

Leventi, Chrysa; Mazzon, Alberto; Orlandi, Fabrice

Working Paper

Indexing wages to inflation in the EU: fiscal drag and benefit erosion effects

EUROMOD Working Paper, No. EM 02/24

Provided in Cooperation with:

Institute for Social and Economic Research (ISER), University of Essex

Suggested Citation: Leventi, Chrysa; Mazzon, Alberto; Orlandi, Fabrice (2024) : Indexing wages to inflation in the EU: fiscal drag and benefit erosion effects, EUROMOD Working Paper, No. EM 02/24, University of Essex, Institute for Social and Economic Research (ISER), Colchester

This Version is available at:

<https://hdl.handle.net/10419/324447>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

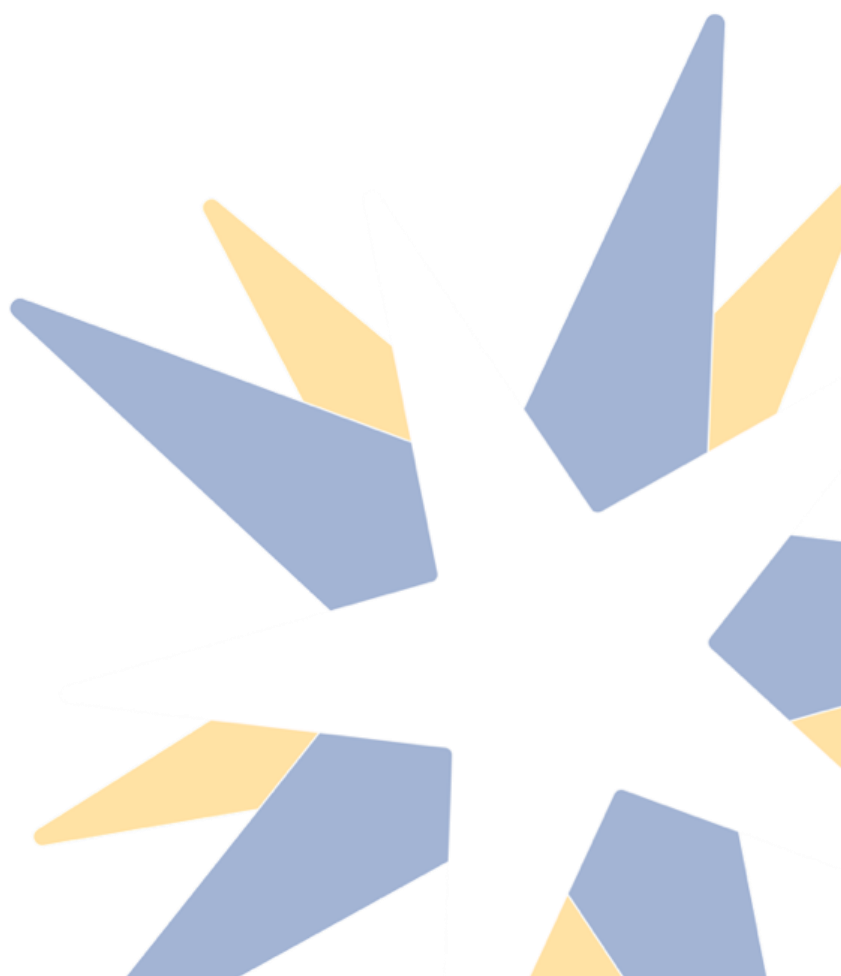
EUROMOD WORKING PAPER SERIES

EM 02/24

Indexing wages to inflation in the EU: fiscal drag and benefit erosion effects

Chrysa Leventi, Alberto Mazzon, Fabrice Orlandi

March 2024



Indexing wages to inflation in the EU: fiscal drag and benefit erosion effects¹

Chrysa Leventi ^a

Alberto Mazzon ^a

Fabrice Orlandi ^b

^a DG JRC, European Commission

^b DG ECFIN, European Commission

Abstract

In 2022 inflation hit European economies in a severe way. To protect the purchasing power of households, EU Member States adopted a series of exceptional fiscal policy measures. In this paper, we turn our focus on wage indexation schemes, a policy option that has been relatively less explored in the relevant literature. Our objective is to analyse the (first-order) fiscal and distributional impact of wage indexation and of its two main subsequent effects, fiscal drag and benefit erosion. Using EUROMOD, the tax-benefit microsimulation model for the EU, we construct three hypothetical scenarios with uniform/diversified inflation shocks and with/without compensation schemes for the income losses caused by benefit erosion. We find that the budgetary impact of wage indexation varies widely among European countries. Interestingly, we also observe that in most countries, the relative magnitude of fiscal drag and benefit erosion is not affected by the magnitude of the increase in employment income. Our estimates suggest that in almost half of the countries, fiscal drag and benefit erosion cause an implicit increase in government revenues sufficient to finance an indexation of benefits and pensions to the inflation of that year. The latter would be associated with a substantial decrease in income inequality in the vast majority of EU Member States. Finally, we discuss how the existing automatic indexation adjustments embedded in EU countries' personal income tax schedules affect the magnitude and distributional implications of fiscal drag.

JEL codes: H24, H31, I32

Keywords: wage indexation, fiscal drag, benefit erosion, microsimulation

Corresponding author/Contact:

Alberto Mazzon

Alberto.MAZZON@ec.europa.eu

¹ Having been originally maintained, developed and managed by the Institute for Social and Economic Research (ISER), since 2021 EUROMOD is maintained, developed and managed by the Joint Research Centre (JRC) of the European Commission, in collaboration with Eurostat and national teams from the EU countries. We are indebted to the many people who have contributed to the development of EUROMOD. The opinions expressed and arguments employed are those of the authors. The authors wish to acknowledge the helpful comments provided by Salvador Barrios, Francesco Figari, Sara Riscado, Frank Neher, Mattia Ricci, Antonio F. Amores, Holly Sutherland, as well as participants of the 2nd Banca d'Italia Microsimulation Modelling Workshop, the IV Workshop en Evaluación de Políticas Públicas of the University of Valencia and the 2023 EUROMOD Research Workshop.

1. Introduction

In 2022, inflation rates increased in many countries all over the world. In the European Union, the average annual rate measured by the harmonised index of consumer prices (HICP) rose from 5.6% in January 2022 to 10.4% in December of the same year. This magnitude of increase was largely unprecedented in advanced economies since the 1970s (Beer et al., 2023). The average figure hides that the surge in consumer prices hit some countries more severely than others. This is true especially for the Baltic countries, where annual HICP rate exceeded 20% in the second part of the year (Eurostat, 2023).

