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Bornukova, K., Picos, F.,

with

Amores, A., Belousova, I., Cruces, H., De Agostini, P., De Poli, S., Dreoni, I., Grünberger, K., Hernández Martín, A., Jędrych Villa, M., Leventi, C., Maier, S., Manios, K., Manso, L., Mazzon, A., Navarro Berdeal, S., Palma Fernández, B., Papini, A., Ricci, M., Serruys, H.

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Joint Research Centre

Contact information
Name: JRC-EUROMOD Team
Address: Edificio EXPO, c/ Inca Garcilaso 3, E-41092 Sevilla
Email: JRC-EUROMOD@ec.europa.eu
Tel.: +34 854 590225

EU Science Hub
https://joint-research-centre.ec.europa.eu

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Contents

Foreword

This document presents a selection of baseline results and headline indicators from the latest public version (I6.0+) of EUROMOD, the tax-benefit microsimulation model for the EU. The model was previously maintained, developed and managed by the Institute for Social and Economic Research (ISER) at the University of Essex, and since 2021 these responsibilities were taken over by the Joint Research Centre of the European Commission (Unit JRC.B2) in collaboration with Eurostat and 27 national teams. The model's yearly update is financially supported by the following Directorate-Generals of the European Commission: DG EMPL, DG ECFIN, DG REFORM, DG TAXUD, JRC and Eurostat.

This paper borrows the structure and the logic from previous EUROMOD baseline reports, in particular Kneeshaw et al. (2021), Maier, Ricci et al. (2022) and De Poli et al. (2023).

Comments should be sent to JRC-EUROMOD@ec.europa.eu.

Executive Summary

- This report uses EUROMOD, the comprehensive tax-benefit microsimulation model for the European Union, to assess the influence of tax-benefit systems on income distribution and labour incentives within the EU from 2020 to 2023. EUROMOD, as a comprehensive tool, enables researchers and policy analysts to evaluate the effects of taxes and benefits on household incomes and work incentives comparably across the EU. Baseline indicators presented in the report provide transparency to users by presenting and discussing primary model predictions regarding poverty and inequality. They also serve as a benchmark for comparison with any reform or hypothetical scenarios.

- The scope of EUROMOD simulations includes direct taxes and social insurance contributions (SICs), as well as most cash social benefits. The lack of information on individual contributory history in the underlying microdata prevents the simulation of some contributory benefits and pensions, whose values are taken from the underlying EU-SILC data.

- The report provides baseline results from EUROMOD version I6.0+, focusing on income poverty, inequality, and work incentives indicators. It is important to note that while EUROMOD and social statistics published by Eurostat both derive data from EU-SILC, discrepancies may arise due to differences between incomes simulated with EUROMOD (presented in this report) versus incomes reported in the EU-SILC (used in EU social statistics published by Eurostat). In particular, differences arise because of the different treatment of non-take-up and tax evasion, as well as variations in household income definitions, among other factors. Hence, the outcomes of Euromod modelling presented in this paper reflect the intended design of policies rather than their de facto implementation.

- Income inequality and poverty risks differ throughout the EU. Baseline simulated indicators such as at-risk-of-poverty rates and the Gini coefficient demonstrate stark contrasts between Member States. The highest poverty rates are found in Bulgaria, Romania, and Latvia, while the lowest are in Czechia and Belgium. Notably, children and older adults are more susceptible to poverty, with marked differences in risk levels across countries.

- The EUROMOD baseline report highlights several countries that have successfully utilized their tax-benefit systems to lower poverty risks or reduce income inequality. For instance, France and Ireland are noted for their reliance on means-tested benefits, which have a considerable impact on poverty reduction.

- When it comes to reducing income inequality, countries like Belgium and Germany are shown to use progressive taxation effectively to this end. The tax systems in these countries are structured to ensure that higher earners contribute a greater proportion of their income, which helps to narrow the income gap between the rich and the poor. Additionally, Nordic countries such as Sweden and Denmark also stand out, as their comprehensive welfare benefits, including non-means-tested benefits, have a strong redistributive effect, further mitigating income inequality within their societies.

- The redistributive impact of tax-benefit systems across the EU is examined in depth. The report investigates how Member States achieve varying degrees of redistribution through the interplay of the progressivity and level of their tax-benefit systems.

- The report scrutinizes indicators of work incentives, such as effective marginal tax rates (METRs) and net replacement rates (NRRs) of unemployed. These indicators, measured as country averages across the sample of households, gauge the tax-benefit systems' effects on decisions to work more or to accept a job offer when unemployed. Belgium records the highest mean METR, indicating a substantial portion of additional work income is absorbed by taxes and benefit reductions, potentially dampening the motivation to work more. In contrast, countries with lower METRs, like Estonia and Bulgaria, suggest a more supportive environment to increase earnings from employment, without excessive fiscal penalties. The NRR analysis which compares household's disposable income in case of job loss with that under employment reflects that while countries like Luxemburg, Portugal, France, Denmark, and Belgium offer robust income replacement rates for people losing their job, the influence of taxes and social insurance contributions on NRR is minor compared to benefits and household income components.

- In summary, the EUROMOD baseline report highlights the essential function of tax-benefit systems in shaping poverty risk, income equality and labour market incentives across the EU. It illustrates the diversity in policy approaches and outcomes among Member States as they strive to reconcile goals such as poverty alleviation, inequality reduction, and work incentives. These insights provide a foundation for policymakers to appraise and refine tax-benefit systems, aiming to bolster social protection and advance the socio-economic well-being within the EU.

Acknowledgements

This report would not be possible without the many people who contribute and have contributed to the development of EUROMOD. We are particularly indebted to the EUROMOD National Teams that make the annual update of the model possible and to the Eurostat colleagues that collaborated on the production of the EUROMOD input data: Sébastien Chami, Olga Moraru and Anastasija Norkuviene.

We would also like to acknowledge the support by Eurostat for providing access to microdata from the EU Statistics on Incomes and Living Conditions (EU-SILC) made available under the agreement RPP 189/2019-ECHP-LFS-EU-SILC-HBS. We would also like to thank the National Statistical Institutes for contributing to the enrichment of the EUROMOD input data. None of the aforementioned data providers bears any responsibility for the analysis or interpretation of the data reported here.

Abstract

This report provides a selection of baseline simulation results and headline indicators from the latest public version (I6.0+) of EUROMOD, the tax-benefit microsimulation model for the EU. We begin by presenting indicators for income inequality and at-risk-of-poverty and how they are affected by the tax-benefit system. We then provide a comparative decomposition of the redistributive effect of the tax-benefit systems across the EU. We study how Member States achieve various degrees of redistribution through different combinations of progressivity and size of their tax-benefit system and each of its components. We then analyse various work incentive indicators affecting both the decision whether to work and that of how much to work, discussing how effective marginal rates of taxation and net replacement rates of going into unemployment vary across countries.

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1 Introduction

This report presents a selection of baseline simulation results and headline indicators from EUROMOD microsimulation model, version I6.0+. The analysis covers the years 2020-2023 and focuses on the redistributive effects of the tax-benefit systems in the EU and the incentives to work they provide. This report uses 2020 policy simulations as a base (baseline year hereafter), since 2020 is the latest income year available in the most recent EUROMOD input data (2021) at the time of the EUROMOD release I6.0+. For four countries, however, only 2020 input data (corresponding to 2019 incomes) was available at the time of the release, see Table A1.1 for details. The analysis of the subsequent years is undertaken through income uprating of input data.

EUROMOD is a tax-benefit microsimulation model that covers the 27 Member States of the European Union. Used in combination with representative household microdata from the EU Statistics on Incomes and Living Conditions (EU-SILC), the model allows researchers and policy analysts to study the fiscal and distributional effects of existing policies and policy reforms. These analyses can be carried out for individual member states and for the EU as a whole.

The model is developed and maintained by the Joint Research Centre of the European Commission, in collaboration with Eurostat and a network of national experts from the various Member States. Its public release includes direct taxes, social insurance contributions and cash benefits (including pensions). The model is distributed with an open-source license, and it can be freely downloaded from the EUROMOD JRC website (https://euromod-web.jrc.ec.europa.eu/). The EUROMOD software and its source code can be also accessed from the website. To ensure cross-country comparability, EUROMOD runs on microdata based on EU-SILC, which contains information on income and socio-demographic circumstances of representative samples of private households in each EU Member State.[1]

Yearly reporting and analysis of EUROMOD's baseline indicators are crucial for several reasons. Baseline indicators provide transparency to users by presenting and discussing primary model predictions regarding poverty and inequality. They also serve as a benchmark for comparison with any reform or hypothetical scenarios. Understanding these baseline results is therefore essential for interpreting model predictions under different policy scenarios. Additionally, EUROMOD's baseline results offer a range of supplementary indicators that describe the properties and effects of the tax-benefit systems. ESTAT does not routinely produce those indicators, partly because they cannot be calculated using only EU-SILC information. Given the vast number of indicators, only a selection is published in the annual baseline report to give readers an insight into the kinds of analysis that EUROMOD can facilitate. In this year report, we also focus on the redistributive impact of the four major components of the tax-benefit systems –means-tested benefits, non-means-tested benefits, taxes and social insurance contributions – separately, decomposing the total redistribution by component, and analysing the progressivity and size of each component.

The remaining of the report is structured as follows. Section 2 presents indicators for income inequality and at-risk-of-poverty using EUROMOD. In Section 3, we provide a comparative decomposition of the redistributive effect of the tax-benefit systems across the EU. We study how different Member States achieve various degrees of redistribution through different combinations of progressivity and size of their tax-benefit systems. We also focus on the four main components of the tax-benefit systems separately, presenting the contributions of the components to the total redistributive effect. In Section 4, we discuss work incentive indicators affecting work decisions both at the extensive margin (whether to work) and the intensive margin (how much to work). We analyse how effective marginal rates of taxation and net replacement rates measured as country averages across the representative sample of households, vary across countries. Section 5 concludes.

[1] The use of EU-SILC and EU-SILC-based EUROMOD input data is subject to permission by Eurostat. More information can be found in https://euromod-web.jrc.ec.europa.eu/download-euromod/.

2 Poverty, inequality and the effects of the tax benefit system in the EU

This section describes headline indicators of poverty and inequality in the baseline Euromod simulations, as well as the decomposed impact of tax-benefit systems over them. These indicators are calculated using Eurostat methodology.[2] Selected poverty indicators based on different poverty lines, together with the Gini index, are presented in Section 2.1. In subsequent sections, we proceed to analyse the impact of the tax-benefit systems and their components on poverty (Section 2.2) and inequality (Section 2.3).

While we follow Eurostat methodology to construct indicators, the results might be different from those produced by Eurostat for a number of reasons. Mainly, when constructing disposable income, official social statistics published by Eurostat rely on tax and benefit variables that are self-reported or imputed/derived in EU-SILC. In EUROMOD, only market incomes are taken directly from EU-SILC, while most tax and benefit variables are simulated by the model, and subsequently used to construct disposable incomes. Additionally, in the process of simulation, some country models in EUROMOD do not account for non-take-up of benefits or tax evasion. Hence, the outcomes of modelling reflect the intended design of policies rather than their de facto implementation. Further differences might emerge due to other minor technical discrepancies like the release version of EU-SILC data used, treatment of observations with missing sampling weights etc (see, for more detail, Maier, Ricci et al. [2022]).

In the main text, we typically refer to the results for the baseline year, 2020, where the policy rules match the income reference period from the latest available input data.[3] The results for the whole period analysed, 2020-2023, are available in Annex 4. The non-simulated parts of income (market incomes, some benefits and pensions) for the years different from the baseline are uprated using the income source-specific indices.[4] The use of the uprated baseline input data allows abstracting from changes in socio-demographic characteristics of the population, and the resulting dynamics in poverty and inequality indicators proceed only from the changes in income levels and changes in tax and benefit policies.

When discussing the effects of tax and benefits systems on poverty and inequality, we rely on a synthetic decomposition exercise of subtracting (or adding) benefits (or taxes) from disposable income, and comparing the at-risk-of-poverty rates and inequality measures at these synthetic income concepts and at disposable income. This might not reflect the real effects of abolishing benefits/taxes as it does not consider behavioural responses or corresponding changes in poverty line (fixed at disposable income).

2.1 Poverty risk and inequality in the EU

This section reports on the main indicators of poverty and income inequality in the EU-27. At-risk-of-poverty rates are presented for the whole population, and for three poverty thresholds defined as 50%, 60% and 70% of national median equivalised disposable income. Separately, at-risk-of-poverty rates are reported for two population groups, children (defined as individuals aged under 18) and older people (aged 65 or more). These rates are reported at the 60% threshold. We also use Gini coefficient as the measure of income inequality. Table 1 summarizes the indicators for the baseline year 2020.

The highest at-risk-of-poverty rates at the 60% threshold are observed in Bulgaria (23.6%), Romania (23%) and Latvia (22.9%) followed by Spain, Italy and Croatia (all above 20%). The lowest risks of poverty at 60% threshold are in Czechia (8%) and Belgium (9.9%), followed by Slovakia, France, Finland and Slovenia (all below 12%). The use of alternative poverty thresholds does not introduce significant changes into the country rankings.

The risks of poverty rates are on average higher for the vulnerable groups – children and the elderly – and these risks also vary more across countries. In Romania, 30.3% of children are at risk of poverty, followed by Spain, Bulgaria and Italy (above 25%). The lowest at-risk-of-poverty rate for children is in Denmark (9.1%) followed by Czechia, Slovenia, Poland, Finland and Belgium (all below 12%). The risk of poverty for the elderly is the highest in Latvia (42.4%), followed by Estonia, Bulgaria, Croatia, Lithuania and Malta (all above 30%).

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[2] A description of Eurostat method can be found at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology.

[3] As noted before, EU-SILC 2021 was not available for all EU-27 countries at the time of I6.0+ release, and some countries still rely on 2019 incomes uprated to 2020 for the baseline year 2020, see more in Table A1.1.

[4] Detailed rules and guidelines about how uprating factors are implemented in EUROMOD can be found in the EUROMOD modelling conventions, available in https://euromod-web.jrc.ec.europa.eu/resources/model-documentation.

The lowest poverty rates among the older people are in France (5.7%) and Slovakia (7.9%), followed by Sweden, Netherlands, and Finland (less or equal to 10%).

