996	1	-3,056,771	1	-2.6
2	192,872,276	187,115,483	2	-5,756,793	2	-3.0
3	228,389,416	221,832,508	3	-6,556,908	3	-2.9
4	333,465,366	324,306,328	4	-9,159,038	4	-2.7
5	397,757,270	387,839,126	5	-9,918,144	5	-2.5
6	512,306,905	499,969,216	6	-12,337,689	6	-2.4
7	590,881,961	577,588,352	7	-13,293,609	7	-2.2
8	724,449,428	708,868,618	8	-15,580,810	8	-2.2
9	938,843,874	920,097,031	9	-18,746,844	9	-2.0
10	1,714,219,138	1,687,078,207	10	-27,140,931	10	-1.6
All	5,749,456,401	5,627,908,863	All	-121,547,538	All	-2.1

We see an overall revenue change of -121 million EUR, which is the net impact of the direct SIC reduction (-161) and the indirect PIT increase (+40), shown already in Table 1.1. As we go up in the deciles the revenue losses are higher in absolute terms, but lower in relative terms. However, be aware that these relative reductions cannot be interpreted in terms of progressivity, since they are not calculated over income but over the own tax/SIC liabilities (for progressivity see Figure 17).

Figure 9 shows Table 2.3, which offers the same concept as Table 2.2, but computed as household means instead of totals.

Figure 9: Reducing employee health contributions in Slovenia – worksheet 2. Distributional – Table 2.3 (summary).

Table 2.3. Mean annual income taxes + Social Insurance Contributions paid at household level, by decile (EUR)

	Total		Diff. w.r.t. Baseline		Diff. (% of Baseline)	
Decile	Baseline	Reform	Decile	Reform	Decile	Reform
1	943	918	1	-25	1	-2.6
2	2,223	2,157	2	-66	2	-3.0
3	2,697	2,620	3	-77	3	-2.9
4	4,183	4,068	4	-115	4	-2.7
5	5,108	4,981	5	-127	5	-2.5
6	7,131	6,959	6	-172	6	-2.4
7	8,049	7,868	7	-181	7	-2.2
8	10,318	10,096	8	-222	8	-2.2
9	12,967	12,708	9	-259	9	-2.0
10	22,450	22,094	10	-355	10	-1.6
All	**7,041**	**6,893**	**All**	**-149**	**All**	**-2.1**

The average impact for the whole population is -149 EUR, and the values range from -25 for the lower decile and -355 for the upper decile. Again, in absolute terms the pattern is strictly increasing across deciles, while in relative terms the opposite happens (the relative results are, by definition, identical to those shown in Table 2.2).

Figure 10 displays Table 2.4, which takes the totals shown in Table 2.2 and divides them by the total income of each decile. This result can be interpreted as a generic measure of average tax burden borne by household incomes.

Figure 10: Reducing employee health contributions in Slovenia – worksheet 2. Distributional – Table 2.4 (summary).

Table 2.4. Income taxes + Social Insurance Contributions as a share of market income + benefits, by decile (%)

	Total		Diff. w.r.t. Baseline	
Decile	Baseline	Reform	Decile	Reform
1	10.2	9.9	1	-0.2
2	14.7	14.3	2	-0.4
3	15.1	14.7	3	-0.4
4	19.0	18.5	4	-0.5
5	19.9	19.5	5	-0.5
6	22.8	22.3	6	-0.5
7	23.4	22.9	7	-0.5
8	25.4	24.8	8	-0.5
9	27.6	27.0	9	-0.5
10	31.7	31.2	10	-0.5
All	**23.8**	**23.3**	**All**	**-0.5**

The average tax burden in the baseline is 23.8%, ranging from 10.2% for the first decile to 31.7% for the tenth. The simulated reform reduces it in 0.5 percentage points for the whole population. This difference is constant across deciles, except for the first two, which face smaller reductions.

The impact of this reform on disposable income can be seen in Figure 11, which shows household averages as computed in Table 2.5.

Figure 11: Reducing employee health contributions in Slovenia – worksheet 2. Distributional – Table 2.5 (summary).