Inflation is relevant for understanding inequality because it can have a disproportionate impact on different groups within a society and, hence, further widen the gap between the rich and the poor (Amores, Basso et al., 2023; Jaravel, 2021). In an inflationary environment, unevenly rising prices distort the purchasing power of recipients and payers of fixed interest rates and reduce the purchasing power of consumers. To protect households (and also limit the impact of the increase in input costs for firms), EU Member States adopted an array of exceptional fiscal policy programmes. Those included price subsidies/caps, income support measures as well as indexation schemes. In 2022, the net budgetary cost of measures to mitigate the impact of high energy prices was estimated at 1.2% of GDP in the EU (EC Autumn Forecast, 2023). Until that year, this kind of policy responses to inflation were largely inexistent, and their impact still remains relatively unexplored.¹

In this paper, we attempt to analyse wage indexation as a policy option to protect the purchasing power of households. This option was heavily used in the high-inflation context of the 1970s, but was later disregarded, as it was held responsible for the subsequent stagflation of the early 1980s. However, recent research suggests that the wage indexation mechanisms currently in place in EU countries are unlikely to trigger the price-wage spirals of the past (Checherita-Westphal, 2022; Koester & Grapow, 2021). The main reasons are related to the limited share of employees covered by such mechanisms and the fact that energy prices are typically excluded from the price index to which wages are adjusted (Matsaganis & Theodoropoulou, 2022). Hence, this policy option has returned on the table as a possible way of offsetting the negative impact of inflation for households and has triggered important questions concerning its impact on public finances and economic efficiency. Our main objective is to explore the fiscal and distributional outcomes of a mechanism of indexation of employment income to inflation in all EU countries.

In the short run, implementing wage indexation policies has two well-known, and largely unintended, consequences: fiscal drag and benefit erosion. Fiscal drag refers to a situation in which earnings growth may push more taxpayers into higher tax brackets or may cause non-taxpayers to become taxpayers, and therefore it typically leads to a proportionally higher tax burden due to the progressivity of the system. In principle, this can be overcome by the use of appropriate indexation rules in the tax system of a country. In the absence of such rules, fiscal drag can alter the desired level of progressivity and redistribution of the tax system (Fuenmayor et al., 2005). Also, the lack of benefit indexation rules may lead to decreasing real values of social benefits, a situation which is known as benefit erosion.

¹ An assessment of the distributional impact of the price cap policies introduced in 2023 in Germany, the Netherlands and Austria is presented in Amores, Christl, et al. (2023).

Immervoll (2005) lists three main channels of interaction between inflation and tax revenues. First, when inflation is high, a long collection lag can reduce the real value of the tax revenue and lead to unequal treatment of taxpayers, depending on whether they pay as they earn, or self-assess their incomes once a year. Second, income taxes are assessed in nominal terms and, therefore, ignore the deterioration of the purchasing power of consumers with respect to the period for which tax liabilities are calculated. The third channel, the most relevant for this analysis, is the fiscal drag: the erosion of the real value of tax-bracket limits.

The methodology that we follow to explore the (first-order) impact of wage indexation, and its subsequent fiscal drag and benefit erosion effects, includes a counterfactual analysis. We construct three hypothetical scenarios: in the first one, we assume that employment incomes increase by 5% in all EU countries.² In the second one, we assume that employment incomes increase by the forecasted GDP-based inflation for 2022. In our third scenario we assume the same employment income increase as in scenario 2 and that, additionally, all benefit and pension recipients receive a compensation which is proportional to the forecasted increase in prices. To perform this analysis we rely on EUROMOD, the tax-benefit microsimulation model for the EU. Finally, the paper also attempts to examine the performance of the existing automatic indexation adjustments embedded in Member States' personal income tax (PIT) schedules.

We aim to contribute to the existing literature in three ways. First, by devising an indexation mechanism of wages to inflation and assessing its impact on the tax-benefit systems of all EU Member States. European and international organisations such as the OECD (OECD, 2023) and the IMF (IMF, 2023) have emphasised the significant distortions that fiscal drag and benefit erosion can introduce to economies. However, the quantification of the extent and patterns of these distortions is not possible without sound empirical investigation. There are very few examples of countries in which this topic has been thoroughly examined (Immervoll, 2005; Fuenmayor, 2005) and, to the best of our knowledge, this ex-ante policy assessment has never been done at the EU level, using a uniform methodology. This allows us to leverage the diversity of tax-benefit features and underlying wage distributions across the EU, identifying the countries that are most susceptible to fiscal drag and benefit erosion and those where the relative impact of those matters is limited. Second, we devise a mechanism that compensates for potential losses in disposable income due to fiscal drag and quantify its distributional and budgetary effects. This is done in a comparable way for all EU Member States, by indexing benefits and pensions to the country-specific forecasted CPI-based inflation for 2022. Third, we try to explore existing indexation mechanisms by isolating the parts of countries' PIT legislation related to automatic indexation and measuring their effectiveness in mitigating the impact of fiscal drag. This is done specifically for countries with tax systems that are found to be more vulnerable to this issue.

Our results show that a significant part of the simulated increase in wages is taken away due to fiscal drag and benefit erosion. As a result, the rise in disposable income generated by wage indexation is less than proportional. The simulated compensation mechanism is found to be inequality decreasing and, in almost half of the EU countries, could be financed with the extra revenues generated by fiscal drag. Finally, we demonstrate that the existing indexation

² Note that 5% broadly represents the average inflation across the EU during the recent surge in inflation in 2022.

mechanisms are able to reduce the magnitude of fiscal drag, without fully alleviating it, leaving scope for possible policy improvements.

The paper is organised as follows. Section 2 provides a brief overview of the related literature. In Section 3 we proceed by illustrating the methodology of our analysis and the data we use. In Section 4 we illustrate our results. Conclusions follow in Section 5.

2. Literature review

According to Tanzi et al. (1987), there are several interaction mechanisms between inflation and fiscal aggregates. The most intuitive is the one that acts on in primary public expenditures and tax revenues. Governments can expect an increase in tax revenues through two channels. First, a higher rate of inflation mechanically increases revenues from VAT and other indirect taxes that are proportional to prices. Second, nominal increases in employment income and firm profits translate into higher revenues from personal income tax and corporate income tax. On the other hand, public expenditure generally increases too. It happens not only through the higher price of goods and services purchased by the state, but also because compensations of public employees and pensions are typically indexed to inflation (Attinasi et al., 2016).

The macroeconomic effects of wage indexation and its correlation with inflation uncertainty have been relevant topics in economic research since the 1970s. In his analysis of the oil price shock of 1974, Fischer (1983) acknowledged the existence of a potential mechanism of translation of wage indexation into higher inflation. However, his cross-sectional analysis of forty countries led him to conclude that countries with some form of wage indexation did not experience higher inflation after the oil shock.

In the 1990s, Ball and Cecchetti (1991) devised a model of staggered wage setting to determine the effect of increasing the proportion of wages covered by indexation. According to their findings, wage indexation can lead to more inflationary monetary policies. A different result was reached by Holland (1995), who examined the link between inflation and wage indexation in the post-war USA, using information concerning cost-of-living adjustments in collective bargaining agreements. He concluded that there was no evidence that wage indexation affected inflation in the USA.

Cost-of-living adjustments in the USA have been the centre of the analysis also for Ragan and Bratsberg (2000). They acknowledged that this form of wage indexation declined since the end of the 1980s as result of the reduction in inflationary uncertainty. According to them, the long period of low inflation decreased the importance of this type of agreements. However, a return of inflationary uncertainty could induce an increase in wage indexation coverage for workers. This result was confirmed by Ascari et al. (2011).

Most of the research on wage indexation focusses on the United States. However, there is some form of automatic adjustment of wages in the private sector to prices in a group of countries in the European Union. The debate on the opportunity of adopting this kind of measures has resurfaced recently, in light of the rampant inflation experienced in many economies. For example, Matsaganis and Theodoropoulou (2022) suggested extending indexation, as a possible measure to protect real incomes. Moreover, they stress that this measure would be less distortive than other measures enforced by European countries to counteract the negative effects of inflation (such as price caps and price subsidies).