Table A4.1 (Annex 4) tracks the indicators over time in 2020-2023. We can see that changes in the policies and market incomes over those years do not contribute to large changes in the indicators. The largest increase in the risk of poverty over these years happened in Ireland (+3.7 p.p.), followed by Cyprus, France, Luxemburg, and Belgium (over 1 p.p.). In many of the countries with increases in poverty, the increase happened when the Covid-related policies were discontinued (Christl et al, 2022) and inflation led to benefit erosion (Leventi et al., 2024). The largest decline in the risk of poverty was observed in Romania (-1.9 p.p.), followed by Latvia and Netherlands with over 1 p.p. decline. The changes affected the vulnerable groups differently. Poverty risks among children increased by 3 p.p. or more in Ireland, Lithuania, Luxemburg and Hungary; and declined by over 2 p.p. in Germany, Bulgaria, Slovakia, Romania and Portugal. The poverty risk increases for the elderly were most pronounced in Bulgaria, Cyprus and Belgium (over 7 p.p.). The poverty risks for the elderly declined most of all in Hungary (-4.4 p.p.) and Romania (-4 p.p.).

Table 1. EUROMOD poverty and inequality statistics, baseline year 2020

Country	Poverty risk			Poverty risk (60%)			Gini coefficient
	50%	60%	70%	age<18	age>=65	Poverty threshold EUR/year	
AT	5.2	13.0	20.7	15.2	13.7	16,548	0.237
BE	5.1	9.9	19.3	11.1	12.7	15,120	0.216
BG	15.1	23.6	30.9	26.4	36.5	3,115	0.400
CY	5.7	13.8	22.5	13.9	23.2	9,967	0.292
CZ	4.0	8.0	15.4	9.9	10.2	6,260	0.238
DE	9.6	16.5	25.0	16.7	19.6	14,615	0.296
DK	7.3	13.2	23.0	9.1	11.4	21,228	0.256
EE	10.2	19.0	26.9	13.3	38.9	7,472	0.306
EL	11.8	18.2	25.4	20.5	14.1	5,466	0.310
ES	15.0	21.5	28.4	28.5	16.5	9,365	0.324
FI	4.4	11.4	20.4	11.1	10.0	15,020	0.248
FR	6.2	11.3	19.7	16.8	5.7	12,979	0.278
HR	13.7	20.2	27.5	18.3	33.9	5,005	0.291
HU	11.2	15.9	23.1	21.6	10.6	3,592	0.280
IE	7.8	16.4	26.1	18.3	22.0	15,214	0.286
IT	13.4	20.3	27.3	25.5	16.6	10,514	0.326
LT	9.6	16.8	24.8	13.3	30.4	5,511	0.321
LU	6.5	13.1	23.4	15.1	19.2	24,902	0.260
LV	15.2	22.9	29.9	16.9	42.4	5,361	0.350
MT	8.1	16.2	23.9	15.0	30.1	10,264	0.304
NL	6.8	13.0	22.3	13.3	10.0	17,140	0.253
PL	8.1	14.3	21.9	11.1	20.6	4,939	0.262
PT	11.3	18.3	25.5	18.2	22.2	6,873	0.319
RO	17.8	23.0	31.2	30.3	22.3	2,927	0.334
SE	7.9	14.2	23.5	16.6	8.3	15,200	0.253
SI	5.7	11.9	19.9	11.0	14.2	8,776	0.231
SK	7.1	11.2	18.0	16.7	7.9	5,446	0.209

Source: EUROMOD version I6.0+

The highest income inequality as measured by the Gini coefficient was registered in Bulgaria (0.4) followed by Latvia (0.35). The lowest inequality was in Slovakia (0.21) followed by Belgium (0.22). Ireland (+0.012) and

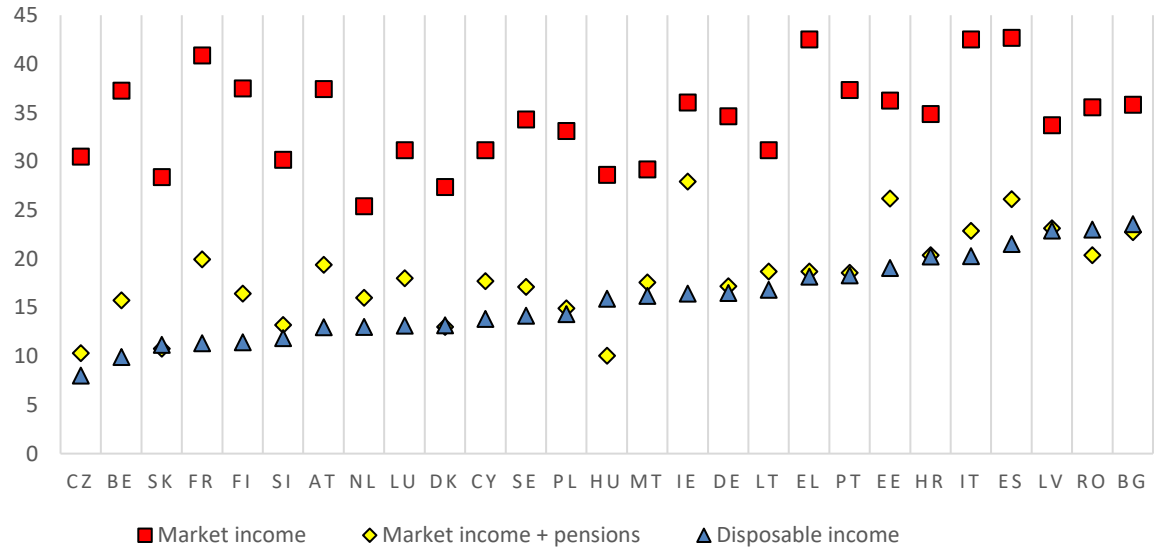
France (+0.011) experienced largest increases in inequality in 2020-2023 (these countries also saw increases in poverty), while Romania (-0.017) and Italy (-0.016) saw inequality reductions.

2.2 The effect of taxes and benefits on the risk of poverty

Using EUROMOD, we can identify the direct impact of taxes and benefits on risks of poverty and income inequality. Figure 1 displays at-risk-of-poverty rates for different income concepts, highlighting the role of public pensions, and other benefits and taxes in mitigating poverty risks. The figure shows poverty risk at the level of disposable income (which includes market incomes plus pensions plus benefits minus taxes), market income plus pensions and market income, and using the 60% of national median equivalised disposable income as a poverty threshold for all three income concepts. Countries are sorted by the poverty risk at disposable income level.

As we can see in Figure 1, public pensions have a significant impact on poverty risk reduction for all EU-27 countries. For all countries with the exception of Ireland, public pensions are the main contributor for the poverty reduction from market income to disposable income level. For example, out of 22.5 p.p. in the reduction of poverty from market to disposable income in Czechia, 20.2 p.p. (difference between the risk of poverty at market income and at market income plus pensions). For Ireland, public pensions only contribute 8.1 p.p. to the total poverty reduction of 19.6 p.p. The high role of private pensions included in market incomes explains this phenomenon in Ireland.

Figure 1. Poverty risk and the role of public pensions and non-pension benefits and taxes (2019 incomes and policies)



Source: EUROMOD version I6.0+

Note: countries are ranked according to the poverty estimates for disposable income. The poverty line for the three measures is the one of disposable income.

Table 2 shows the impact of tax-benefit systems and their components on the risk of poverty using the 60% of national median equivalised disposable income as a poverty threshold. Ireland and France achieve the highest poverty risk reductions due to non-pension benefits and taxes – of 11.5 and 8.6 p.p., correspondingly. Non-pension benefits and taxes increase poverty risk in Hungary, Romania and, to a lesser extent, in Bulgaria and Slovakia. In these countries, the "poverty-increasing" impact of taxes overweighs the "poverty-reducing" effects of non-pension benefits, and in Fig.1 we see that poverty risks are higher at disposable income compared to those at market income plus pensions

The considered components of the tax-benefits system, aside from public pensions, are means-tested benefits, non-mean-tested benefits, direct taxes and social insurance contributions (SIC). To see the impact of each component on the risk of poverty, they are subtracted (in case of benefits) or added (in case of

taxes/SIC) separately to disposable income. The difference between the poverty risk based on disposable income versus disposable income adjusted for the given component represents this component's poverty impact.

Non-means-tested benefits (which include unemployment benefits, universal or quasi-universal child benefits and other benefits which do not require a means test) are, on average, the second most important instrument to reduce poverty. The difference between the disposable income and disposable income with means-tested benefits subtracted is the highest in Estonia (10.7 p.p.) followed by Sweden (10.2 p.p.). It is the lowest in Portugal (2 p.p.) and Croatia (2.2 p.p.).

Table 2. Effects of tax-benefit components on at-risk-of-poverty rate, baseline year 2020

Country	Disposable Income (DPI)	DPI less means-tested benefits	DPI less non-means-tested benefits	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
AT	12.98	16.79	21.76	13.43	9.83	37.44	19.39
BE	9.92	15.78	15.90	9.93	8.83	37.25	15.75
BG	23.55	26.41	26.69	21.17	19.83	35.83	22.75
CY	13.84	19.58	16.88	13.40	8.99	31.15	17.71
CZ	8.01	9.67	12.13	7.58	6.42	30.48	10.30
DE	16.50	19.38	22.93	15.32	11.85	34.62	17.18
DK	13.17	20.88	20.11	5.39	12.78	27.36	13.01
EE	19.04	19.46	29.75	17.83	18.53	36.23	26.17
EL	18.18	22.46	21.76	16.23	13.81	42.53	18.70
ES	21.51	25.18	26.71	20.17	18.45	42.67	26.11
FI	11.45	17.85	18.42	7.71	10.06	37.50	16.44
FR	11.32	21.72	17.99	9.13	9.77	40.88	19.94
HR	20.23	21.91	22.43	20.09	17.17	34.87	20.36
HU	15.89	16.60	18.30	11.41	10.77	28.60	10.04
IE	16.43	25.08	24.29	15.03	16.04	36.03	27.94
IT	20.26	23.15	26.72	18.08	17.81	42.51	22.86
LT	16.84	19.27	24.89	15.13	13.19	31.15	18.69
LU	13.14	17.24	21.86	13.20	9.51	31.15	18.00
LV	22.91	22.91	28.45	20.42	20.12	33.71	23.13
MT	16.19	19.47	18.93	15.26	13.60	29.17	17.58
NL	12.99	20.05	18.56	11.60	6.43	25.38	16.00
PL	14.32	16.32	22.45	9.42	11.17	33.12	14.90
PT	18.30	19.89	20.32	17.13	16.24	37.33	18.55
RO	23.00	23.97	25.80	21.15	17.94	35.56	20.36
SE	14.15	17.50	24.34	9.47	12.49	34.32	17.12
SI	11.88	15.78	18.09	10.93	7.36	30.17	13.21
SK	11.18	12.05	16.49	10.66	6.83	28.38	10.78

Source: EUROMOD version I6.0+

Means-tested benefits on average have smaller poverty impacts. Yet, some countries like France and Ireland rely significantly on this component. In these countries, the differences in poverty risk between disposable income and disposable income without means-tested benefits are 10.4 and 8.7 p.p., correspondingly. In Latvia, Estonia and Hungary, on the opposite, the effect of means-tested benefits is negligible.

Direct taxes and social contributions (SIC) have relatively small effects on poverty risk. Paying taxes typically reduces incomes and increases poverty risk – this is reflected in the decrease of poverty rates when we add

back taxes or SIC to the disposable incomes in Table 2. However, due to low tax rates at low income brackets and presence of various tax allowances and tax credits, the impoverishment effects of direct taxes are typically low. In Austria, where certain tax credits are cashable, direct taxes reduce risk of poverty, although insignificantly. In Luxemburg, Belgium and Croatia, the impact of direct taxes is negligible, although in the former two taxes are also poverty-reducing due to the use of cashable tax credits. However, there are countries where direct taxes increase poverty risk significantly. These are countries like Denmark (7.8 p.p.), Poland, Sweden and Hungary (above 4 p.p.). Yet in Denmark, as well as in Ireland and Estonia, the impact of SIC is negligible. In Ireland and Estonia this is partially explained by the high risk of poverty among the older people who do not pay contributions. In Hungary and Romania, the impact of SIC on risks of poverty is higher than 5 p.p.

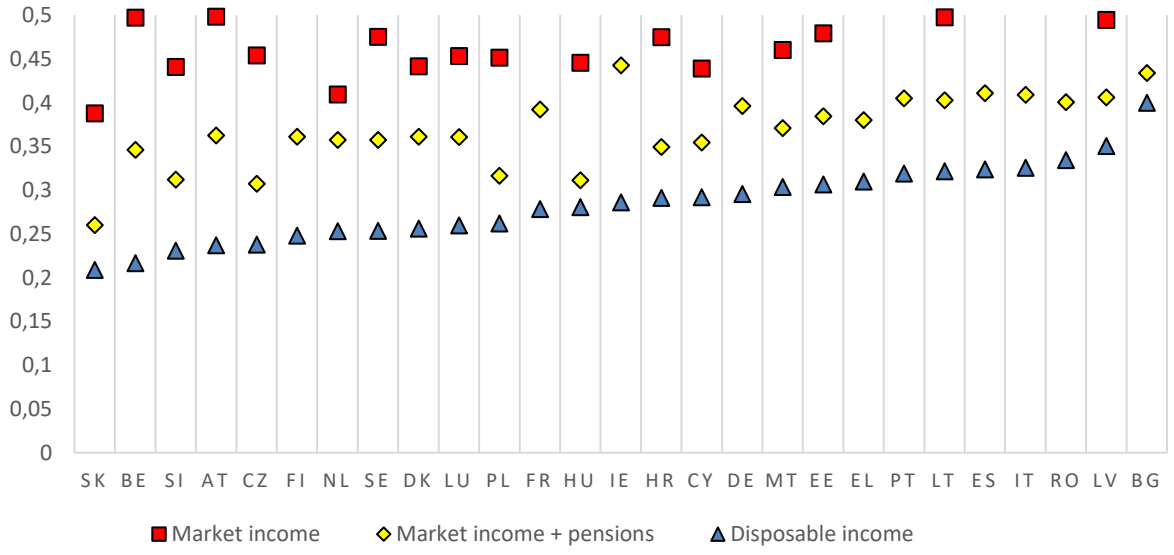
Table A4.2 in Annex 4 tracks the dynamics of the impacts of different components on risk of poverty over the years 2020-2023. The poverty reduction properties of tax-benefit systems remain relatively stable, and the ranking of the countries is preserved. For most countries the performance of all the components change in the interval from -1 to 1 percentage points. There are some exemptions. For instance, in Romania, the poverty-reducing impact of means-tested benefits increased by 1.95 p.p. partially due to the increases in social pensions and heating benefits. In Italy, the poverty reducing impact of non-means-tested benefits was reduced by 3.7 p.p., with part of the negative impact compensated by +1.4p.p. increase in poverty reduction from means-tested benefits. The lowering of the income tax rate for the lowest bracket in Poland in 2022 has reduced the impoverishment impact of direct taxation by 2p.p.., while increase in tax allowances in Latvia in the same year led to 1.2 p.p. reduction.