Table 2.5. Mean annual disposable income at household level, by decile (EUR)

	Total		Diff. w.r.t. Baseline		Diff. (% of Baseline)	
Decile	Baseline	Reform	Decile	Reform	Decile	Reform
1	8,247	8,253	1	6	1	0.1
2	12,880	12,910	2	30	2	0.2
3	15,095	15,151	3	56	3	0.4
4	17,729	17,836	4	107	4	0.6
5	20,405	20,529	5	124	5	0.6
6	24,011	24,179	6	168	6	0.7
7	26,269	26,443	7	174	7	0.7
8	30,223	30,438	8	216	8	0.7
9	33,992	34,248	9	256	9	0.8
10	48,147	48,501	10	355	10	0.7
All	**22,446**	**22,583**	**All**	**137**	**All**	**0.6**

By construction, the 137 EUR average increase computed for the whole population is the result (with opposite sign) of the net average budgetary change induced by the reform (through SIC, PIT and means-tested benefits). The results are similar to those shown in Table 2.3., the difference being only the means-tested benefits lost. For example, we see that the number for the top decile (+355) is exactly the same (with opposite sign), because no benefits are lost with the reform. On the contrary, the average tax/SIC reduction seen in Table 2.3 for the first decile (-25) translates only in an average increase of 6 EUR in disposable income, due to the loss of means-tested benefits by low income households.

Figure 12 depicts the results of Table 2.6, which computes mean annual equivalised disposable income at individual level. The difference with Table 2.5 is that household incomes are equivalised using the modified OECD scale, and then assigned to each member of the household. This is the equivalised income concept used by EUROSTAT in its statistics.

Figure 12: Reducing employee health contributions in Slovenia – worksheet 2. Distributional – Table 2.6 (summary).

Table 2.6. Mean annual equivalised disposable income at individual level, by decile (EUR)

	Total		Diff. w.r.t. Baseline		Diff. (% of Baseline)	
Decile	Baseline	Reform	Decile	Reform	Decile	Reform
1	6,407	6,412	1	5	1	0.1
2	8,140	8,159	2	19	2	0.2
3	9,377	9,414	3	36	3	0.4
4	10,628	10,694	4	66	4	0.6
5	11,883	11,960	5	77	5	0.6
6	13,266	13,362	6	96	6	0.7
7	14,716	14,816	7	101	7	0.7
8	16,405	16,525	8	120	8	0.7
9	18,903	19,048	9	145	9	0.8
10	27,583	27,792	10	210	10	0.8
All	**13,729**	**13,817**	**All**	**87**	**All**	**0.6**

The average impact is +87 EUR, +0.6% in relative terms. The pattern is increasing in absolute terms, but in this case also in relative terms, meaning that the reform would be regressive using the standard concept of relative inequality.

Finally, Figure 13 shows the percentage of individuals who see their equivalised disposable income increase (winners) or decrease (losers) with the reform, as computed respectively in Tables 2.7 and 2.8.

Figure 13: Reducing employee health contributions in Slovenia – worksheet 2. Distributional – Table 2.7 and 2.8 (summary).

Table 2.7. Winners (individuals whose equivalised disposable income increases with the reform)

A. Total number of winners, by decile

Decile	Reform
1	27,316
2	73,056
3	111,701
4	155,488
5	160,829
6	177,835
7	174,861
8	180,505
9	184,462
10	186,213
All	**1,432,268**

B. Share of winners, by decile (%)

Decile	Reform
1	13.6
2	36.3
3	55.5
4	77.3
5	80.0
6	88.3
7	87.1
8	89.7
9	91.7
10	92.7
All	**71.2**

Table 2.8. Losers (individuals whose equivalised disposable income decreases with the reform)

A. Total number of losers, by decile

Decile	Reform
1	7,557
2	8,403
3	9,055
4	4,723
5	2,590
6	2,478
7	3,937
8	1,633
9	0
10	0
All	**40,376**

B. Share of losers, by decile (%)

Decile	Reform
1	3.8
2	4.2
3	4.5
4	2.3
5	1.3
6	1.2
7	2.0
8	0.8
9	0.0
10	0.0
All	**2.0**

In aggregate terms there are approximately 1.4 million winners (panel A), which represent 71.2% of the Slovenian population. By deciles the impact is quite asymmetric, affecting almost all individuals in the upper deciles, but showing much lower shares in the lower deciles, especially in the first one. The reason for this is that in the majority of high-income households there is at least one employee who benefits from the reform, what increases the equivalent income all the members of the household. On the contrary, people with no labour income (e.g. pensioners or households living exclusively from benefits), and therefore not affected by the reform, are probably concentrated in the lower deciles.

Since the reform implies only the reduction of the health contribution, there are no direct losers, but however we see in Table 2.8 that 2% of individuals are worse off after the reform. These individuals lose because, as a result of the reduction of the health contribution, their net income increases. As long as that income is used for a means-tested benefit, they may lose eligibility and end up having lower disposable income (i.e., what they lose from benefits is higher than what they gain from the contribution reduction). This result is connected with the interactions seen in Table 1.1.