In the 1970s, general wage indexation was a powerful force in the price-wage loop. Since then, private sector wages are no longer automatically indexed in the vast majority of EU countries, with the exception of the minimum wage. However, hikes in the latter increase the probability and the extent of revaluations of wages across the whole spectrum of the wage distribution (Gautier et al., 2022). According to Koester & Grapow (2021), four indexation regimes can be identified across euro area (EA) countries: (a) an automatic indexation regime. This regime only applies to around 3% of private sector employees in the EA in 2021³; (b) a regime in which indexation is part of formal wage negotiations, applicable to around 18% of private sector employees in the EA; (c) a regime where indexation only applies to minimum wages, affecting around 18% of private sector workers in the EA; and (d) a regime in which there are no formal wage indexation rules. This regime applies to more than 50% of private sector employees in the EA in 2021. The authors also note that the likelihood of those schemes triggering second-order effects is very limited, as most of them use inflation measures that exclude energy.

A conceptual framework linking inflation, wage increases and fiscal drag has been laid out by Lee (2009). According to his work, fiscal drag can make tax systems less progressive. This occurs because inflation reduces the real value of the non-indexed tax brackets. Consequently, taxpayers are pushed into higher marginal rates if they maintain their real income constant (the phenomenon called bracket creep). In addition, because of inflation, the real value of cash benefits, tax-free allowances, flat-rate tax deductions, and tax credits decreases.

Microsimulation is commonly used to illustrate fiscal drag and benefit erosion dynamics under alternative scenarios. One of the first examples can be found in Immervoll (2005), who analysed the sensitivity of the tax-benefits systems of Germany, the Netherlands and UK. His results showed that the erosion of nominal tax parameters reduced the progressivity of the tax-benefit system in all countries under examination. Immervoll et al. (2006) used EUROMOD to assess the sensitivity of poverty rates to several macroeconomic changes, including the growth of gross earnings. Their results showed that, without indexation of tax thresholds, the tax burden increases while benefit incomes fall relative to market incomes. Sutherland et al. (2008) analysed the consequence of extending for 20 years the existing indexation policies for tax-benefit parameters in the UK. According to their results, doing this would have increased significantly child poverty while reducing the poverty rate of the elderly. Investigating the case of Brazil, Levy (2010) concluded that the progressivity of the country's tax system would decrease in the absence of appropriate adjustments of tax parameters to inflation. Paulus et al. (2020) analysed actual indexation rules in a selection of European countries over one decade. The authors concluded that, in the presence of uprating of nominal tax parameters, avoiding fiscal drag and benefit erosion allowed for decreases in poverty and inequality.

3. Methodology and data

In this work we make use of EUROMOD, the open-source tax-benefit microsimulation model for the EU.⁴ The model uses survey data on gross incomes, labour market status and other characteristics of the individuals and households, which it then applies to the tax and benefit rules in place in order to simulate direct taxes, social insurance contributions and entitlements

³ The few countries where automatic wage indexation rules apply to a large share of private sector employees are Belgium, Cyprus, Malta and Luxembourg.

⁴ Detailed information about EUROMOD can be found in <https://euromod-web.jrc.ec.europa.eu/>.

to cash benefits. The components of the tax–benefit system that cannot be simulated (for example, those depending on prior contributions such as pensions) are read off the model’s underlying input data. The latter are drawn from the 2019 EU-SILC (2018 income reference period), a dataset which is specifically designed to provide detailed information on income distribution and social inclusion.

One important advantage of microsimulation in general, and EUROMOD in particular, is that it can be used to disentangle the effects of each policy, or other economic developments separately, taking into account the complex ways in which taxes interact with benefits and with each other. A direct analysis of actual data cannot do this equally well. Moreover, significant efforts have been made to address the issues of tax evasion and benefit non-take-up in order to enhance the credibility and accuracy of our estimates. Detailed information about the countries for which such adjustments have been implemented can be found in Maier et al. (2022).

EUROMOD has been validated both at micro and macro level and has been tested in numerous applications. Examples of such applications include, among others, several studies on the distributional impact of tax-benefit systems and on how policies have shaped income distributions over time, disentangling income changes due to policy reforms from changes due to evolution of market incomes and changes in populations’ underlying characteristics, introducing new EU-wide policies and stress-testing the welfare state. For a comprehensive overview, see Sutherland and Figari (2013).

The tax-benefit systems simulated in our **baseline** refer to those in place as of June 2021, as coded in EUROMOD.⁵ The methodological strategy that we follow to explore the impact of wage-indexation-driven fiscal drag and benefit erosion includes a counterfactual analysis in which our baseline scenario is compared with three hypothetical scenarios:

- **Scenario 1** assumes that employment incomes (i.e. wages) increase by 5% in all EU countries. The aim of this scenario is to highlight that equal inflation has different implications across countries, due to differences in tax-benefit systems.
- **Scenario 2** assumes that employment incomes increase by the forecasted GDP-based inflation for 2022, based on the Autumn 2022 EC forecast. The aim of this scenario is to also account for the fact that inflation differed across countries in 2022.
- **Scenario 3** assumes the same employment income increase as in Scenario 2. Additionally, we assume that all benefits and pensions increase by the forecasted CPI-based inflation for 2022, based on the Autumn 2022 EC forecast.

In scenarios 1 and 2, all tax-benefit policies are kept constant, i.e. same as in the baseline scenario. This way, we are able to isolate the distributional and budgetary impact of the fiscal drag and benefit erosion caused by the 2021 tax-benefit policies in each of the EU Member States under different wage indexation scenarios. In scenario 3, we also offset benefit erosion, and estimate the fiscal and distributional effects of this ad hoc intervention. The analysis is static, in the sense that it does not attempt to capture any behavioural adjustments of individuals in response to changes in incomes, tax liabilities and benefits received.

⁵ For more information about the different tax-benefit policies simulated in EUROMOD for each country, see the latest EUROMOD Country Reports: <https://euromod-web.jrc.ec.europa.eu/resources/country-reports>.

More formally, let $f(Y,P)$ denote a distribution of household disposable income as a function of developments in market incomes (Y) and government policies (P). The fiscal and distributional impact of our scenarios (say s_i) versus the baseline (say b), can be denoted as:

$$D_1 = f(Y_{s1}, P_b) - f(Y_b, P_b)$$

$$D_2 = f(Y_{s2}, P_b) - f(Y_b, P_b)$$

$$D_3 = f(Y_{s2}, P_{s3}) - f(Y_b, P_b)$$

where P_{s3} denotes a policy system with the same taxation policies as in the baseline, but with the inflation-indexed benefit policies described in scenario 3. The forecasted GDP and CPI-based inflation for 2022 used for the construction of our scenarios can be found in the Appendix (Table A.1).