2.3 The effect of taxes and benefits on inequality

This section analyses the role of taxes and benefits in reducing inequality. Figure 2 and Table 3 report the impact of tax-benefit systems on income inequality, with the Gini coefficient as the inequality indicator.

As expected, in Figure 2 we see that income inequality declines as we go from market income to market income plus pensions and to disposable income, hence public pensions and tax-benefit systems reduce inequality in all EU-27 countries. The data shows that public pensions are the most significant income component in reducing market income inequality in many countries, with the largest reduction in the Gini coefficient observed in Greece (0.16), Belgium and Finland (0.15 both). In Netherlands and Ireland, on the opposite, the impact of public pensions is relatively small as the countries rely mostly on private pensions.

Figure 2. Income inequality (Gini coefficient) and the role of public pensions and non-pension benefits and taxes (baseline year 2020)



Source: EUROMOD version I6.0+

Note: countries are ranked according to the value of the Gini coefficient for disposable income.

Direct taxes are the second most effective instrument for reducing income inequality (see Table 3). Taxes reduce income inequality mainly through the use of progressive schedules of tax rates, but also through the use of tax allowances and credits to lower-income households. In Belgium and Ireland, the value of the Gini coefficient at disposable income plus taxes (which could be interpreted as income before taxes) is 0.07 higher than at disposable income. In the countries with flat tax systems like Bulgaria, Hungary and Romania the impact of direct taxes on the Gini coefficient is only 0.01. Contrary to taxes, social insurance contributions are often flat and do not include many exemptions, allowances or credits, hence their impact on inequality is overall small, and negligible in several countries.

Benefits, both means-tested and non-means-tested, have modest impacts on inequality. Larger impacts for non-means-tested benefits are observed in Nordic countries: Sweden (0.06), Denmark (0.04), and Estonia (0.04). The impact of means-tested benefits is relatively strong in Ireland, Netherlands, France and Finland (all between 0.06 and 0.04), while in Estonia, Latvia, Slovakia and Hungary it is negligible.

Table 3. Effects of tax-benefit components on Gini coefficient rate, baseline year 2020

Country	Disposable Income (DPI)	DPI less means-tested	DPI less non-means-tested	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
AT	0.24	0.27	0.27	0.30	0.25	0.50	0.36
BE	0.22	0.24	0.24	0.29	0.24	0.50	0.35
BG	0.40	0.42	0.41	0.41	0.40	0.53	0.43
CY	0.29	0.32	0.30	0.32	0.29	0.44	0.35
CZ	0.24	0.25	0.25	0.27	0.26	0.45	0.31
DE	0.30	0.32	0.32	0.36	0.30	0.52	0.40
DK	0.26	0.29	0.30	0.31	0.26	0.44	0.36
EE	0.31	0.31	0.35	0.34	0.31	0.48	0.38
EL	0.31	0.34	0.32	0.34	0.31	0.54	0.38
ES	0.32	0.35	0.35	0.37	0.32	0.52	0.41
FI	0.25	0.29	0.28	0.30	0.26	0.51	0.36
FR	0.28	0.33	0.30	0.32	0.29	0.53	0.39
HR	0.29	0.30	0.30	0.32	0.31	0.47	0.35
HU	0.28	0.28	0.30	0.29	0.29	0.45	0.31
IE	0.29	0.35	0.31	0.36	0.30	0.51	0.44
IT	0.33	0.35	0.34	0.38	0.33	0.53	0.41
LT	0.32	0.33	0.35	0.36	0.35	0.50	0.40
LU	0.26	0.28	0.29	0.32	0.27	0.45	0.36
LV	0.35	0.35	0.37	0.38	0.36	0.49	0.41
MT	0.30	0.32	0.32	0.35	0.30	0.46	0.37
NL	0.25	0.30	0.28	0.31	0.25	0.41	0.36
PL	0.26	0.27	0.29	0.27	0.27	0.45	0.32
PT	0.32	0.34	0.33	0.38	0.33	0.53	0.40
RO	0.33	0.34	0.35	0.34	0.38	0.52	0.40
SE	0.25	0.28	0.31	0.30	0.26	0.48	0.36
SI	0.23	0.25	0.26	0.26	0.25	0.44	0.31
SK	0.21	0.21	0.23	0.23	0.22	0.39	0.26

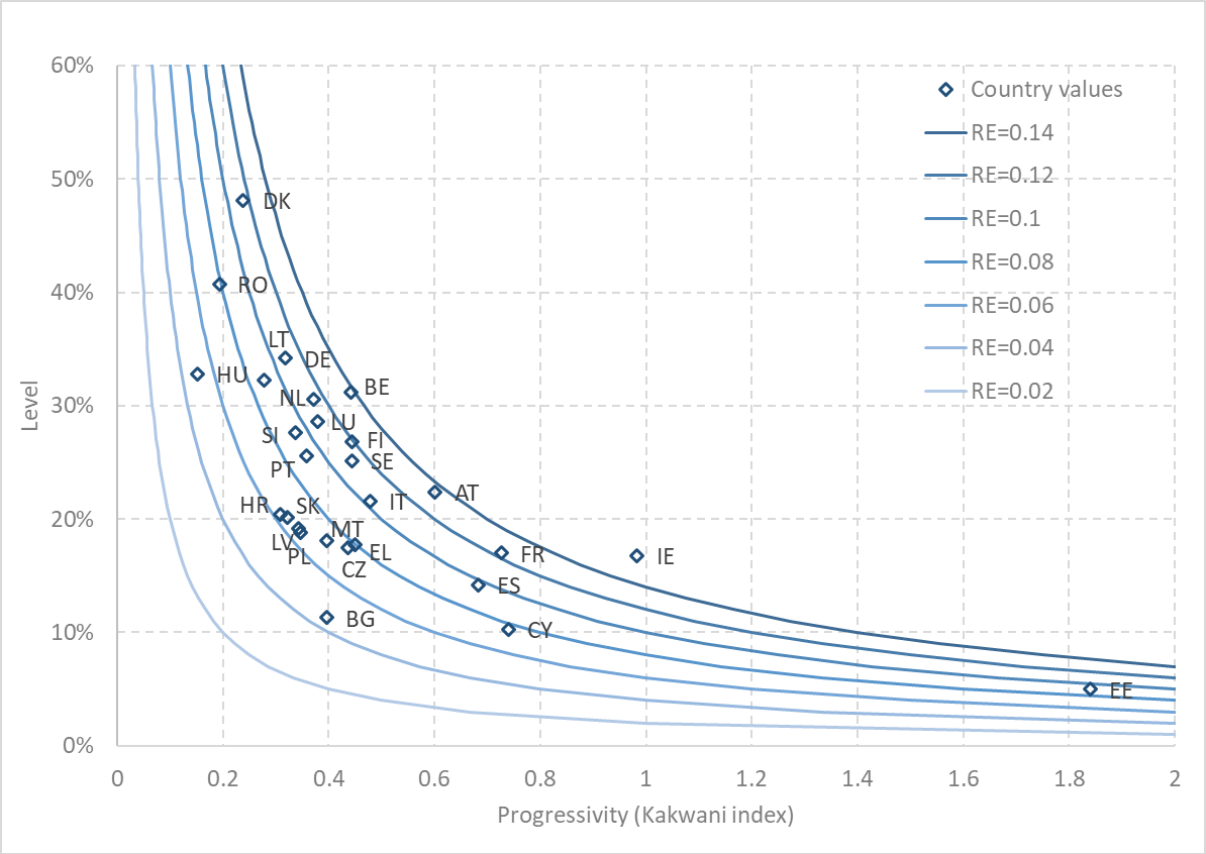
Source: EUROMOD version I6.0+

Table A4.3 in Annex 4 compares the impact of different components of the tax/benefits systems on inequality over the years 2020-2023. There are no significant changes in the role of tax-benefit systems in income inequality reduction, and fluctuations in the impact on the Gini coefficient are from -0.01 to 0.01. The only exception is Germany, where the impact of means-tested benefits grew from 0.02 in 2020 to 0.04 in 2023.

3 Breaking down the redistributive effect of the tax-benefit systems in the EU

This section focuses on analysing the redistributive effect of the tax-benefit system in the EU-27 countries for the year 2020 using the Kakwani decomposition framework. The overall redistributive effect (RE) of the tax-benefit system (excluding pensions) is examined, along with the roles of relative progressivity and the size of the policies in relation to disposable income. Additionally, the overall redistributive effect is further decomposed to identify the role of each tax-benefit component. The methodologies used are based on Kakwani (1977), Reynolds-Smolensky (1977), and the adaptation and generalization proposed by Onrubia et al. (2014). Further details and formalization of the indicators can be found in Annex 5.

Figure 3. Progressivity (x), level (y) and redistribution (position w.r.t. curves) of the 2020 tax-benefit systems before re-ranking



Source: EUROMOD version I6.0+

Note: Kakwani index, level and RE displayed in this figure refer to the net effect of personal taxes and cash benefits (except pensions) modelled in EUROMOD baseline 2020.

Figure 3 presents the Kakwani decomposition of the redistributive effect for all EU member states. The total redistributive effect of the tax-benefit system (excluding pensions) is shown here as the product of its relative progressivity (measured by the Kakwani index, horizontal axis) and its level (measured as a relative size to disposable income, vertical axis), minus the re-ranking effect[5]. The countries are plotted against the iso-redistribution curves; each curve reflects a certain level of the total redistributive effect, measured in this case as the difference between the Gini coefficient of disposable income and the Gini coefficient of market

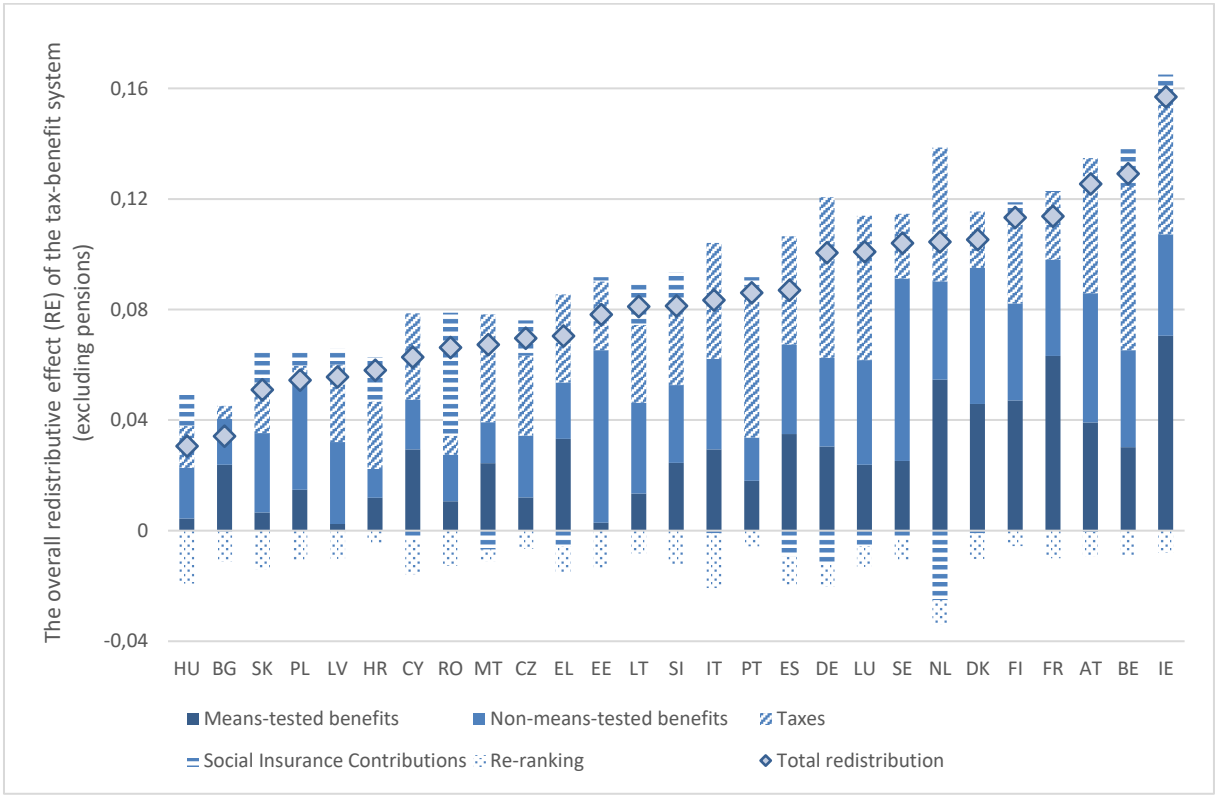
[5] The re-ranking effect in redistribution analysis refers to changes in the relative ranking of individuals when the income distribution is changed by a policy. For example, an individual A with lower market income than an individual B may end up with a higher disposable income because he/she is entitled to a specific benefit and B is not.

income plus pensions. The iso-redistribution curves represent combinations of progressivity and level leading to the same redistributive effect (RE). We plot the values before re-ranking effect for consistency between the pairs of progressivity and level value on one side, and total redistribution on another.

Countries that are further away from the origin and closer to the darker curves have higher redistributive effect. In Figure 3, we see that these are mostly Nordic and Central European countries (Ireland, Belgium, Austria, France, Finland and Denmark). Yet these countries rely on different policy mixes to achieve the high redistribution results. Ireland's tax-benefit system is relatively low in level (only four other EU countries have levels which are lower). Yet the very high level of progressivity of its tax-benefit system allows it to effectively lower income inequality. On the other side, there is Denmark with relatively low progressivity (it is only lower in Romania and Hungary). Due to a high level, however, Denmark also reaches high levels of redistribution. Southern European countries (Cyprus, Greece, Italy, Malta, Portugal and Spain) have an intermediate level of redistribution compared with the remaining member states Bulgaria and Hungary have the lowest redistributive effects among European peers, followed by other Baltic and Eastern European countries. But as Bulgaria has low level and average progressivity, Hungary has a high level but the lowest progressivity of a tax-benefit system among the EU-27. Finally, Estonia represents a clear outlier in terms of both progressivity and level, achieving with this combination an average level of redistribution.