The impact by decile is not homogeneous: there are more losers in the lower deciles, because they are the ones that receive benefits, while there are no losers in the top two deciles. In the eight decile we can see that there are some losers, but the value is highlighted, meaning that is not statistically significant. In statistical terms this means that, given the sample design, we cannot be sure, at a 95%

confidence level, that the result is not obtained by chance. I.e., other possible samples drawn from the same population may not show losers in that decile. Conversely, we can say that in (at least) 95% of the possible samples of the population we would find losers in deciles 1 to 7. The specific confidence intervals can be consulted in the sheet 2.8.

2.3.4. Inequality and at-risk-of-poverty impact [3. Inequality and Poverty worksheet]

This file provides tables showing the impact of the reform on inequality, redistribution and at-risk-of-poverty indicators.

Figure 14 shows the results of Table 3.1, which measures inequality, with the Gini coefficient, for four sequential concepts of (equlivalised) income, from original to disposable income. The first concept is a standard EUROMOD concept that includes all kinds of gross market income as included in EU-SILC, the most relevant concepts being wages, self-employment income, property income and investment income. The other three income concepts are standard concepts used by EUROSTAT. Additionally, it shows the redistributive impact of the tax-benefit system (as the difference between the Gini coefficients of original income and disposable income), the social welfare index proposed by Sen (1973) and the income quintile share ratio, as defined by EUROSTAT.

Figure 14: Reducing employee health contributions in Slovenia – worksheet 3. Inequality and Poverty – Table 3.1 (summary).

Table 3.1. Inequality and redistributive effect of the tax-benefit system

		Value		Diff. w.r.t. Baseline
		Baseline	Reform	Reform
Gini coefficient	A = original income	0.4635	0.4635	0.0000
	B = A - taxes and social insurance contributions (EQ_INC23)	0.4560	0.4556	-0.0005
	C = B + pensions (EQ_INC22)	0.2990	0.2989	-0.0001
	D = C + other benefits (disposable income, EQ_INC20)	0.2340	0.2350	0.0009
Redistribution index = Gini A - Gini D		0.2294	0.2285	-0.0009
Social welfare index = mean eq. disp. Income * (1-D)		876	881	5
Income quintile share ratio = S80/S20		3.1932	3.2123	0.0191

We can see that the reform increases the Gini coefficient of disposable income, from 0.2340 to 0.2350. This result is consistent with the pattern we saw in panel B of Table 2.6. However, the breakdown shows that this increase is produced in the last step, i.e., when benefits are added (from C to D). This is caused by the fact that low-income households become ineligible for some benefits. On the contrary, the first step (from A to B) is more inequality-reducing after the reform, meaning that combined impact of SIC (direct) and PIT (indirect) is progressive. However, it is important to point out that the order in which taxes/benefits are subtracted/added affects the results. I.e., if taxes and SIC were subtracted after adding all pensions and benefits, the results may change. Here we stick to the order used by EUROSTAT in their statistics.

Figure 15 (Table 3.2) departs from the EUROSTAT sequential income concepts and shows the progressivity and redistributive effect of taxes and SIC on total income. For this purpose, it computes the Gini coefficients of the equivalised sum of all incomes in gross and net terms (after PIT and SIC). The difference between this coefficient is the Reynolds-Smolensky index, which in this case indicates the degree of redistribution of the tax/SIC system. This index is them decomposed in three parts

using the Kakwani methodology: the Kakwani index (measuring progressivity), the net average tax rate (measuring the level of taxation) and the re-ranking effect (a residual that measures to which extent the observations are re-ranked due to the application of taxes and SIC).

Figure 15: Reducing employee health contributions in Slovenia – worksheet 3. Inequality and Poverty – Table 3.2 (summary).

Table 3.2. Progressivity and redistributive effect of income taxes + Social Insurance Contributions on market income + pensions + other benefits

	Value		Diff. w.r.t. Baseline
	Baseline	Reform	Reform
A = Gini gross income	0.2856	0.2858	0.0003
B = Gini net income	0.2335	0.2344	0.0009
C = Kakwani index	0.1847	0.1863	0.0016
D = net average tax rate	0.3246	0.3157	-0.0089
E = re-ranking effect	0.0079	0.0074	-0.0005
A - B= C*D - E = Reynolds-Smolensky index	0.0521	0.0514	-0.0007

Here we see that the Gini coefficient of gross income increases with the reform (because of the loss of some benefits, as already explained), but the Gini coefficient of net income increases even more due to the impact of the health contribution reduction. This result differs from what we saw in the previous table, but it has to be taken into account that the income concepts are different: gross income also includes pensions and benefits here, while net income only subtract taxes on income and not taxes on property. In turn, the Kakwani decomposition shows that the reform makes the tax+SIC system more progressive (higher Kakwani index), but the lower revenue collected (lower average tax rate) makes the reform overall less redistributive (the re-ranking effect being negligible).