4. Results

4.1. Budgetary impact and other fiscal estimates

Figures 1 and 2 illustrate the budgetary impact of wage indexation under scenarios 1 and 2 respectively. In this work, the government budget is defined as the sum of direct taxes and social insurance contribution (SIC) minus pensions, civil servants' increase in salaries (due to wage indexation), means-tested benefits and non means-tested benefits. Due to data limitations, changes in indirect taxation are beyond the scope of analysis (EU-SILC provides no information on consumption). The budgetary impact is, thus, defined as the difference in the budget between each scenario and the baseline, as a percentage of each country's GDP. The impact of scenarios 1 and 2 on total direct tax revenues, employers and employees SIC revenues, expenditure on means-tested benefits and mean equivalised disposable income is depicted in Tables 1 and 2 respectively.⁶

The most important findings of those figures and tables can be summarised as follows. First, the analysis confirms our expectation of a positive impact of fiscal drag/benefit erosion on the government budgetary position. However, this impact seems to be highly heterogeneous among the EU Member States and depends on governments' revenues structures. Looking at scenario 1, the estimated budgetary changes vary from 0.5% of GDP in the case of Malta to 1.57% of GDP in the case of Belgium.⁷ The magnitude of these estimates greatly depends on the absolute values of revenues from direct taxes and SIC in our baseline scenario; countries with high initial levels of direct tax/SIC revenues seem to be the ones experiencing the largest

⁶ Equivalised disposable income is defined as the total disposable income of a household adjusted for the household composition by taking into account economies of scale. In Eurostat wording, it is the 'total income of a household, after tax and other deductions, that is available for spending or saving, divided by the number of household members converted into equalised adults; household members are equalised or made equivalent by weighting each according to their age, using the so-called modified OECD equivalence scale'. This scale assigns a weight of 1 to the household head, 0.5 to other adults (14 year-old or older) and 0.3 to children (younger than 14). The result of the calculation is attributed to every member of the household.

⁷ Note that the average impact of 0.2 (i.e. on average 1% for an inflationary shock of 5%) is in line with evidence reported in the literature – see e.g. Attinasi et al. (2016).

increases in revenues and decreases in expenditures coming from fiscal drag and benefit erosion respectively.

The estimated increases in direct tax revenues also vary widely among EU countries in scenario 1: from 3.8% in Greece to 9.3% in Croatia. In 17 out of the 27 countries the increases in direct tax revenues are found to be higher than 6%, i.e. higher than the assumed indexation of wages to inflation, indicating that fiscal drag is an important issue in the majority of countries. The estimated increases in employers and employees SIC vary from 0% in the case of Denmark (as contributions to Denmark's supplementary labour market pension scheme are fixed amounts that do not depend on employment income) to 5.8% in the case of Belgium. In 21 out of the 27 EU Member States the SIC revenue increases are (almost) proportional to the employment income increases, varying from 4.1% to 5.8%. Deviation from full proportionality are due to the existence of lower/upper thresholds in the design of those policies. Means-tested benefits are on average reduced by 1.9%.⁸ The reduction is most prominent in the case of Czechia (-5.9%), followed by Croatia (-3.6%), and less prominent in the case of Hungary, where the reduction is close to zero. The most important reason behind the significant reductions in means-tested benefits is the existence of several income thresholds and benefit levels in these policies.

Changes in mean equivalised disposable income depend on a number of factors, apart from the changes in employment income and the resulting changes in the above-mentioned tax-benefit instruments; those include the composition of income sources in the population (e.g. employment income earners vs self-employed, pensioners, unemployed/inactive etc.) as well as the households' structure of each population. In scenario 1, they are estimated to vary from 1.8% in the case of Italy and Greece to slightly more than 3%, in the case of Estonia, Romania, Latvia, Hungary and Bulgaria. We can thus observe that simulated wage increases are not automatically translated into disposable income increases of the same magnitude, as they only affect a specific segment of the population and a significant part of them is taken away by the tax-benefit system.

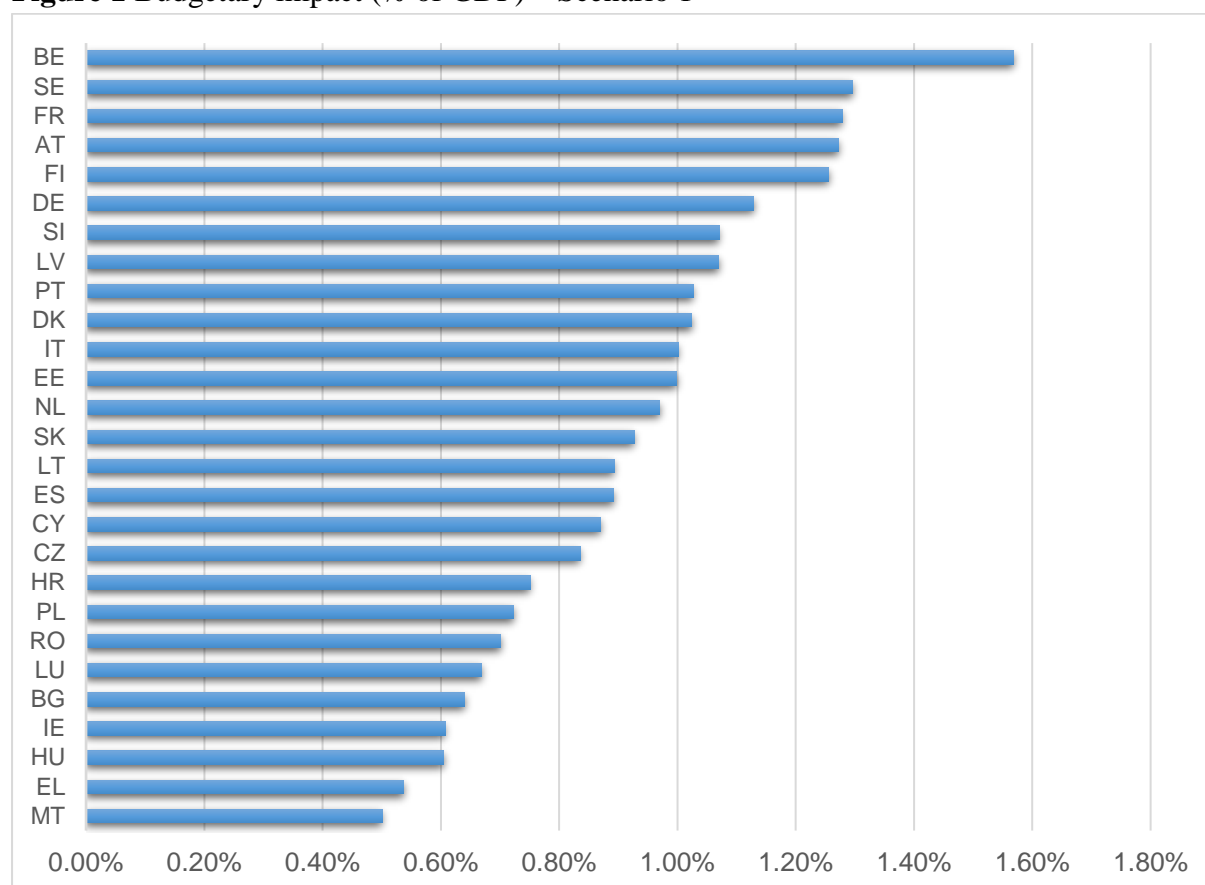
In scenario 2, employment incomes are assumed to increase by 5.2% on average,⁹ but this time with great variability across countries, with increases ranging from around 2% to 3% in the cases of France and Portugal to close to 10% in the cases of Poland, Bulgaria and Romania. Those increases are based on the GDP-related inflation developments of all EU countries. The findings of this scenario point at patterns similar to those shown for the scenario 1. In particular, the budgetary impact range from 0.5 to 1.6 is similar to that shown for scenario 1, which, interestingly, suggests that inflation dispersion in 2022 may not have substantially heightened budgetary development's dispersion. In turn, this suggests that countries whose budgetary developments are more sensitive to inflation posted more contained inflation, while the reverse seems also true. On average, direct tax revenues increase by 6.3%, with the most important

⁸ Note that the means-testing of those benefits is assumed to happen without any time lag. In reality, the incomes accounted for in the means-testing may have a significant time lag.