Figure 4 presents the decomposition of the total redistributive effect by tax-benefit system components. Countries are ranked by redistributive effect with highest total effect on the right. Again, we can see that countries rely on different policy mixes to achieve similar redistribution results. We can say roughly that countries with the strongest redistribution tend to rely more on means-tested benefits; those with intermediate redistribution, on taxes; and those with lowest redistribution on non-means-tested benefits. Romania is the only country with social contributions playing a major redistributive role due to their progressive nature.

Figure 4. Redistribution of the 2020 tax-benefit systems by component



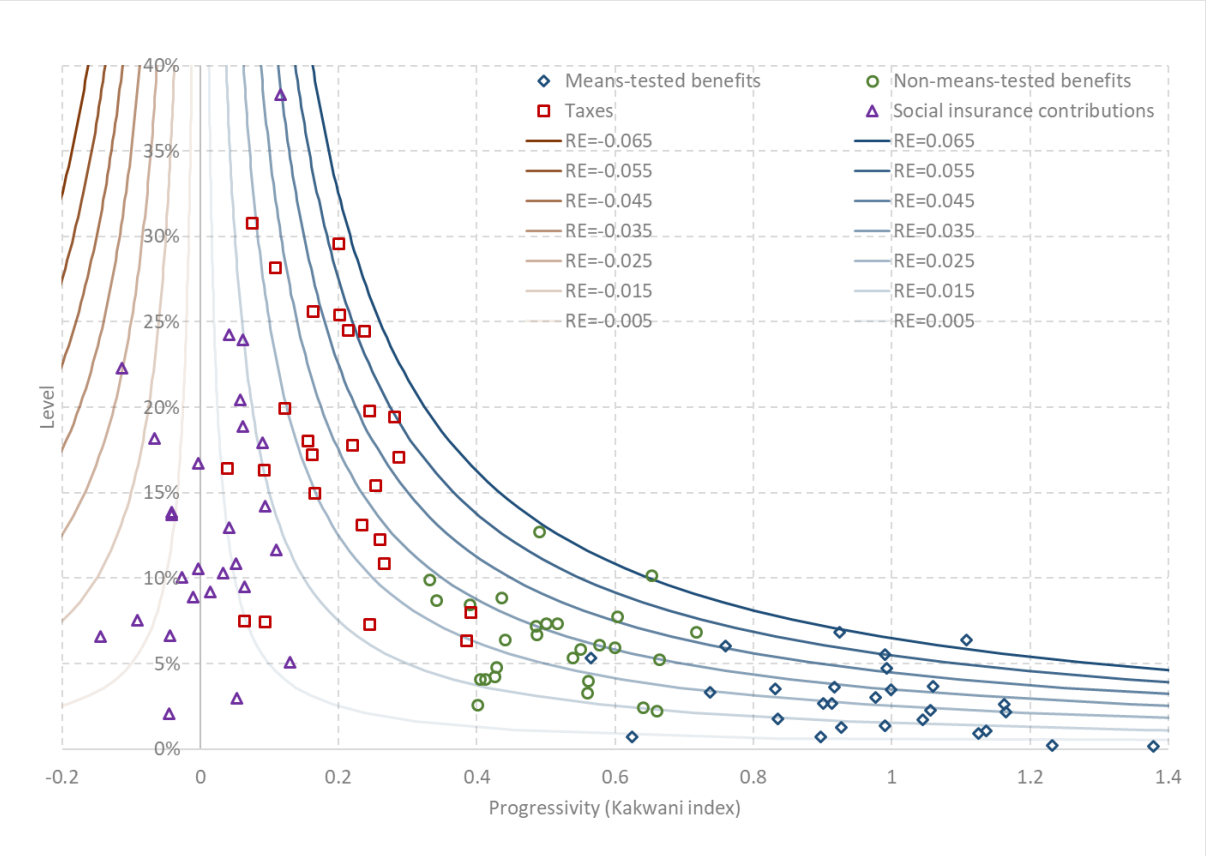
Source: EUROMOD version I6.0+

Note: the redistributive effect displayed in this figure refers to the net effect of personal taxes and cash benefits (except pensions) modelled in EUROMOD baseline 2020.

Finally, Figure 5 replicates Figure 3 separately for each tax-benefit component. Country labels are omitted for readability, but still patterns are very clear. Benefits are the most progressive components, with non-means-

tested benefits clearly more progressive than non-means-tested, as expected. On the contrary, levels are on average higher for non-means-tested benefits. Taxes are next in terms of progressivity, their levels being higher than benefits on average and with greater variance. Finally, social insurance contributions are close to being neutral in terms of progressivity, being slightly progressive in some countries and slightly regressive in others. Hence, their high heterogeneity in terms of levels is the main driver of their level of redistribution.

Figure 5. Progressivity (x), level (y) and redistribution (position w.r.t. curves) of the 2020 tax-benefit systems before re-ranking, by component



Source: EUROMOD version I6.0+

Note: the decomposition of the redistributive effect (RE) displayed in this figure refers to the net effect of taxes and benefits modelled in EUROMOD baseline 2020.

4 Work incentives on the intensive and extensive margins: marginal effective tax rates and net replacement rates

EUROMOD is a versatile tool which can be used also to assess the influence of tax and benefit systems on the work incentives of individuals. In the context of labour incentives, two particular indicators derived from EUROMOD's simulations are instrumental: marginal effective tax rates (METR) and net replacement rates (NRR. METRs affect work decisions on the intensive margin (how much to work), for instance, the decision to work additional hours. The indicator quantifies the proportion of an individual's increase in gross earnings that is lost to higher taxes and reduced benefits, essentially gauging the (inverse of the) financial incentive to work more. NRRs affect the extensive margin, i.e., the decision whether to work at all. This measure reflects the amount of benefits in the event of job loss, expressed as a proportion of previous net earnings. Thus, this indicator provides insight into the security provided by the social safety net in case of job loss and, indirectly, its effect on a jobseeker's incentives to accept a job offer at his or her previous level of pay.

METRs are calculated for individuals with earned income by observing the effect on disposable income following a hypothetical increase in earnings set at 3%. This measure reveals how much of the increase in gross earnings is eroded by the tax-benefit system through higher tax payments and the potential loss of benefits. EUROMOD's analysis excludes the top and bottom percentiles of the METR distribution to mitigate the distortion from outliers, such as those with METRs above 150% or negative values. These exclusions were made to ensure that average METR calculations remain representative of the population and not skewed by extreme cases. The analysis assumes that all income is reported and taxed, and that individuals fully claim their entitled benefits, meaning that the METRs reflect the intended design of the tax-benefit system rather than the practical return on additional work, which might vary due to non-compliance or incomplete benefit take-up. Table 4 reports values for the baseline year 2020, while Annex 4 provides full results for 2020-2023. Since METRs are calculated for the average of the surveyed population with positive taxable income, they are not directly comparable with synthetic METRs calculated for hypothetical workers earning for instance 100% of the average gross wage.

The 2020 baseline figures for METR shed light on the disparities across the European Union in terms of work incentives. Belgium's tax-benefit system resulted in the highest mean METR at 54%, indicating that over half of additional income earned from work is absorbed by the tax system and loss of benefits, potentially discouraging additional work effort. Belgium is followed by Germany, Finland, Luxemburg and Denmark with average METRs between 44% and 46%. On the other end of the spectrum, countries like Estonia, Croatia, Cyprus, and Bulgaria recorded mean METRs of 25% or lower, suggesting a more favourable environment for individuals to increase their labour supply without facing substantial fiscal penalties. Table A4.4 also tracks changes over 2020-2023, revealing that Croatia has experienced the most marked increase in average METR of 9 p.p., while Czechia experienced 3.8 p.p. decrease.

The detailed breakdown of METRs into contributions of taxes, social insurance contributions (SIC), and all types of benefits in Table 4 for the year 2020 provides information on the composition of these work disincentives. Taxes typically represent the largest share of METR, explaining over half of the indicator. Denmark stands out with a particularly high tax component, underscoring the significant role that tax policy plays in shaping work incentives. In contrast, countries with a flatter tax system, such as Croatia, Cyprus, Bulgaria, and Romania, exhibited lower METR due to taxes, implying less of a disincentive to increase labour supply at the intensive margin. The contribution of SIC was most pronounced in countries like Romania and Latvia, where the SIC component of METR exceeds 20 p.p.. Notably, Romania's SIC contribution reached p.p.%, the highest among the listed nations. In contrast, countries such as Spain, Estonia, Ireland, and Denmark had minimal SIC impacts on METR, with contributions below 5 p.p., reflecting different approaches to social insurance financing across the EU.

Although generally less influential than taxes or SIC, benefits factor into the overall incentive structure, especially for lower-income workers for whom the loss of benefits can be a substantial economic concern. In some countries, like France, the withdrawal of benefits as earnings increase can contribute significantly to the METR.

Table 4. Mean Marginal Effective Tax Rates (METR) by component, 2020

Country	Taxes	SIC	Benefits	Total METR
AT	21.0	16.7	3.6	41.3
BE	35.7	16.2	5.2	57.2
BG	8.0	13.1	0.6	21.7
CY	8.4	11.2	3.4	23.0
CZ	16.6	11.2	1.6	29.4
DE	25.6	16.9	4.3	46.2
DK	42.8	0.0	1.7	44.6
EE	19.5	3.2	2.8	25.6
EL	13.7	12.5	1.5	27.7
ES	19.5	3.7	4.6	27.8
FI	28.5	10.2	6.8	45.5
FR	17.4	11.2	10.0	38.6
HR	9.5	15.5	0.4	25.3
HU	14.0	18.2	0.1	32.4
IE	27.5	5.0	6.3	39.0
IT	26.9	9.6	2.6	39.1
LT	18.7	21.1	1.0	40.9
LU	30.8	11.9	2.8	45.5
LV	18.9	10.6	0.7	30.2
MT	20.6	5.7	2.4	28.7
NL	21.6	11.4	5.9	39.5
PL	15.1	11.0	0.5	26.7
PT	22.5	11.1	1.3	35.0
RO	7.5	28.1	1.8	37.4
SE	26.7	6.3	3.0	36.0
SI	15.5	18.0	4.9	38.4
SK	13.2	17.1	2.0	32.3

Note: METRs are calculated as the average of all individuals with positive earnings who have a simulated METR which is non-negative and lower than 150%.

Source: EUROMOD version I6.0+.

The Net Replacement Rate (NRR) of the unemployed is an indicator of work incentives at the extensive margin (related to the decision to work at all). The EUROMOD NRR is calculated as the ratio between household income when one of its members loses her income to household income in the case of no job loss. The NRR breakdown highlights the importance of each tax-benefit component as well as of the market income (for example, earnings of working members of the household that continue working) in the remaining income of households affected by job loss. Since NRRs are calculated for the average of surveyed households with a working member, they are not directly comparable with synthetic NRR indicators calculated for hypothetical workers earning for instance 100% of the average gross wage. Traditionally unemployment-related NRR indicators focus on pure replacement incomes from public sources, typically unemployment or social assistance benefits (see, for example, Carone et al., 2004; Martin, 1996). EUROMOD NRR indicator is more integral, focusing on household as a whole and including non-replacement benefits and other family income in remaining income while unemployed. The use of this more integral indicator allows capturing work incentives more realistically, considering the effects of family insurance mechanisms that still play a crucial role in economic decisions (see Immervol and Sutherland, 2005; Christl et al., 2022). Further decomposition of this integral indicator highlights the effects of tax-benefit systems.

Table 5 provides the NRR by country as well as its breakdown by component. Looking at the overall NRR, countries featuring the highest replacement rates (over 80%) are Luxemburg, Portugal, France, Denmark and Belgium. Note that this list of countries has a lot of intersections with the high-METR countries, with Portugal being the only exception. Table A4.5 allows to track the evolution of mean and median NRR over 2020-2023. Over this period, France has lowered NRR by 7 p.p., while Estonia has seen a 1.5 p.p. increase.

The market income component is the largest contributor to the remaining income of households affected by the job loss. Of course, whether households potentially affected by job loss have additional market income depends on the typical size of households in a country as well as the typical number of market income earners in these households. Across countries, benefits appear to be the key tax-benefit system contributor to the remaining income of households affected by job loss. With the exception of countries with high rates of income taxation, such as Denmark, Sweden and Finland, the contribution of taxes to NRR is generally small. Similarly, and with limited exceptions (e.g. the Netherlands, Slovenia and Romania), the contribution of SIC is also small. This indicates that, for most parts of the EU, households potentially affected by job loss can rely on the earnings of other household members, but fiscal systems provide crucial support through benefits. However, in Luxemburg, Sweden, Finland, France, Denmark and Greece, benefits play higher role than market income, i.e. household support.

The interplay between taxes, contributions, and benefits highlights the complexity of designing a tax-benefit system that balances the goals of providing a robust social safety net with the need to maintain strong work incentives. The variation in METR components across the EU reflects diverse policy priorities and economic contexts, with each country's approach to taxation and benefits yielding distinct outcomes in terms of incentives to work and labour market participation. The insights gleaned from EUROMOD's simulations thus serve as a crucial input for policymakers seeking to refine their tax and benefit systems to promote employment while ensuring adequate protection for those out of work, accounting for typical household structures.