Finally, Figure 16 shows two at-risk-of-poverty indicators for three anchored poverty lines calculated as 40%, 50% and 60% of the median equivalised disposable income in the baseline scenario. Table 3.3 shows the at-risk-of-poverty-rate (share of individuals below this fixed threshold), while Table 3.4 shows the at-risk-of-poverty-rate (average relative difference with respect to the poverty line, computing individuals above it as having a zero difference). Both indicators are computed for the same concepts of income shown in Figure 14.

For the 40% and 50% poverty lines we can see that the (small) reduction of the at-risk-of-poverty rates caused by the SIC reduction is then compensated by the loss of benefits by some households, keeping the final values unchanged. On the contrary, in the 60% case the negative impact of the benefits does not fully compensate the positive impact of the SIC reduction, so the final value is slightly lower in the reform than in the baseline. When analysing the at-risk-of-poverty gap, we see a similar pattern, but even in the 60% case there is no impact on disposable income.

Figure 16: Reducing employee health contributions in Slovenia – worksheet 3. Inequality and Poverty – Table 3.3 and Tables 3.4 (summary).

Table 3.3. FGT(0) at-risk-of-poverty rates (%) for different anchored poverty lines and different definitions of income

Poverty line	Type of income	Value		Diff. w.r.t. Baseline
		Baseline	Reform	Reform
40% of the median equivalised annual disposable income (EUR 5,029.82)	A = original income	26.6	26.6	0.0
	B = A - taxes and social insurance contributions (EQ_INC23)	31.6	31.4	-0.1
	C = B + pensions (EQ_INC22)	11.3	11.2	-0.1
	D = C + other benefits (disposable income, EQ_INC20)	1.2	1.2	0.0
50% of the median equivalised annual disposable income (EUR 6,287.28)	A = original income	29.2	29.2	0.0
	B = A - taxes and social insurance contributions (EQ_INC23)	37.1	36.8	-0.3
	C = B + pensions (EQ_INC22)	16.7	16.5	-0.2
	D = C + other benefits (disposable income, EQ_INC20)	3.4	3.4	0.0
60% of the median equivalised annual disposable income (EUR 7,544.74)	A = original income	33.0	33.0	0.0
	B = A - taxes and social insurance contributions (EQ_INC23)	43.1	42.7	-0.4
	C = B + pensions (EQ_INC22)	23.3	23.0	-0.3
	D = C + other benefits (disposable income, EQ_INC20)	10.5	10.4	-0.1

Table 3.4. FGT(1) at-risk-of-poverty gaps (%) for different anchored poverty lines and different definitions of income

Poverty line	Type of income	Value		Diff. w.r.t. Baseline
		Baseline	Reform	Reform
40% of the median equivalised annual disposable income (EUR 5,029.82)	A = original income	21.2	21.2	0.0
	B = A - taxes and social insurance contributions (EQ_INC23)	24.9	24.8	-0.1
	C = B + pensions (EQ_INC22)	5.6	5.5	-0.1
	D = C + other benefits (disposable income, EQ_INC20)	0.1	0.1	0.0
50% of the median equivalised annual disposable income (EUR 6,287.28)	A = original income	22.6	22.6	0.0
	B = A - taxes and social insurance contributions (EQ_INC23)	26.7	26.6	-0.1
	C = B + pensions (EQ_INC22)	7.2	7.1	-0.1
	D = C + other benefits (disposable income, EQ_INC20)	0.5	0.5	0.0
60% of the median equivalised annual disposable income (EUR 7,544.74)	A = original income	24.0	24.0	0.0
	B = A - taxes and social insurance contributions (EQ_INC23)	29.0	28.8	-0.2
	C = B + pensions (EQ_INC22)	9.4	9.2	-0.1
	D = C + other benefits (disposable income, EQ_INC20)	1.5	1.5	0.0

3. Input data, sampling error and confidence intervals[9]

The most recent version of EUROMOD Online uses EUROMOD I6.0+ and policy year 2023 for all countries. Input data are based on EU-SILC 2021 microdata, containing 2020 incomes uprated to 2023.

Table 2 shows, for each country, the number of observations (households and individuals) used in the simulations, as well as their corresponding weighted population values.

Table 2: Number of observations, and sampling design variables used in the calculations for 2023 policy year and data year 2021.