⁹ In line with the calibration retained under scenario 1.

increases estimated in Czechia, Estonia and Slovakia (above 10%). Revenues from SIC increase by 4.7% on average, closely following the increase in wages. Expenditure in means-tested benefits decreases by 2% on average and mean equivalised disposable income goes up by 2.9%.

Figure 1 Budgetary impact (% of GDP) – Scenario 1



Source: Own elaboration using EUROMOD version I4.0+.

Table 1 Percentage change (%) in direct taxes, SIC, means-tested benefits & disposable income – Scenario 1

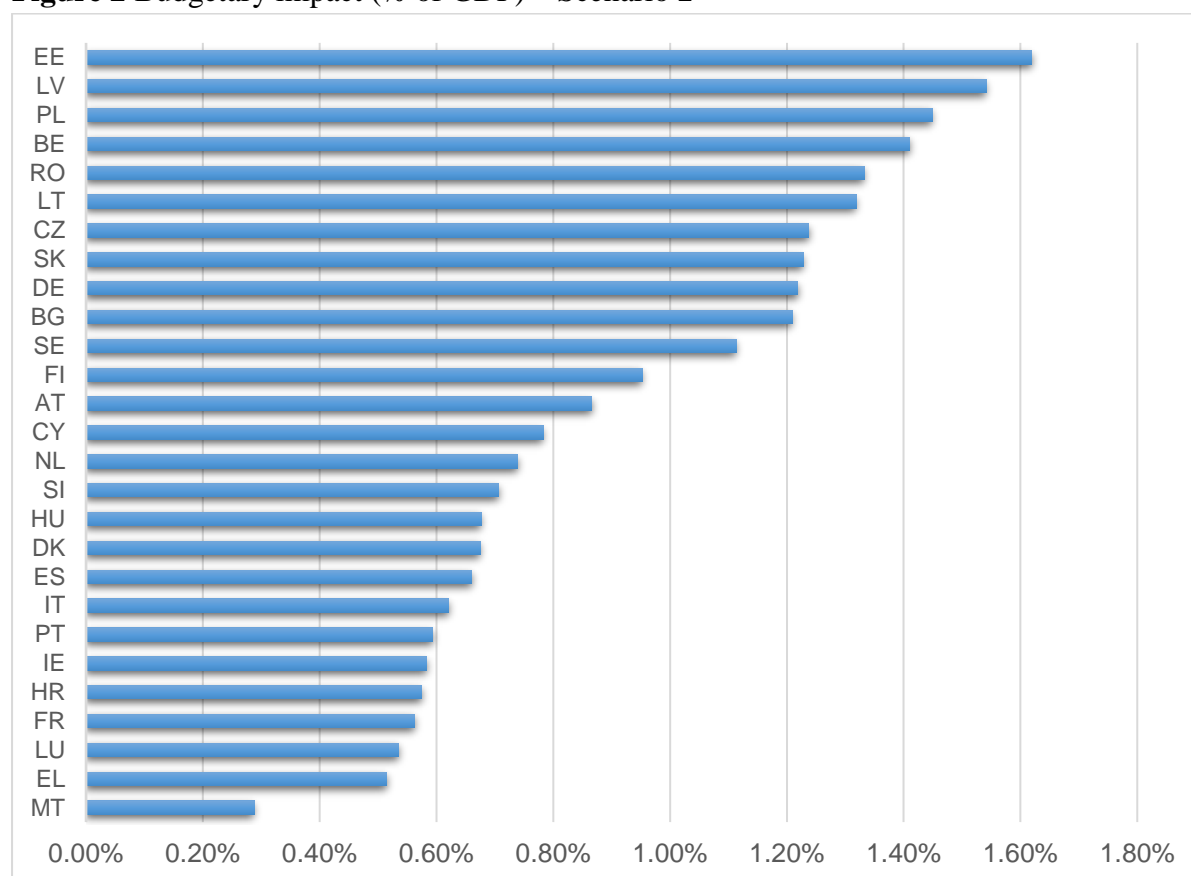
Country	Employment income	Direct taxes	SIC	Means-tested benefits	Disposable income
EL	5.0	3.8	4.9	-2.0	1.8
DK	5.0	3.9	0.0	-1.2	2.7
HU	5.0	4.0	5.1	-0.1	3.3
FR	5.0	4.2	5.6	-2.2	2.5
PL	5.0	4.3	4.7	-0.9	2.9
BG	5.0	4.5	4.1	-1.5	3.4
IT	5.0	4.6	4.3	-1.3	1.8
RO	5.0	4.8	5.0	-1.2	3.2
FI	5.0	5.4	5.0	-1.6	2.3
SE	5.0	5.6	5.0	-1.6	2.7
LT	5.0	6.0	4.9	-2.4	2.8
PT	5.0	6.1	5.0	-2.5	2.5

LV	5.0	6.2	4.8	-1.6	3.3
BE	5.0	6.3	5.8	-0.6	2.0
LU	5.0	6.4	3.9	-3.0	2.5
IE	5.0	6.6	5.4	-1.1	2.4
EE	5.0	6.7	4.9	-1.6	3.2
DE	5.0	6.9	3.3	-2.8	2.7
SI	5.0	6.9	4.7	-3.0	2.7
ES	5.0	7.0	3.5	-1.0	2.6
AT	5.0	7.3	4.4	-0.8	2.2
CZ	5.0	8.1	4.9	-5.9	2.9
NL	5.0	8.2	3.4	-1.6	2.4
SK	5.0	8.2	5.0	-3.4	2.9
MT	5.0	8.2	2.6	-1.5	2.9
CY	5.0	8.2	4.5	-2.3	2.9
HR	5.0	9.3	5.1	-3.6	2.9

Note: Countries are ranked according to the magnitude of the change in direct taxes.

Source: Own elaboration using EUROMOD version I4.0+.

Figure 2 Budgetary impact (% of GDP) – Scenario 2



Source: Own elaboration using EUROMOD version I4.0+.