Table 5. Mean Net Replacement Rates (NRR) of the unemployed by component, 2020

Country	Taxes	SIC	Market income	Benefits	Total NRR
AT	-5.5	-8.2	49.4	42.3	78.0
BE	-15.2	-7.2	54.0	49.5	81.3
BG	-4.4	-6.7	52.9	35.4	77.2
CY	-2.5	-5.5	50.7	28.1	70.8
CZ	-4.0	-5.7	49.9	25.3	65.5
DE	-7.9	-8.4	50.2	43.0	77.0
DK	-35.6	-1.0	56.9	61.1	81.3
EE	-6.5	-1.3	40.2	39.5	71.9
EL	-6.3	-7.3	42.0	43.5	71.8
ES	-6.6	-4.2	46.4	37.5	73.1
FI	-18.4	-4.3	45.9	54.7	77.9
FR	-11.8	-5.0	47.4	51.6	82.2
HR	-2.2	-10.2	54.8	28.2	70.5
HU	-3.0	-5.4	47.2	21.8	60.5
IE	-11.4	-2.4	54.9	30.2	71.2
IT	-8.9	-6.2	43.7	41.2	69.7
LT	-8.0	-13.1	54.9	45.6	79.4
LU	-12.2	-11.7	42.4	65.6	84.2
LV	-7.2	-4.9	47.5	30.1	65.4
MT	-6.0	-5.7	53.5	19.7	61.5
NL	-10.9	-23.6	60.1	51.9	77.4
PL	-8.2	-7.6	51.7	28.7	64.6
PT	-5.7	-5.5	51.7	42.8	83.4
RO	-5.1	-18.5	58.6	27.2	62.3
SE	-20.3	-5.8	43.3	58.4	75.6
SI	-6.6	-19.6	61.7	40.6	76.0
SK	-3.8	-12.4	59.6	28.7	72.1

Source: EUROMOD version I6.0+
Note: The EUROMOD NRR is calculated as the ratio between household income when one of its members loses her employment to household income in the case of no job loss. NRRs are calculated as averages across all individuals with positive earnings.

5 Conclusions

This report provides a number of baseline simulation results and headline indicators from the latest public version (I6.0+) of EUROMOD, the tax-benefit microsimulation model for the EU. The analysis for 2020-2023 offers a comprehensive overview of the welfare effects of tax-benefit systems across the EU and their influence on work incentives. The analysis reveals that while there is a common objective to provide a safety net and promote labour market participation, the variation in policy approaches and outcomes across Member States is significant.

Income inequality and poverty risk assessments highlight cross-country differences in existing socioeconomic disparities. Countries range from those with high poverty risk, such as Bulgaria and Romania, to those achieving lower risks, like Czechia and Belgium. The analysis underscores the greater vulnerability of children and the elderly, with even higher variances in poverty risk across countries. Over the last few years, policy changes and market income fluctuations have resulted in modest alterations in poverty and inequality indicators, with Ireland experiencing the largest increase in poverty risk and Romania witnessing the most notable, although still modest, decline.

The analysis of effects of the tax and benefit systems on poverty and income inequality indicators highlights the major role of public pensions. Focusing on the non-pension components of the tax-benefit systems, benefits are the largest contributors to poverty reduction, while taxes and social insurance contributions also have significant redistributive effects. Again, we observe distinct policy choices as some countries like France and Ireland rely on means-tested benefits for poverty reduction, while others like Estonia and Sweden choose to lower poverty risks with non-means-tested benefits.

In redistribution, while most of the countries rely on progressive taxes, some countries achieve most of the redistribution through benefits (Ireland, France, Estonia), or even through social insurance contributions, like Romania. Similarly, for the same redistribution effect, countries might opt for higher intervention or net spending large tax-benefit systems (see, for example, Denmark) and others might choose higher progressivity of their policies (like Ireland).

The study of marginal effective tax rates (METR) and net replacement rates (NRR) of unemployment benefits provides valuable insights into how tax-benefit systems shape work incentives. Belgium's high mean METR suggests a significant portion of additional income is lost to taxes and withdrawn benefits, potentially discouraging additional work effort. In contrast, lower METRs in Estonia, Croatia, Cyprus, and Bulgaria indicate a more favourable environment for increasing labour supply at the intensive margin. Findings related to NRRs demonstrate that Luxemburg, Portugal, France, Denmark, and Belgium feature the highest average net replacement rates, with substantial contributions from benefits. This points to a strong financial safety net for individuals experiencing income loss. The analysis also indicates that for most EU countries, taxes and SIC have a minor impact on NRRs compared to benefits and household income, which form the majority of remaining household income after job loss.

The EUROMOD model provides a powerful tool for policymakers to analyse the distributional impact of tax-benefit systems and to understand the implications for work incentives. It supports evidence-based decision-making for policy reforms aimed at reducing poverty and inequality, promoting labour market participation, and ensuring financial security for households across the European Union. The baseline results serve as a foundation for interpreting policy changes and offer a benchmark for future reforms.

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Annexes

Annex 1. SILC datasets by country

Table A1.1. SILC datasets used to create EUROMOD input datasets used in this report

Country	Base dataset for EUROMOD	Survey year	Income year	Best-match systems
AT	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
BE	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
BG	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
CY	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
CZ	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
DE	EMSD = UDB (C21_release 23_03) + National SILC	2021	2020	2020-2023
DK	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
EE	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
EL	EMSD = UDB (C21_release_22_09) + National SILC EMSD = UDB (C20_release_21_09 rev.1) + National SILC	2021 2020	2020 2019	2020-2021 2022-2023
ES	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
FI	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
FR [a]	EMSD = UDB (C20_release_22_03) + National SILC	2020	2019	2020-2023
HR	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
HU	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
IE	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
IT	EMSD = UDB (C21_release 23_03) + National SILC National SILC 2019	2021 2019	2020 2018	2020-2021 2022-2023
LT [a]	UDB (C20_release_21_09) + National SILC	2020	2019	2020-2023
LU	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
LV	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
MT	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
NL	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
PL [b]	UDB (C20 release 22-03) + National SILC	2020	2019	2020-2023
PT	EMSD = UDB (C21_release 23_03) + National SILC UDB (C20_release_22_03)	2021 2020	2020 2019	2020,2022-2023 2021
RO	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
SE	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
SI	EMSD = UDB (C21_release_22_09) + National SILC	2021	2020	2020-2023
SK [b]	EMSD = UDB (C20_release_21_09) + National SILC	2020	2019	2020-2023

Notes:

a. 2021 dataset (2020 incomes) available, but 2020 (2019 incomes) was selected as best match for the 2020 policy system. See details in the corresponding EUROMOD country report.

b. 2021 dataset (2020 incomes) not available in EUROMOD I6.0+.

Annex 2. National teams contributing to EUROMOD I6.0+

Table A2.1. National teams and team leaders by country

Country	Institution	National team leader
AT	European Centre for Social Welfare Policy and Research	Michael Fuchs
BE	University of Antwerp KU Leuven	Gerlinde Verbist André Decoster
BG	University of National and World Economy	Ekaterina Tosheva
CY	Ministry of Labour, Welfare and Social Insurance	Christopher Markides
CZ	Center for Economic Research and Graduate Education – Economics Institute	Daniel Münich
DE	ifo Institute – Leibniz Institute for Economic Research at the University of Munich	Mathias Dolls
DK		Bent Greve
EE	PRAXIS Center for Policy Studies	Merilen Laurimäe Kelly Toim
EL	Athens University of Economics and Business	George Economides
ES	Instituto de Estudios Fiscales	Adela Recio Alcaide
FI	Research Department of the Social Insurance Institution of Finland	Tapio Räsänen
FR	Aix-Marseille University	Alain Trannoy
HR	Institute of Public Finance	Ivica Urban
HU	TÁRKI Social Research Institute	Péter Szivós
IE	Economic and Social Research Institute	Karina Doorley
IT	Centre for Industrial Studies	Carlo Fiorio
LT	Vilnius University	Jekaterina Navickė
LU	Luxembourg Institute of Socio-Economic Research	Nizamul Islam
LV	Baltic International Centre for Economic Policy Studies	Anna Pluta
MT	Ministry for Finance and Employment	Stephanie Vella
NL	Stichting Centerdata	Klaas de Vos
PL	Center for Economic Analysis	Michał Myck
PT	Institute of Public Finance	Carlos Farinha Rodrigues
RO	National Research Institute for Labour and Social Protection	Eva Militaru
SE		Jonathan Ståle
SI	Institute for Economic Research	Nataša Kump
SK	Ministry of Finance of the Slovak Republic	Dušan Paur

Source: own elaboration

Annex 3. Country notes: tax evasion, benefit non-take-up and full year adjustment

Table A3.1. Summary of tax compliance, benefit non-take up and full year adjustments in EUROMOD I6.0+, 2020-2023 systems

Country	Benefit take-up adjustment (BTA) 2020-2023	Tax compliance adjustment (TCA) 2020-2023	Full year adjustment (FYA)			
			2020	2021	2022	2023
AT	-	-	-	-	-	-
BE	on	-	-	-	-	-
BG	-	on	off	off	off	-
CY	-	-	off	-	-	-
CZ	-	-	off	off	off	off
DE	off	-	-	-	-	-
DK	-	-	-	-	-	-
EE	on	-	off	off	off	off
EL	on	on	on	on	on	on
ES	on	-	off	-	-	-
FI	on	-	off	off	off	off
FR	on	-	off	on	on	on
HR	on	-	-	-	-	-
HU	-	-	off	off	off	off
IE	on	-	-	-	-	-
IT	-	on	on	on	on	on
LT	-	off	on	on	-	-
LU	on	-	-	-	-	-
LV	on	-	-	-	on	on
MT	-	-	-	-	-	-
NL	-	-	-	-	-	-
PL	-	-	-	-	-	-
PT	on	-	on	on	on	on
RO	on	on	-	-	-	-
SE	-	-	-	-	-	-
SI	on	-	-	-	-	-
SK	on	-	-	on	on	on

Source: own elaboration based on EUROMOD version I6.0+

Note: "on" ("off") indicates that the adjustment is available and switched on (off) by default; "-" indicates that the adjustment is not available.

Benefit non-take-up

For **Belgium** we employ a simple non-take-up correction of the main means-tested benefits by applying the take-up proportions estimated on a caseload basis. In particular, we adjust for the non-take-up of benefits with a simple random non-take-up correction by applying the take-up proportion estimated as the ratio between the caseload recipients reported by the Official Statistics and those simulated to be entitled by EUROMOD. Take-up probabilities are applied at the household level (so that people entitled to the same benefits within a household exhibit the same take-up behaviour), for each benefit separately.

For **Croatia**, non-take-up is simulated for subsistence benefit on the assumption that small entitlements (i.e. smaller than 3% of the average net wage) are not claimed. Full take-up is assumed for all other simulated means-tested benefits.

For **Estonia** non-take-up is simulated for social assistance on the assumption that small entitlements (either in absolute or relative to other household income) are not claimed. Additionally, a calibration is implemented on top to ensure a take-up rate of 34%. Full take-up is assumed for all other simulated means-tested benefits.

In **Finland** eligibility for income support is assessed at the family level (rather than at the household level). For example, adult children can apply separately from their parents. In practice, however, this happens rarely. Therefore, in the model we account for non-take-up by simulating income test at the household level. Also, the households where the head is self-employed are excluded from eligibility (as they rarely apply for income support).

For **France,** the non-take-up correction of the main means-tested social assistance benefit (RMI/RSA)[13] and Activity Allowance (Prime d'activité) is simulated to be random, by applying proportions of non-take-up taken from external estimates, provided by the French Government.

For **Germany**, a random non-take-up correction is simulated for housing benefits, the additional child benefits, citizen's benefit, and general social assistance. The take-up rates are calculated by comparing information on the number of recipients from official statistics (Federal Employment Agency and Federal Statistical Office) to the simulated number of recipients from EUROMOD baselines. The extension can be switched on for the years 2020-2023.

For **Greece** a random non-take-up correction is simulated for unemployment assistance benefit for long-term unemployed and child benefit. Full take-up is assumed for all other simulated means-tested benefits.

For **Ireland**, non-take-up is simulated for the Working Family Payment (formerly known as Family Income Supplement), applying external estimates on the caseload. Full take-up is assumed for all other means-tested simulated benefits.

For **Latvia** non-take-up is simulated for paternity benefit based on the benefit receipt observed in the data.

For **Luxembourg** a non-take-up adjustment is simulated for the minimum income scheme and the rent allowance to align the simulated number of beneficiaries with the figures obtained from official statistics.

For **Poland,** the eligibility of housing benefit, due to significant differences between the number of recipients simulated by the model (assuming full take up) and reported in official statistics, is conditional on receipt being reported in the input database. Furthermore, due to lack of information on assets that are necessary for the means-test, the eligibility for temporary social assistance is simulated conditional on an estimated expected probability to be eligible. Moreover, by law the central government is obliged to pay just a share of the total benefit amount. The rest (or part of it) may be paid by the local government. In EUROMOD, we assume that only the central government pays its part.

For **Portugal** full take up is assumed in the simulation of all means-tested benefits. However, given the inability of simulating all eligibility conditions for the social solidarity supplement for the elderly, the simulation of this benefit overestimates the number of recipients and aggregate amounts. Thus, the beneficiaries were calibrated to guarantee consistency with the official statistics.

For **Romania** non-take-up is simulated for the minimum guaranteed income. The calibration is based on the assumption that households headed by a person under 26 do not claim for they are students.

For **Slovenia** a non-take-up correction is simulated for social assistance only if older input data (based on SILC 2018 or SILC 2019) are used. Baseline simulations of the years 2020-2023 do not correct for non-take-up because input data based on SILC 2021 do not require such a correction.

For **Slovakia** a non-take-up correction is simulated for the material need benefits. The take-up rate is calculated as the ratio between the actual expenditure based on administrative data and the expenditure simulated by EUROMOD without correcting for non-take-up.

In **Spain** a non-take-up adjustment is simulated for the national and regional minimum income schemes, plus the 2022 and 2023 lump-sum benefit for families with low income and wealth. These benefits are overestimated in EUROMOD due to (i) the non-simulation of some eligibility conditions, because of lack of relevant information in EU-SILC such as assets, (ii) the non-take-up by potential beneficiaries, and (iii) the existence of different regional budget constraints and bureaucratic procedures across regions. The calibration aligns the simulated number of beneficiaries with the figures obtained from official statistics. In the case of the regional minimum income schemes figures are aligned by region.

Full take-up is assumed for all simulated means-tested benefits for the remaining EU countries.

Tax evasion

For **Bulgaria** tax evasion adjustments have been made because of oversimulation of taxes and social insurance contributions. The adjustment is based on a comparison between net and gross employment incomes. Under this approach, it is assumed that an individual is involved in the shadow economy if her (positive) net and gross employment incomes are equal. Such an individual is assumed to be a full tax evader and hence, no income tax and social insurance contributions are simulated for her. Furthermore, for the simulation of the income test for child and social assistance benefits, the earnings of a tax evader are not taken into account because it is assumed that they will not be reported and thus, will not be part of the income test. No correction for individuals with self-employment income has been done. These adjustments lead to more accurate simulations of the tax and benefit instruments.