	Number of observations					
	Sample		Population		Sampling design	
Country	Households	Individuals	Households	Individuals	PSUs	Strata
AT	6,018	12,305	4,013,636	8,770,969	6,018	9
BE	7,538	16,872	5,031,174	11,364,642	226	3
BG	7,551	17,204	2,940,241	6,916,540	1,089	2
CY	4,113	10,596	340,000	891,212	4,113	1
CZ	8,677	18,572	4,496,126	10,469,877	1,879	8
DE	31,099	62,427	40,494,373	80,897,989	5,022	16
DK	7,836	15,616	2,945,987	5,789,764	7,836	1
EE	6,467	15,112	626,454	1,313,750	6,467	1
EL	15,086	32,832	4,130,552	10,495,046	2,335	90
ES	21,007	52,112	18,825,525	46,695,055	3,654	19
FI	9,407	22,360	2,831,000	5,454,474	9,407	5
FR	10,897	24,719	28,370,292	63,155,152	1,049	8
HR	8,088	19,308	1,440,354	3,906,814	2,624	1
HU	7,805	16,852	4,126,849	9,490,466	3,352	3
IE	4,846	12,273	1,929,451	5,006,312	1,311	1
IT	20,831	43,317	26,042,644	59,954,773	621	21
LT	5,146	11,350	1,282,506	2,792,091	5,146	1
LU	4,080	10,943	273,711	596,707	4,080	1
LV	6,571	13,975	824,774	1,869,147	1,493	1
MT	4,038	10,062	208,584	504,108	4,038	1
NL	15,242	32,567	8,043,443	17,166,610	15,242	1
PL	15,281	38,642	13,327,898	36,834,623	5,949	7
PT	10,973	26,777	4,149,703	10,264,203	6,282	1
RO	7,266	16,593	7,545,309	19,103,890	787	4
SE	8,889	21,671	5,190,540	10,355,085	8,889	3
SI	7,164	19,642	840,977	2,077,933	3,956	1
SK	5,542	13,767	1,852,059	5,373,936	5,542	4

Source: own calculations based on EUROMOD input data

[9] More detailed explanations about sample design and the computation and interpretation of standard errors and confidence intervals can be found in Section 3 and Appendix II of Picos & Schmitz (2016).

Based on these input data, the output tables provide point estimates (totals, ratios, means, etc.) of various key variables of interest for both the baseline and the reform scenarios. The differences between estimates of the baseline and the reform scenario are accompanied by standard errors and the 95% confidence intervals, which allow assessing whether a policy change of interest has a statistically significant impact on an outcome of interest or not. For instance, a reform may have a positive budgetary effect, which appears to be economically relevant in terms of its size, but it may not be statistically significant if the standard error is large and hence the confidence interval includes the zero (i.e., its lower and upper bound have different signs). In this case we would conclude that the positive budgetary effect is statistically insignificant in the sense that it is likely to be due to sampling variability (i.e., it could be negative for a different sample drawn from the same population).

The accurate estimation of standard errors of point estimates based on survey data requires taking into account the underlying sample design. As EUROMOD underlying input data (EU-SILC) are based on national surveys, the sample design is also country-specific. In addition to this, most sample designs in EU-SILC are complex in the sense that they involve stratification[10] and clustering[11] in at least one stage of the sampling process, as well as weighting. A third complication lies in the fact that for most countries part of the sampling information is not available.

In order to compute standard errors from EUROMOD microdata, we make use of the following variables: strata, primary sampling unit and cross-sectional weight. These variables contain the country-specific information on the sample design and are used to compute the standard errors and the confidence intervals provided in the seven tables. In the case of EU-SILC, each observation has a weight and information about the primary sample unit, but no information about strata is available for any country, due to confidentiality issues. To overcome this problem, a proxy of it (usually the geographical location of the household at the time of the interview) is used whenever possible and applicable. This will lead to larger confidence intervals than those that would arise if precise identification of strata were available. [12]

[10] Stratification refers to the division of the target population in homogeneous, non-overlapping groups or subpopulations (strata) prior to the sampling of units. It is usually based on geography or administrative borders (regions, states), but can be also based on individual characteristics (age, sex), socio-economic (income, wealth), or other criteria (municipality size). In multi-stage sampling designs, different stratification criteria may be applied at different stages of the sampling process.

[11] Clustering refers to the sampling of units which are groupings of smaller elements. For instance, a two-stage sampling process would consist of drawing first a random sample of census units, and then a random sample of dwellings within each of the selected units.

[12] For more detailed explanations about strategies for overcome the limitations of EU-SILCS, see Zardo-Trindade and Goedemé (2016).

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