Table 2 Percentage change (%) in direct taxes, SIC, means-tested benefits & disposable income – Scenario 2

Country	Employment income	Direct taxes	SIC	Means-tested benefits	Disposable income
FR	2.2	1.8	2.5	-1.1	1.1
DK	3.3	2.5	0.0	-0.8	1.8
IT	3.1	2.9	2.7	-0.8	1.1
PT	2.9	3.5	2.9	-1.5	1.5
EL	4.8	3.7	4.7	-1.9	1.7
FI	3.8	4.1	3.8	-1.2	1.7
HU	5.6	4.5	5.7	-0.1	3.7
SI	3.3	4.6	3.1	-2.0	1.8
MT	2.8	4.6	1.5	-0.8	1.6
SE	4.3	4.8	4.3	-1.4	2.3
AT	3.4	5.0	3.0	-0.6	1.5
LU	4.0	5.1	3.2	-2.5	2.0
ES	3.7	5.1	2.6	-0.7	1.9
BE	4.5	5.7	5.2	-0.5	1.8
NL	3.8	6.2	2.6	-1.3	1.8
IE	4.8	6.4	5.2	-1.0	2.3
HR	3.8	7.0	3.9	-3.0	2.2
CY	4.5	7.4	4.1	-2.1	2.6
DE	5.4	7.5	3.6	-3.0	3.0
PL	10.0	8.6	9.4	-1.9	5.8
BG	9.5	8.6	7.6	-3.0	6.4
LT	7.4	8.9	7.2	-3.0	4.1
LV	7.2	9.0	7.0	-2.2	4.7
RO	9.5	9.1	9.5	-2.4	6.1
SK	6.6	10.8	6.7	-3.9	3.9
EE	8.1	10.9	7.9	-2.5	5.2
CZ	7.4	12.0	7.3	-8.5	4.3

Note: Countries are ranked according to the magnitude of the change in direct taxes.

Source: Own elaboration using EUROMOD version I4.0+.

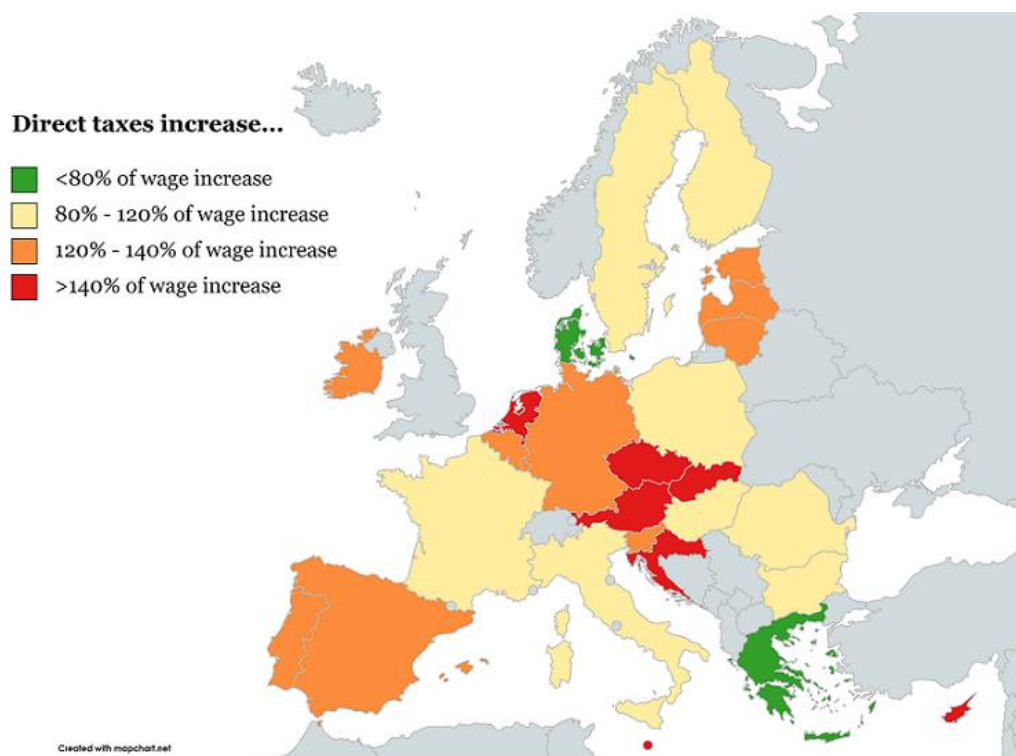
In Figure 3 we group countries according to the relative incidence of fiscal drag in scenarios 1 and 2. In the first category, we place countries in which an increase in employment income by a target of x% (in scenario 1 this target is uniform for all countries and equal to 5%) causes direct tax increases by less than 80% of this target (i.e. less than 4% in scenario 1). In the second category we allocate counties where an x% wage increase causes direct tax increases of approximately the same magnitude, i.e. between 80% and 120% of the employment income increase (i.e. from 4% to 6% in scenario 1). In the third category we place countries in which a wage increase by a target of x% induces direct tax hikes of 120%-140% of this target (i.e. 6%-7% in scenario 1). In the last category we allocate the countries with tax systems that are most prone to fiscal drag, i.e. in which an x% increase in wages causes direct tax increases by more than 140% of this target (i.e. more than 7% in scenario 1).

In Figure 4 we group countries according to the relative incidence of benefit erosion in scenarios 1 and 2. In the first category, we allocate countries where an x% increase in employment income causes relatively small decreases in the spending for means-tested benefits, i.e. less than 30% of the employment income increase. In the second category, we place countries where an x% increase in employment income causes decreases in means-tested benefits' spending that are between 30% and 60% of the employment income increase. In the third category we allocate the countries with the largest estimated benefit erosion effects, i.e. where an x% increase in employment income causes a more than 60% decrease in means-tested benefits' spending. The percentages of direct tax/means-tested benefit increases/decreases can be found in the Appendix (Table A.2).

Interestingly, it seems that the non-linearities that are inherent in the tax-benefit systems of all EU countries do not significantly manifest themselves in terms of the relative impact of the fiscal drag or benefit erosion.¹⁰ Looking at Table A.2 and Figures 3 and 4, we observe that in the vast majority of countries the relative magnitude of fiscal drag or benefit erosion is not affected by the magnitude of the simulated employment income increases. For example, an increase in employment income in Poland by a factor of 5% is estimated to cause the country's direct taxes to increase by 85.1% of this factor; an increase in employment income by 10% is causing Polish direct taxes to increase by 85.8% of this factor. This finding was also confirmed by running a sensitivity analysis in which employment incomes rise according to the Summer 2022 EC HICP forecast. This corresponds to increases of 9.5% on average (i.e. almost double the size of the increase assumed in scenario 1), with the hikes varying from 5.6% in the case of Malta to as much as 17% in the cases of Estonia and Lithuania. The sensitivity analysis confirmed that the relative magnitude of fiscal drag/benefit erosion is not affected by the magnitude of the simulated employment income increases (i.e. an increase in employment income in Estonia by a factor of 5% is estimated to cause the country's direct taxes to increase by 134% of this factor; an increase in employment income by 17% is estimated to cause Estonia's direct taxes to increase -again- by 134% of this factor).

¹⁰ Non-linearities are caused by various factors, such as the existence of progressive tax schedules, tax allowances, tax credits, lower/upper limits of taxes/SIC/benefits, means-testing thresholds etc.