For **Greece** tax evasion adjustments have been made on the basis of external estimates for the extent of average income underreporting by income source (earnings, self-employment income from farming and non-farm business). Assuming that net incomes reported in SILC reflect true incomes, two sets of gross incomes have been derived – one under the assumption of full compliance and the other assuming that everyone has underreported a given income source to the tax authority by the same proportion. A user can choose which assumption is utilised for calculating disposable incomes, and the model automatically draws on the relevant set of gross incomes. Adjustments for tax evasion are used by default for the baseline scenarios.

For **Italy** self-employment income has been calibrated in order to take into account tax evasion behaviour. Since we implement our own net-to-gross procedure (starting from net incomes reported in SILC data), we split the recorded self-employment income into two components: the first component declared to the tax authorities (and hence grossed up) and the second component not declared (but still included in the definition of disposable income). The coefficient used to separate the two components allows us to get a total aggregate gross self-employment income corresponding to the aggregate amount of reported self-employment income as reported in the official statistics.

For **Romania** all self-employed in agriculture living in rural areas and with a self-employment income below the average wage are assumed to evade taxes (social insurance, health insurance, income tax).

Full compliance is assumed for both income taxes and social insurance contributions for the rest of the countries.

Full year adjustments

For **Bulgaria**, in 2020 the increase to the minimum UB and the increase to the Covid-19 pension supplement are simulated via the FYA. In 2021 the increase to the monthly amount for the contributory maternity benefit for bringing up a child up to age of 2 as well as the increase to the Covid-19 pension supplement are modelled via the FYA. In 2022, the increase of the upper threshold applied on earnings in the calculation of employee and self-employed SIC, and the increase of the minimum wage, and the increase of the minimum and maximum amount paid for the unemployment insurance benefit, as well as the increase to the amounts in the calculation of the means-tested child benefit are simulated via the FYA.

For **Cyprus** for employees' and employers' contribution to the General Health System in 2020.

For **Czechia** in **2021** for the change in the amount of the Child Allowance. The full year adjustment is programmed, but the extension is turned off in the baseline. A user can turn it on if necessary.

For **Estonia** in **2020** for unemployment insurance benefits. In **2021** and **2022**, for pension contribution payments (2nd pillar).

For **Finland** since 2020, several benefits amounts are increased in August. The full year adjustments calculate the monthly average taking into account the increase of the benefits amounts in August.

For **France** in **2022** several benefit amounts and pensions increased in July, as well as the SMIC in August, as response to rising consumer price inflation.

For **Hungary** during the COVID period, and only for 4 months, additional social insurance contributions for employees, self-employed and employers.

For **Greece** in **2022** for employees' and employers' social insurance contribution for supplementary pensions. In **2020** for employees' and employers' social insurance contribution for unemployment.

For **Italy** in **2020** for a reform of the bonus "IRPEF". In **2021** for the introduction of the Children Universal Allowance. In the baseline, both in 2020 and 2021, the full year adjustment extension is set to on. In 2023 for a reform of Reddito di Cittadinanza (some form of basic universal income).

For **Lithuania** in **2020** to take into account the increase in the social assistance benefit, and in **2021** to simulate the single person benefit.

In **Latvia** in **2022 and 2023**, full year adjustments are used for the amounts of the state social security benefit, the non-taxable minimum income for pensioners, the GMI level and the income thresholds which determine the households' eligibility for the GMI benefit and the coefficients used to calculate the amount of the housing benefit.

In **Portugal**, full-year adjustments are used to account for changes in pension updates that became effective in July **2023**, and to child benefit amounts that have been implemented in July since **2017**.For **Slovakia** in **2022** for several changes introduced within the year with regards the Tax Credit on Dependent Children.

For **Spain** in **2020** for the simulation of the new nation-wide minimum income scheme.

No full-year adjustments are applied for the remaining EU countries.

Annex 4. Additional tables

Table A4.1 EUROMOD poverty and inequality statistics: 2020-2023

		Poverty risk			Poverty risk (60%)			
Country	**Policy year**	**50%**	**60%**	**70%**	**age<18**	**age>=65**	**Poverty threshold EUR/year**	**Gini coefficient**
AT	2020	5.2	13.0	20.7	15.2	13.7	16,548	0.237
AT	2021	4.9	13.1	21.1	15.5	13.1	16,721	0.238
AT	2022	4.0	12.4	19.9	15.5	11.8	18,083	0.229
AT	2023	5.1	13.4	21.2	16.8	12.7	18,975	0.236
BE	2020	5.1	9.9	19.3	11.1	12.7	15,120	0.216
BE	2021	5.3	10.0	19.5	11.3	12.7	15,465	0.218
BE	2022	5.1	10.0	20.1	11.0	13.8	16,445	0.218
BE	2023	5.4	11.1	20.9	10.8	19.7	17,754	0.222
BG	2020	15.1	23.6	30.9	26.4	36.5	3,115	0.400
BG	2021	15.4	23.5	31.1	25.0	37.3	3,535	0.398
BG	2022	16.4	24.0	31.4	24.1	41.9	4,050	0.404
BG	2023	16.4	24.4	31.7	23.6	44.8	4,484	0.405
CY	2020	5.7	13.8	22.5	13.9	23.2	9,967	0.292
CY	2021	5.9	14.6	22.4	14.2	27.4	10,294	0.293
CY	2022	6.2	15.2	22.9	14.2	29.5	10,647	0.293
CY	2023	6.3	15.3	22.9	14.1	30.9	11,213	0.294
CZ	2020	4.0	8.0	15.4	9.9	10.2	6,260	0.238
CZ	2021	4.7	9.7	17.7	11.6	13.4	7,123	0.247
CZ	2022	4.1	8.1	15.4	10.1	9.7	8,037	0.236
CZ	2023	3.9	7.9	15.3	10.8	7.9	8,954	0.236
DE	2020	9.6	16.5	25.0	16.7	19.6	14,615	0.296
DE	2021	9.7	16.8	25.1	15.6	21.4	15,095	0.297
DE	2022	9.5	16.7	25.2	16.2	20.2	15,988	0.295
DE	2023	8.9	16.0	24.4	13.9	21.6	16,716	0.295
DK	2020	7.3	13.2	23.0	9.1	11.4	21,228	0.256
DK	2021	6.5	12.8	22.9	8.2	12.4	21,740	0.257
DK	2022	6.7	12.9	23.0	8.3	12.7	22,211	0.257
DK	2023	7.0	13.7	23.6	8.5	15.5	22,979	0.261
EE	2020	10.2	19.0	26.9	13.3	38.9	7,472	0.306
EE	2021	12.0	20.3	28.0	14.0	43.3	7,998	0.314
EE	2022	11.7	20.1	28.0	14.1	42.8	8,557	0.315
EE	2023	10.7	19.0	26.9	12.1	40.8	9,686	0.307
EL	2020	11.8	18.2	25.4	20.5	14.1	5,466	0.310
EL	2021	11.8	18.0	25.2	20.6	12.9	5,450	0.312
EL	2022	10.0	16.8	23.9	18.5	14.9	5,792	0.309
EL	2023	10.8	17.3	25.0	19.2	16.2	6,115	0.314
ES	2020	15.0	21.5	28.4	28.5	16.5	9,365	0.324
ES	2021	14.8	21.6	28.1	27.8	18.8	9,682	0.318
ES	2022	14.5	21.1	27.9	27.4	17.0	10,016	0.318
ES	2023	14.5	20.9	27.9	27.7	15.4	10,581	0.316

		Poverty risk			Poverty risk (60%)			
Country	Policy year	50%	60%	70%	age<18	age>=65	Poverty threshold EUR/year	Gini coefficient
FI	2020	4.4	11.4	20.4	11.1	10.0	15,020	0.248
FI	2021	4.7	11.9	21.2	11.3	10.8	15,349	0.254
FI	2022	4.8	12.1	21.5	11.6	11.6	15,807	0.256
FI	2023	4.3	11.3	20.4	10.9	9.8	16,580	0.252
FR	2020	6.2	11.3	19.7	16.8	5.7	12,979	0.278
FR	2021	6.9	12.4	20.6	18.7	6.8	13,349	0.283
FR	2022	7.0	12.3	20.8	18.6	6.8	13,871	0.284
FR	2023	7.4	12.8	21.7	18.1	8.5	14,209	0.290
HR	2020	13.7	20.2	27.5	18.3	33.9	5,005	0.291
HR	2021	14.3	20.6	27.9	18.0	36.4	5,458	0.300
HR	2022	14.0	20.5	27.5	17.6	36.7	5,825	0.298
HR	2023	13.5	20.3	27.1	18.7	34.1	6,276	0.295
HU	2020	11.2	15.9	23.1	21.6	10.6	3,592	0.280
HU	2021	10.7	15.9	22.7	22.1	10.2	3,988	0.281
HU	2022	10.9	15.7	22.2	22.3	7.2	4,392	0.277
HU	2023	11.1	16.0	22.4	24.6	6.2	5,130	0.282
IE	2020	7.8	16.4	26.1	18.3	22.0	15,214	0.286
IE	2021	10.4	19.3	27.2	21.8	22.4	16,651	0.295
IE	2022	10.5	19.2	27.6	21.7	22.9	17,307	0.297
IE	2023	10.5	19.4	27.7	22.0	22.9	18,171	0.297
IT	2020	13.4	20.3	27.3	25.5	16.6	10,514	0.326
IT	2021	13.4	20.1	27.0	24.6	16.8	10,644	0.325
IT	2022	12.3	20.1	27.1	24.8	17.3	10,832	0.307
IT	2023	12.8	20.2	26.9	24.1	16.9	11,157	0.310
LT	2020	9.6	16.8	24.8	13.3	30.4	5,511	0.321
LT	2021	10.5	18.6	25.6	16.6	31.9	5,904	0.330
LT	2022	10.4	17.6	25.4	16.4	29.8	6,635	0.326
LT	2023	10.2	17.3	24.9	16.6	28.4	7,443	0.323
LU	2020	6.5	13.1	23.4	15.1	19.2	24,902	0.260
LU	2021	8.2	14.8	23.7	18.5	20.2	25,897	0.266
LU	2022	7.4	14.3	23.1	18.1	19.2	27,216	0.261
LU	2023	7.5	14.5	23.2	18.1	19.3	29,169	0.263
LV	2020	15.2	22.9	29.9	16.9	42.4	5,361	0.350
LV	2021	14.9	22.2	29.3	14.1	43.1	6,077	0.343
LV	2022	14.0	21.4	29.1	13.7	40.7	6,670	0.335
LV	2023	14.1	21.4	29.1	15.6	38.5	7,213	0.340
MT	2020	8.1	16.2	23.9	15.0	30.1	10,264	0.304
MT	2021	8.5	16.8	24.4	15.7	31.3	10,641	0.307
MT	2022	7.9	15.9	24.0	15.0	29.6	10,972	0.305
MT	2023	6.9	15.4	23.8	14.5	29.3	11,355	0.304
NL	2020	6.8	13.0	22.3	13.3	10.0	17,140	0.253
NL	2021	6.7	13.0	22.2	13.0	10.4	17,582	0.251
NL	2022	6.7	13.0	22.1	13.1	10.9	18,034	0.252

		Poverty risk			Poverty risk (60%)			
Country	**Policy year**	**50%**	**60%**	**70%**	**age<18**	**age>=65**	**Poverty threshold EUR/year**	**Gini coefficient**
NL	2023	5.8	11.8	20.8	11.5	10.2	19,376	0.242
PL	2020	8.1	14.3	21.9	11.1	20.6	4,939	0.262
PL	2021	7.9	14.1	21.7	11.5	19.2	5,088	0.261
PL	2022	8.1	14.6	21.9	12.0	20.6	5,665	0.260
PL	2023	8.8	15.1	22.6	12.9	21.0	6,557	0.266
PT	2020	11.3	18.3	25.5	18.2	22.2	6,873	0.319
PT	2021	9.8	16.8	24.3	17.3	21.6	6,931	0.308
PT	2022	11.5	18.4	25.3	17.8	23.8	7,498	0.317
PT	2023	10.7	18.6	25.1	16.0	27.0	8,064	0.309
RO	2020	17.8	23.0	31.2	30.3	22.3	2,927	0.334
RO	2021	16.8	22.2	30.9	29.3	20.5	3,141	0.328
RO	2022	13.2	19.8	27.0	26.3	16.6	3,565	0.310
RO	2023	15.0	21.1	29.4	28.0	18.3	4,077	0.317
SE	2020	7.9	14.2	23.5	16.6	8.3	15,200	0.253
SE	2021	8.6	15.0	24.4	17.8	9.7	16,435	0.256
SE	2022	8.4	14.1	23.7	17.5	9.1	16,022	0.253
SE	2023	8.3	13.8	22.8	17.6	7.3	15,139	0.252
SI	2020	5.7	11.9	19.9	11.0	14.2	8,776	0.231
SI	2021	6.4	12.8	20.3	11.6	16.8	9,332	0.237
SI	2022	6.3	12.6	20.2	11.8	15.5	9,889	0.236
SI	2023	6.6	12.7	20.5	11.1	16.4	10,510	0.236
SK	2020	7.1	11.2	18.0	16.7	7.9	5,446	0.209
SK	2021	7.1	11.9	18.7	17.0	9.4	5,769	0.211
SK	2022	7.0	11.8	18.8	16.4	10.6	6,134	0.211
SK	2023	6.5	10.9	17.6	14.3	8.5	7,230	0.198

Source: EUROMOD version I6.0+

Table A4.2 Effects of tax-benefit components on poverty risk (60%): 2020-2023

Country	**Policy year**	**Disposable Income (DPI)**	**DPI less means-tested**	**DPI less non means-tested**	**DPI plus direct taxes**	**DPI plus SIC**	**Market income**	**Market income plus pensions**
AT	2020	12.98	16.79	21.76	13.43	9.83	37.44	19.39
AT	2021	13.12	17.16	21.19	14.01	9.76	37.20	19.06
AT	2022	12.41	16.86	21.71	13.36	9.30	38.14	20.06
AT	2023	13.44	17.94	21.27	14.23	9.87	37.61	19.62
BE	2020	9.92	15.78	15.90	9.93	8.83	37.25	15.75
BE	2021	10.03	15.80	15.85	9.97	8.92	37.08	15.42
BE	2022	9.99	15.87	15.93	9.73	8.94	36.88	15.12
BE	2023	11.07	16.84	16.99	10.99	10.09	36.82	16.43
BG	2020	23.55	26.41	26.69	21.17	19.83	35.83	22.75
BG	2021	23.52	26.72	26.72	21.82	20.06	36.81	23.77
BG	2022	23.99	27.02	27.04	22.24	20.57	36.12	24.46
BG	2023	24.44	27.64	27.36	22.64	20.62	35.65	25.07