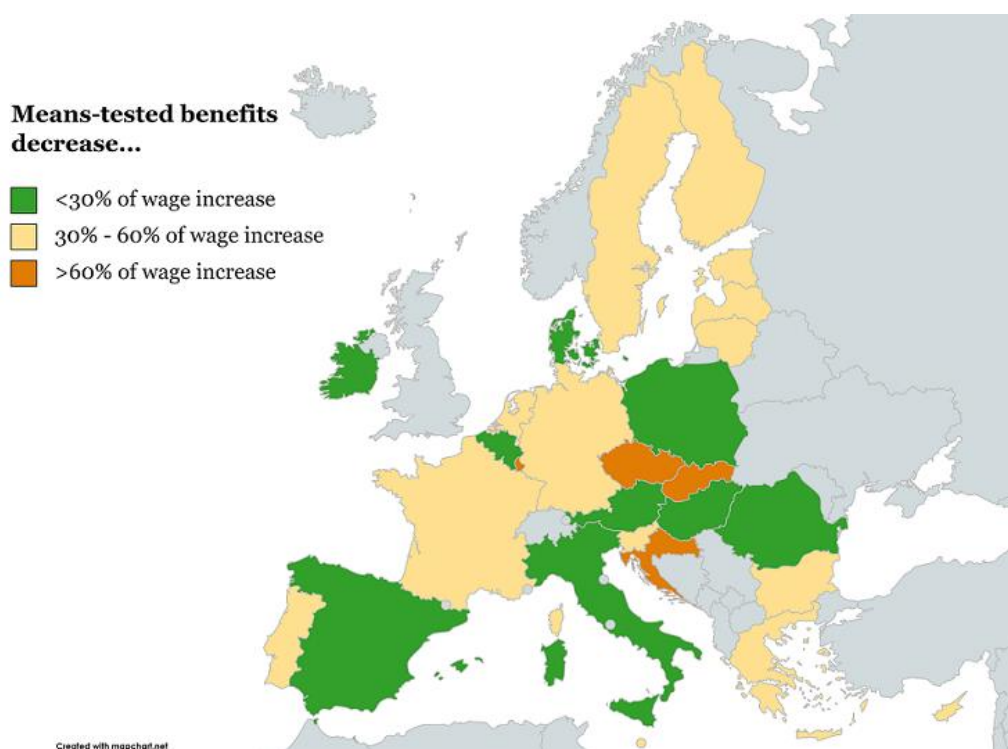
Figure 3 Magnitude of fiscal drag in EU countries (scenarios 1 & 2)



Note: The countries in which direct tax revenue increase is more than 120% of employment income increase are LT, PT, LV, BE, LU, IE, EE, DE, SI, ES, AT, CZ, SK, NL, MT, CY, HR (in ascending order of Scenario 1).

Source: Own elaboration using EUROMOD version I4.0+ and mapchart.net.

Figure 4 Magnitude of benefit erosion in EU countries (scenarios 1 & 2)



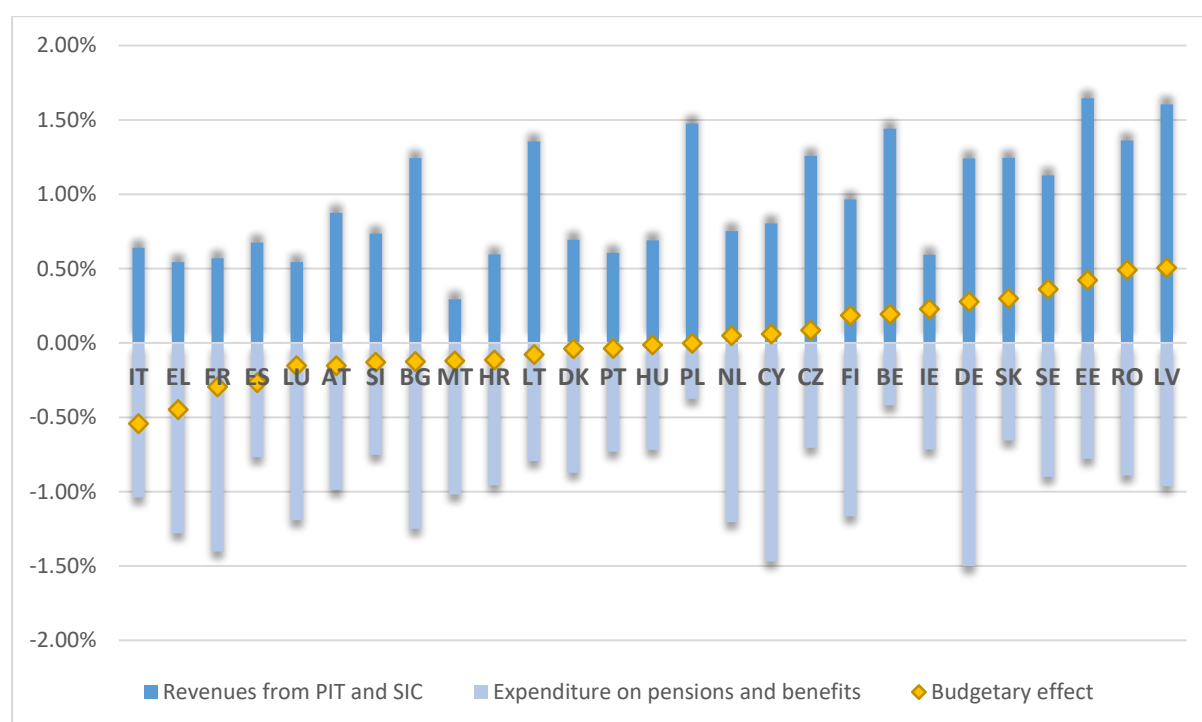
Note: Slovenia is the only country that changes category from scenario 1 to scenario 2, as means-tested benefits go up from 59.4% to 61.9% of the target change in employment income. Please note that in the graph it is depicted as solely belonging to the second category. The countries in which means-tested benefits decrease more than 60% of employment income increase are LU, SK, HR and CZ (in ascending order of Scenario 1).

Source: Own elaboration using EUROMOD version I4.0+ and mapchart.net.

In **scenario 3**, we assume the same employment income increase as in scenario 2. The main difference with respect to the latter is that, in this new scenario benefits (including pensions) are also assumed to increase by 7.5% on average, in line with forecasted CPI-based inflation for 2022, hence keeping their real value intact. This way, we attempt to evaluate the effect of combining two out of the three main options available to policy makers to mitigate the impact of inflation on households: targeted income support (via indexation of pensions/benefits to inflation) and wage indexation. The use of microsimulation in general, and EUROMOD in particular, allows us to account for the complex ways in which taxes interact with benefits/pensions, as well as with each other. It also allows to account for the different tax treatment of the various income sources.

Our results suggest that in almost half of EU Member States, the fiscal space generated by wage indexation via fiscal drag and benefit erosion is sufficient to finance a policy of full indexation of pensions and cash benefits to inflation (Figure 5). In the case of Latvia and Romania, the structure of the labour market combined with the countries' pension/benefit systems in place creates a budgetary surplus of approximately 0.5% of GDP. On the contrary, the countries where the indexation of pensions and benefits produces significant fiscal deficits are Italy and Greece. This is due to the large number of pension recipients (compared to wage earners) in those two countries.

Figure 5 Budgetary impact (% of GDP) – Scenario 3



Source: Own elaboration using EUROMOD version I4.0+.

4.2. Distributional impact

Figures 6, 7 8a and 8b present the impact of our three scenarios on income inequality and poverty. The inequality indicator used is the Gini coefficient of equivalised disposable income. This indicator tends to be more sensitive to changes close to the middle of the income distribution (Cowell, 2000). The poverty indicator that we use is the at-risk-of-poverty (AROP) rate, setting the fixed poverty line at 60% of the median equivalised disposable income of the baseline scenario.¹¹

Our main findings are as follows. Scenario 1, which assumes a uniform 5% increase in employment income, implies relatively small increases in the Gini coefficient for all EU countries (1% on average), ranging from 0.2% in Portugal to 2% in Slovakia and Czechia. This increase in inequality reflects the fact that the assumed wage increase (associated to the inflationary shock) concerns more individuals are at the middle/upper end of the income distribution than people located at the lower end of the distribution, as the latter rely relatively more on non-wage income (i.e. social benefits, pensions etc.), which is assumed not to be indexed.¹²

Scenario 2, which accounts for the effective GDP-related inflation forecasted for 2022, implies diverse increases in employment income across countries. The Gini coefficient increases by 1.2% on average, with the countries witnessing the strongest inflation rates being typically also those posting the largest increases in the Gini coefficient (i.e.CZ, PL, SK, RO and EE).