Country	Policy year	Disposable Income (DPI)	DPI less means-tested	DPI less non means-tested	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
CY	2020	13.84	19.58	16.88	13.40	8.99	31.15	17.71
CY	2021	14.59	19.30	17.44	14.28	10.70	31.06	17.46
CY	2022	15.17	19.91	17.93	14.86	11.84	30.86	17.91
CY	2023	15.33	19.95	17.94	15.01	12.24	30.57	18.02
CZ	2020	8.01	9.67	12.13	7.58	6.42	30.48	10.30
CZ	2021	9.66	11.63	13.47	9.50	7.42	31.16	11.48
CZ	2022	8.12	11.11	11.57	7.96	6.35	31.75	10.83
CZ	2023	7.91	10.63	11.50	7.63	6.04	31.64	10.39
DE	2020	16.50	19.38	22.93	15.32	11.85	34.62	17.18
DE	2021	16.83	19.65	23.54	15.51	12.09	34.65	17.48
DE	2022	16.67	19.46	24.03	15.34	11.99	34.89	17.77
DE	2023	15.99	19.81	22.72	14.87	11.79	34.74	17.70
DK	2020	13.17	20.88	20.11	5.39	12.78	27.36	13.01
DK	2021	12.76	21.28	19.85	4.79	12.45	27.19	12.92
DK	2022	12.93	21.86	19.78	4.81	12.60	27.22	12.82
DK	2023	13.67	22.11	20.22	5.06	13.33	27.23	12.97
EE	2020	19.04	19.46	29.75	17.83	18.53	36.23	26.17
EE	2021	20.25	20.53	30.48	18.98	19.55	35.56	26.68
EE	2022	20.13	20.44	30.51	18.57	19.59	35.16	26.08
EE	2023	19.01	19.37	30.59	18.12	18.56	35.85	26.50
EL	2020	18.18	22.46	21.76	16.23	13.81	42.53	18.70
EL	2021	18.00	22.43	20.98	16.15	13.88	42.09	18.47
EL	2022	16.76	21.70	18.13	14.94	12.84	39.31	16.70
EL	2023	17.33	21.34	18.76	15.47	13.36	39.25	16.40
ES	2020	21.51	25.18	26.71	20.17	18.45	42.67	26.11
ES	2021	21.57	25.02	26.95	20.32	18.58	42.31	25.83
ES	2022	21.11	25.14	26.54	19.44	18.14	42.14	25.79
ES	2023	20.87	25.01	26.28	19.35	17.86	42.38	25.78
FI	2020	11.45	17.85	18.42	7.71	10.06	37.50	16.44
FI	2021	11.87	18.01	18.55	8.15	10.44	37.19	16.48
FI	2022	12.12	18.16	18.59	8.47	10.78	37.12	16.55
FI	2023	11.30	17.74	18.03	7.91	10.01	37.17	16.36
FR	2020	11.32	21.72	17.99	9.13	9.77	40.88	19.94
FR	2021	12.37	21.67	18.44	9.59	10.26	40.58	19.81
FR	2022	12.31	21.68	18.25	9.52	10.31	40.33	19.72
FR	2023	12.81	21.77	18.36	10.05	10.91	39.90	19.47
HR	2020	20.23	21.91	22.43	20.09	17.17	34.87	20.36
HR	2021	20.62	22.30	22.76	20.54	17.77	34.22	20.59
HR	2022	20.54	22.03	22.86	20.43	17.75	34.07	20.69
HR	2023	20.28	21.57	22.34	20.23	17.24	34.38	20.05
HU	2020	15.89	16.60	18.30	11.41	10.77	28.60	10.04
HU	2021	15.88	16.51	17.96	11.57	10.76	28.67	10.09
HU	2022	15.68	16.24	17.79	12.49	10.71	30.79	10.85
HU	2023	16.03	16.69	18.10	11.88	10.38	29.55	9.89

Country	Policy year	Disposable Income (DPI)	DPI less means-tested	DPI less non means-tested	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
IE	2020	16.43	25.08	24.29	15.03	16.04	36.03	27.94
IE	2021	19.25	25.98	25.88	17.52	18.38	37.34	28.24
IE	2022	19.25	26.06	26.01	17.61	18.43	37.13	28.21
IE	2023	19.38	26.25	25.83	17.79	18.53	37.13	28.24
IT	2020	20.26	23.15	26.72	18.08	17.81	42.51	22.86
IT	2021	20.09	23.26	26.32	18.08	17.70	42.59	23.01
IT	2022	20.14	25.03	23.15	18.03	17.87	41.48	22.16
IT	2023	20.18	24.50	22.97	17.74	18.51	41.60	22.04
LT	2020	16.84	19.27	24.89	15.13	13.19	31.15	18.69
LT	2021	18.63	20.51	25.49	16.22	14.64	30.79	18.81
LT	2022	17.56	19.47	24.91	16.17	14.36	30.54	18.45
LT	2023	17.31	19.00	24.75	15.87	13.82	30.55	18.16
LU	2020	13.14	17.24	21.86	13.20	9.51	31.15	18.00
LU	2021	14.82	17.06	22.08	14.38	10.77	30.20	17.23
LU	2022	14.25	16.59	21.21	14.32	10.70	30.67	17.70
LU	2023	14.48	17.01	21.52	14.94	10.70	30.88	17.96
LV	2020	22.91	22.91	28.45	20.42	20.12	33.71	23.13
LV	2021	22.18	22.25	29.81	20.14	19.93	34.18	24.67
LV	2022	21.43	21.76	28.90	20.01	19.27	34.26	24.25
LV	2023	21.35	21.44	27.70	20.10	19.09	33.87	23.23
MT	2020	16.19	19.47	18.93	15.26	13.60	29.17	17.58
MT	2021	16.79	19.85	19.33	15.71	14.04	28.90	17.70
MT	2022	15.90	19.38	19.41	14.89	13.43	28.82	17.64
MT	2023	15.43	19.41	18.51	14.15	12.87	28.47	17.18
NL	2020	12.99	20.05	18.56	11.60	6.43	25.38	16.00
NL	2021	12.98	20.03	18.53	11.60	6.52	25.60	16.09
NL	2022	13.05	19.98	18.33	11.50	6.87	25.68	16.24
NL	2023	11.84	20.41	17.45	10.19	5.90	26.32	16.52
PL	2020	14.32	16.32	22.45	9.42	11.17	33.12	14.90
PL	2021	14.07	16.04	23.53	9.27	11.01	33.05	15.52
PL	2022	14.55	16.19	23.11	11.96	11.74	34.00	17.82
PL	2023	15.06	16.88	23.71	12.21	12.03	33.23	17.78
PT	2020	18.30	19.89	20.32	17.13	16.24	37.33	18.55
PT	2021	16.83	18.86	18.87	16.02	14.51	36.20	17.02
PT	2022	18.38	20.26	20.35	17.22	16.45	37.22	18.75
PT	2023	18.62	20.62	21.86	17.79	16.73	37.47	20.11
RO	2020	23.00	23.97	25.80	21.15	17.94	35.56	20.36
RO	2021	22.22	23.26	26.19	20.54	17.29	35.98	20.21
RO	2022	19.78	22.95	24.45	18.27	15.80	35.44	20.09
RO	2023	21.07	23.99	25.47	19.43	16.98	36.21	21.00
SE	2020	14.15	17.50	24.34	9.47	12.49	34.32	17.12
SE	2021	14.99	17.89	24.64	9.99	13.26	34.41	17.32
SE	2022	14.12	17.64	23.76	10.13	12.43	34.49	17.36
SE	2023	13.82	17.91	23.37	10.12	12.13	34.57	17.71

Country	Policy year	Disposable Income (DPI)	DPI less means-tested	DPI less non means-tested	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
SI	2020	11.88	15.78	18.09	10.93	7.36	30.17	13.21
SI	2021	12.81	15.98	18.29	11.68	8.12	29.39	12.88
SI	2022	12.61	16.15	18.06	11.67	8.03	29.83	13.11
SI	2023	12.67	16.30	18.18	11.83	8.27	29.97	13.44
SK	2020	11.18	12.05	16.49	10.66	6.83	28.38	10.78
SK	2021	11.88	12.43	16.74	11.33	7.15	28.06	10.86
SK	2022	11.84	12.66	16.76	11.11	7.37	27.48	11.37
SK	2023	10.91	12.71	16.10	10.45	6.94	29.09	11.45

Source: EUROMOD version I6.0+

Table A4.3. Effects of tax-benefit components on Gini coefficient: 2019-2022

	Policy year	Disposable Income (DPI) 50%	DPI less means-tested	DPI less non means-tested	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
AT	2020	0.24	0.27	0.27	0.30	0.25	0.50	0.36
AT	2021	0.24	0.27	0.27	0.30	0.25	0.50	0.36
AT	2022	0.23	0.26	0.26	0.29	0.25	0.50	0.36
AT	2023	0.24	0.27	0.27	0.29	0.25	0.50	0.36
BE	2020	0.22	0.24	0.24	0.29	0.24	0.50	0.35
BE	2021	0.22	0.24	0.25	0.29	0.25	0.50	0.35
BE	2022	0.22	0.24	0.25	0.29	0.25	0.50	0.35
BE	2023	0.22	0.24	0.25	0.30	0.25	0.50	0.35
BG	2020	0.40	0.42	0.41	0.41	0.40	0.53	0.43
BG	2021	0.40	0.42	0.41	0.41	0.40	0.53	0.43
BG	2022	0.40	0.42	0.42	0.41	0.40	0.53	0.44
BG	2023	0.40	0.43	0.42	0.41	0.40	0.53	0.44
CY	2020	0.29	0.32	0.30	0.32	0.29	0.44	0.35
CY	2021	0.29	0.32	0.30	0.33	0.29	0.44	0.35
CY	2022	0.29	0.32	0.30	0.33	0.30	0.44	0.35
CY	2023	0.29	0.32	0.30	0.33	0.30	0.44	0.36
CZ	2020	0.24	0.25	0.25	0.27	0.26	0.45	0.31
CZ	2021	0.25	0.26	0.26	0.27	0.26	0.45	0.31
CZ	2022	0.24	0.25	0.25	0.26	0.25	0.45	0.30
CZ	2023	0.24	0.25	0.25	0.26	0.25	0.45	0.30
DE	2020	0.30	0.32	0.32	0.36	0.30	0.52	0.40
DE	2021	0.30	0.32	0.32	0.36	0.30	0.52	0.40
DE	2022	0.29	0.32	0.32	0.36	0.30	0.52	0.40
DE	2023	0.29	0.33	0.32	0.36	0.30	0.52	0.40
DK	2020	0.26	0.29	0.30	0.31	0.26	0.44	0.36
DK	2021	0.26	0.30	0.30	0.31	0.26	0.44	0.36
DK	2022	0.26	0.30	0.30	0.31	0.26	0.44	0.36
DK	2023	0.26	0.30	0.30	0.31	0.26	0.45	0.37

	Policy year	Disposable Income (DPI) 50%	DPI less means-tested	DPI less non means-tested	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
EE	2020	0.31	0.31	0.35	0.34	0.31	0.48	0.38
EE	2021	0.31	0.32	0.36	0.35	0.32	0.48	0.39
EE	2022	0.32	0.32	0.36	0.35	0.32	0.48	0.39
EE	2023	0.31	0.31	0.35	0.34	0.31	0.48	0.39
EL	2020	0.31	0.34	0.32	0.34	0.31	0.54	0.38
EL	2021	0.31	0.34	0.32	0.34	0.31	0.54	0.38
EL	2022	0.31	0.34	0.32	0.34	0.31	0.53	0.37
EL	2023	0.31	0.34	0.32	0.35	0.32	0.53	0.37
ES	2020	0.32	0.35	0.35	0.37	0.32	0.52	0.41
ES	2021	0.32	0.35	0.34	0.37	0.31	0.52	0.41
ES	2022	0.32	0.35	0.34	0.36	0.31	0.52	0.41
ES	2023	0.32	0.35	0.34	0.36	0.31	0.52	0.41
FI	2020	0.25	0.29	0.28	0.30	0.26	0.51	0.36
FI	2021	0.25	0.29	0.28	0.30	0.27	0.51	0.37
FI	2022	0.26	0.30	0.28	0.30	0.27	0.51	0.37
FI	2023	0.25	0.29	0.28	0.30	0.27	0.51	0.37
FR	2020	0.28	0.33	0.30	0.32	0.29	0.53	0.39
FR	2021	0.28	0.34	0.31	0.32	0.29	0.53	0.39
FR	2022	0.28	0.34	0.31	0.32	0.30	0.53	0.39
FR	2023	0.29	0.34	0.31	0.33	0.30	0.53	0.40
HR	2020	0.29	0.30	0.30	0.32	0.31	0.47	0.35
HR	2021	0.30	0.31	0.31	0.32	0.32	0.47	0.35
HR	2022	0.30	0.31	0.31	0.32	0.32	0.47	0.35
HR	2023	0.30	0.30	0.30	0.32	0.31	0.47	0.35
HU	2020	0.28	0.28	0.30	0.29	0.29	0.45	0.31
HU	2021	0.28	0.28	0.30	0.29	0.29	0.45	0.31
HU	2022	0.28	0.28	0.29	0.28	0.28	0.44	0.30
HU	2023	0.28	0.28	0.30	0.29	0.28	0.45	0.30
IE	2020	0.29	0.35	0.31	0.36	0.30	0.51	0.44
IE	2021	0.30	0.35	0.32	0.36	0.31	0.51	0.44
IE	2022	0.30	0.35	0.32	0.36	0.31	0.51	0.44
IE	2023	0.30	0.35	0.32	0.36	0.31	0.51	0.44
IT	2020	0.33	0.35	0.34	0.38	0.33	0.53	0.41
IT	2021	0.32	0.35	0.34	0.38	0.33	0.53	0.41
IT	2022	0.31	0.34	0.31	0.36	0.32	0.52	0.40
IT	2023	0.31	0.34	0.32	0.36	0.32	0.52	0.40
LT	2020	0.32	0.33	0.35	0.36	0.35	0.50	0.40
LT	2021	0.33	0.34	0.35	0.36	0.35	0.50	0.40
LT	2022	0.33	0.34	0.35	0.36	0.35	0.50	0.40
LT	2023	0.32	0.33	0.35	0.36	0.35	0.50	0.40
LU	2020	0.26	0.28	0.29	0.32	0.27	0.45	0.36
LU	2021	0.27	0.28	0.29	0.33	0.27	0.45	0.36
LU	2022	0.26	0.28	0.29	0.33	0.27	0.45	0.36

	Policy year	Disposable Income (DPI) 50%	DPI less means-tested	DPI less non means-tested	DPI plus direct taxes	DPI plus SIC	Market income	Market income plus pensions
LU	2023	0.26	0.28	0.29	0.33	0.27	0.45	0.36
LV	2020	0.35	0.35	0.37	0.38	0.36	0.49	0.41
LV	2021	0.34	0.35	0.37	0.38	0.35	0.49	0.41
LV	2022	0.33	0.34	0.36	0.37	0.35	0.49	0.41
LV	2023	0.34	0.34	0.36	0.37	0.35	0.49	0.40
MT	2020	0.30	0.32	0.32	0.35	0.30	0.46	0.37
MT	2021	0.31	0.33	0.32	0.35	0.30	0.46	0.37
MT	2022	0.30	0.32	0.32	0.35	0.30	0.46	0.37
MT	2023	0.30	0.33	0.31	0.35	0.30	0.46	0.37
NL	2020	0.25	0.30	0.28	0.31	0.25	0.41	0.36
NL	2021	0.25	0.30	0.28	0.31	0.25	0.41	0.36
NL	2022	0.25	0.30	0.28	0.31	0.25	0.41	0.36
NL	2023	0.24	0.30	0.27	0.30	0.24	0.41	0.36
PL	2020	0.26	0.27	0.29	0.27	0.27	0.45	0.32
PL	2021	0.26	0.27	0.29	0.27	0.27	0.45	0.32
PL	2022	0.26	0.27	0.29	0.28	0.27	0.45	0.33
PL	2023	0.27	0.27	0.30	0.29	0.28	0.45	0.33
PT	2020	0.32	0.34	0.33	0.38	0.33	0.53	0.40
PT	2021	0.31	0.32	0.32	0.37	0.32	0.52	0.39
PT	2022	0.32	0.33	0.33	0.38	0.33	0.53	0.41
PT	2023	0.31	0.33	0.32	0.37	0.32	0.53	0.41
RO	2020	0.33	0.34	0.35	0.34	0.38	0.52	0.40
RO	2021	0.33	0.34	0.34	0.34	0.37	0.52	0.39
RO	2022	0.31	0.33	0.33	0.32	0.36	0.51	0.39
RO	2023	0.32	0.34	0.33	0.33	0.37	0.52	0.40
SE	2020	0.25	0.28	0.31	0.30	0.26	0.48	0.36
SE	2021	0.26	0.28	0.31	0.30	0.26	0.48	0.36
SE	2022	0.25	0.28	0.31	0.30	0.26	0.48	0.36
SE	2023	0.25	0.28	0.30	0.30	0.26	0.48	0.36
SI	2020	0.23	0.25	0.26	0.26	0.25	0.44	0.31
SI	2021	0.24	0.26	0.26	0.27	0.26	0.44	0.32
SI	2022	0.24	0.26	0.26	0.27	0.26	0.44	0.31
SI	2023	0.24	0.26	0.26	0.27	0.26	0.44	0.32
SK	2020	0.21	0.21	0.23	0.23	0.22	0.39	0.26
SK	2021	0.21	0.22	0.23	0.23	0.22	0.39	0.26
SK	2022	0.21	0.22	0.23	0.23	0.22	0.39	0.26
SK	2023	0.20	0.21	0.22	0.22	0.21	0.39	0.26

Source: EUROMOD version I6.0+

Table A4.4. Mean and median Marginal effective Tax Rates (METR) 2020-2023

Country	Concept	2020	2021	2022	2023
AT	mean	41.3	41.9	41.9	41.1
AT	median	43.3	43.3	45.4	43.7

Country	Concept	2020	2021	2022	2023
BE	mean	57.2	57.1	58.5	58.7
BE	median	58.4	58.5	59.0	58.9
BG	mean	21.7	21.3	21.3	22.1
BG	median	22.4	22.4	22.4	22.4
CY	mean	23.0	23.2	23.2	23.7
CY	median	13.0	13.6	16.2	19.6
CZ	mean	29.4	25.0	25.3	25.6
CZ	median	31.1	26.0	26.0	26.0
DE	mean	46.2	44.9	44.8	45.0
DE	median	44.6	44.3	44.3	44.1
DK	mean	44.6	45.9	45.9	45.9
DK	median	42.9	42.9	42.9	42.9
EE	mean	25.6	25.8	26.1	26.9
EE	median	22.9	22.9	22.9	22.9
EL	mean	27.7	26.3	29.2	29.8
EL	median	24.2	23.6	30.7	32.9
ES	mean	27.8	28.6	29.2	30.4
ES	median	30.0	30.9	31.5	34.1
FI	mean	45.5	45.2	44.9	45.7
FI	median	46.6	46.9	46.8	48.1
FR	mean	38.6	38.5	38.6	37.9
FR	median	34.1	34.1	34.4	34.1
HR	mean	25.3	24.5	25.4	25.7
HR	median	20.0	25.5	27.9	29.0
HU	mean	32.4	32.5	28.2	31.4
HU	median	33.5	33.5	33.5	33.5
IE	mean	39.0	39.0	39.2	39.1
IE	median	48.5	48.5	48.5	48.5
IT	mean	39.1	38.8	40.6	39.2
IT	median	40.7	39.7	41.1	41.4
LT	mean	40.9	40.8	41.8	42.3
LT	median	45.2	45.5	45.9	46.1
LU	mean	45.5	45.6	47.5	46.6
LU	median	48.6	48.9	49.5	49.3
LV	mean	30.2	29.8	31.9	30.9
LV	median	31.8	32.5	34.5	31.4
MT	mean	28.7	28.5	29.2	29.6
MT	median	25.0	25.0	25.0	26.5
NL	mean	39.5	39.0	38.9	39.4
NL	median	49.0	49.1	48.9	49.5
PL	mean	26.7	26.7	25.5	26.2
PL	median	29.5	29.5	31.8	31.8
PT	mean	35.0	33.6	35.9	35.0
PT	median	35.7	34.0	37.5	37.5
RO	mean	37.4	37.4	36.5	36.7

Country	Concept	2020	2021	2022	2023
RO	median	41.5	41.5	41.5	41.5
SE	mean	36.0	36.1	36.2	34.7
SE	median	32.5	32.5	32.5	32.5
SI	mean	38.4	38.3	37.2	37.8
SI	median	39.3	39.4	38.9	39.4
SK	mean	32.3	33.1	32.8	32.5
SK	median	29.9	29.9	29.9	29.9

Source: EUROMOD version I6.0+

Table A4.5. Mean and median Net Replacement rates (NRR) 2020-2023

Country	Concept	2020	2021	2022	2023
AT	mean	78.0	76.6	78.0	76.9
AT	median	81.1	79.5	81.1	79.7
BE	mean	81.3	80.9	81.3	80.4
BE	median	83.5	83.1	83.5	82.4
BG	mean	77.2	76.8	76.7	77.4
BG	median	82.3	81.9	81.7	81.9
CY	mean	70.8	70.5	70.0	69.5
CY	median	72.4	72.1	71.8	71.5
CZ	mean	65.5	65.0	65.5	65.8
CZ	median	67.5	66.4	67.2	67.3
DE	mean	77.0	77.1	76.9	77.2
DE	median	80.6	80.7	80.5	80.6
DK	mean	81.3	80.7	80.1	81.7
DK	median	80.6	80.3	79.6	82.3
EE	mean	71.9	73.0	72.9	73.4
EE	median	74.4	75.5	75.4	76.0
EL	mean	71.8	69.9	69.4	70.0
EL	median	74.9	74.3	73.5	74.3
ES	mean	73.1	72.6	73.2	73.2
ES	median	74.3	73.7	74.4	74.7
FI	mean	77.9	77.7	77.6	77.9
FI	median	79.5	79.3	79.1	79.4
FR	mean	82.2	82.0	81.4	75.3
FR	median	84.2	84.0	83.7	77.2
HR	mean	70.5	69.8	70.4	71.1
HR	median	73.7	72.9	73.6	74.2
HU	mean	60.5	58.0	60.5	61.6
HU	median	62.3	61.8	61.5	61.8
IE	mean	71.2	80.1	71.2	70.8
IE	median	73.1	83.7	74.5	74.1
IT	mean	69.7	69.6	67.4	67.0
IT	median	74.9	74.8	72.8	72.8
LT	mean	79.4	74.7	74.9	75.4

Country	Concept	2020	2021	2022	2023
LT	median	80.9	78.0	78.1	78.4
LU	mean	84.2	83.6	85.0	84.8
LU	median	90.2	89.8	90.8	90.4
LV	mean	65.4	66.3	67.8	66.2
LV	median	67.5	68.2	69.2	68.0
MT	mean	61.5	61.1	60.3	61.7
MT	median	63.9	63.1	63.1	64.5
NL	mean	77.4	77.3	76.6	77.0
NL	median	81.1	80.9	80.9	81.1
PL	mean	64.6	67.0	57.9	64.2
PL	median	65.5	67.0	66.9	66.8
PT	mean	83.4	83.6	82.9	84.5
PT	median	88.1	88.2	87.8	88.9
RO	mean	62.3	62.2	62.6	62.7
RO	median	65.0	64.9	65.1	64.8
SE	mean	75.6	75.1	74.4	73.9
SE	median	78.2	77.3	76.8	76.0
SI	mean	76.0	74.0	73.0	72.9
SI	median	76.6	75.1	74.4	73.9
SK	mean	72.1	72.3	71.8	71.7
SK	median	73.9	73.9	73.6	74.0

Source: EUROMOD version I6.0+

Annex 5. Decomposition of the redistributive effect of the tax-benefit system

Following Kakwani (1977), the redistributive impact of the tax-benefit system can be decomposed as follows:

$$RE = \frac{\overline{\mathrm{Y_I} - Y_D}}{\overline{\mathrm{Y}_D}} * \Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_D} - R$$

where

Y_I is initial income (original + pensions in our case)

Y_D is disposable income (initial income + benefits - taxes - social insurance contributions)

$\frac{\overline{Y_I - Y_D}}{\overline{\mathrm{Y}_D}}$ is the level $\Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_D}$ is the progressivity (Kakwani index) of the tax-benefit system as a whole, which is in turn the difference between the concentration index of the aggregated tax-benefit components (sorted by initial income) minus the Gini coefficient of initial income ($\mathrm{C}_{Y_I - Y_D} - \mathrm{G}_{\mathrm{Y}_I}$)

R is a re-ranking effect, i.e. the Gini coefficient of disposable income minus the concentration index of the same variable, but sorted by initial income ($\mathrm{G}_{\mathrm{Y}_D} - \mathrm{C}_{\mathrm{Y}_D}$).

Figure 3 depicts, for each country, the values of $\Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_D}$ (x axis) and $\frac{\overline{Y_I - Y_D}}{\overline{\mathrm{Y}_D}}$ (y axis). The position in the graph in relation to the curves is determined by $\frac{\overline{Y_I - Y_D}}{\overline{\mathrm{Y}_D}} * \Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_D}$ (R is not considered for the graphical representation). This redistributive effect without re-ranking is usually referred to in the literature as Reymond-Smolensky index (see, e.g. Verbist and Figari 2014).

Following the generalisation of Onrubia et al (2014) for taxes, we propose the following formula to decompose the impact by tax-benefit component:

$$RE = \sum_{\mathrm{i}=1}^{\mathrm{m}} \frac{\overline{\mathrm{C}_\mathrm{i}}}{\overline{\mathrm{Y}_D}} * \Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_I+\mathrm{C_i}} - R$$

where

Y_I is initial income (original + pensions in our case)

Y_D is disposable income (initial income + benefits - taxes - social insurance contributions)

$\mathrm{C_i}$ is each of the m components (taxes and benefits) added/subtracted to initial income

$\frac{\overline{\mathrm{C_i}}}{\overline{\mathrm{Y}_D}}$ is the level of each component (average component over disposable income)

$\Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_I+\mathrm{C_i}}$ is the progressivity (Kakwani index) corresponding to component *i*, which is the difference between the concentration index of the component (sorted by initial income) minus the Gini coefficient of initial income ($\mathrm{C}_{\mathrm{C_i}} - \mathrm{G}_{\mathrm{Y}_B}$)

R is a re-ranking effect, i.e. the Gini coefficient of disposable income minus the concentration index of the same variable, but sorted by initial income ($\mathrm{G}_{\mathrm{Y}_D} - \mathrm{C}_{\mathrm{Y}_D}$).

Figure 4 depicts, for each country, the values of the redistributive impact ($\frac{\overline{\mathrm{C_i}}}{\overline{\mathrm{Y}_D}} * \Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_I+\mathrm{C_i}}$) of each of the following components: means-tested benefits, non-means tested benefits, taxes and social insurance contributions. Additionally, it shows the overall re-ranking effect $-R$.

Figure 5 applies the logic of Figure 3 to each of the tax-benefit components shown in Figure 4. It depicts, for each component in each country, the values of $\Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_I+\mathrm{C_i}}$ (x axis) and $\frac{\overline{\mathrm{C_i}}}{\overline{\mathrm{Y}_D}}$ (y axis). The position in the graph in relation to the curves is determined by $\frac{\overline{\mathrm{C_i}}}{\overline{\mathrm{Y}_D}} * \Pi^{\mathrm{K}}_{\mathrm{Y}_I,\mathrm{Y}_I+\mathrm{C_i}}$ (R is not considered for the graphical representation).

Table A4.5 lists the income concepts used for the abovementioned computations.

Table A4.5. Income concepts used for the decomposition of the redistributive impact

Concept	**Corresponding EUROMOD income list**
Initial income = market income + pensions (Y_I)	ils_origy + ils_pen
Means-tested benefits	ils_benmt
Non-means-tested benefits	ils_bennt
Taxes	ils_tax
Social insurance contributions paid by the individual	ils_sicdy
Disposable income (Y_D)	ils_dispy = ils_origy + ils_benmt + ils_bennt - ils_tax - ils_sicdy

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