In scenario 3, in which, on top of the differentiated wage increase, all benefits and pensions go up by the forecasted CPI-based inflation, the Gini coefficient goes down by 0.8% on average, driven by the benefits/pensions increases. The decrease exceeds 1% in 10 EU countries. RO is the only country in which the Gini coefficient goes up by approximately 1%. This is due to the fact that the –mostly regressive, as was seen in the previous scenarios– wage increases largely outweigh the –mostly progressive– increases in benefits and pensions.

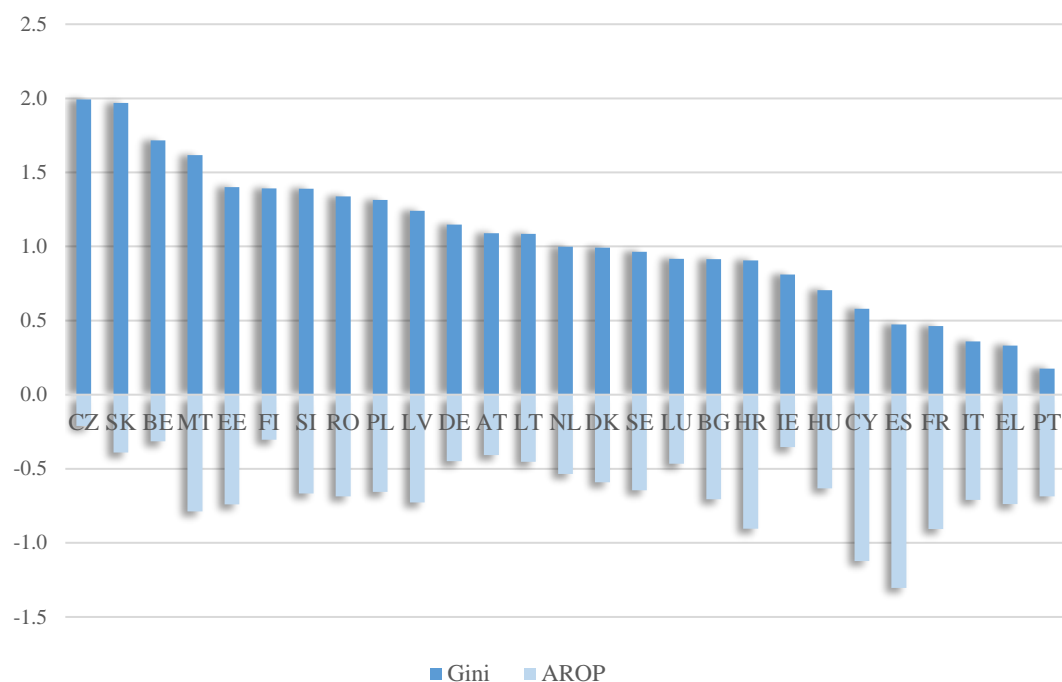
As regards poverty, modest decreases in the AROP rate are estimated for all EU countries in scenarios 1 and 2 (0.6 percentage points increase in the indicator, on average across the EU), again reflecting the fact that wage-earners, which are assumed to benefit from indexation, represent a larger share of the higher income groups. Lower income groups rely relatively more on benefits, assumed not (yet) to be indexed, thereby bearing most of the burden linked to benefit erosion. This finding is consistent with the literature on the distributional impact of increases in the minimum wage (Atkinson et al., 2017). Yet contrasting results are reported under scenario 1, with significant reductions in the AROP rate in the case of Spain and Cyprus (1.3 and 1.1 percentage points respectively), indicating the existence of a relatively important share of wage-earners at the bottom of the income distribution for those two countries. In scenario 3, the indexation of benefits and pensions to inflation has a very significant impact on poverty; the AROP rate is estimated to decrease by as much as 2.5 percentage points on average

¹¹ Results on AROP with a floating poverty line are presented in the Appendix (Table A.3).

¹² The estimated changes in the distributional estimates result from a combination of factors, which include the proportion of wage earners in the overall population of a country, their position in the income distribution, the progressivity of the tax system and the design of the benefit system of each country.

across the EU countries. In 6 countries (EE, PL, LT, BG, CY and LV), the decrease in the AROP rate exceeds 3 percentage points.

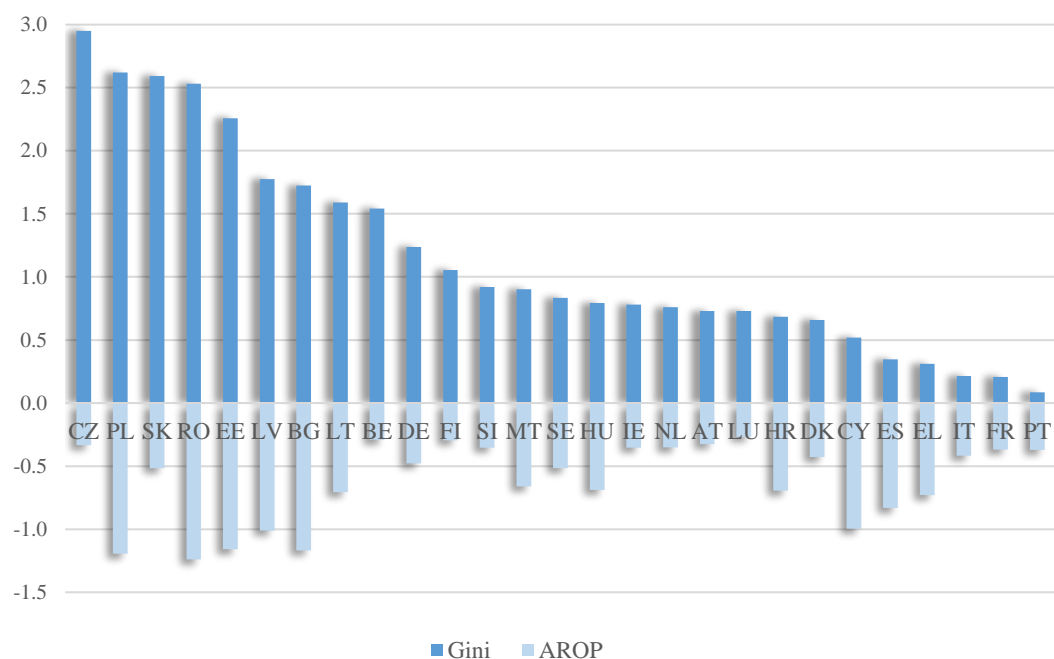
Figure 6 Changes in Gini (%) and AROP (ppts) – Scenario 1



Source: Own elaboration using EUROMOD version I4.0+.

Notes: The poverty line is fixed at 60% of the median equivalised disposable income of the baseline scenario.

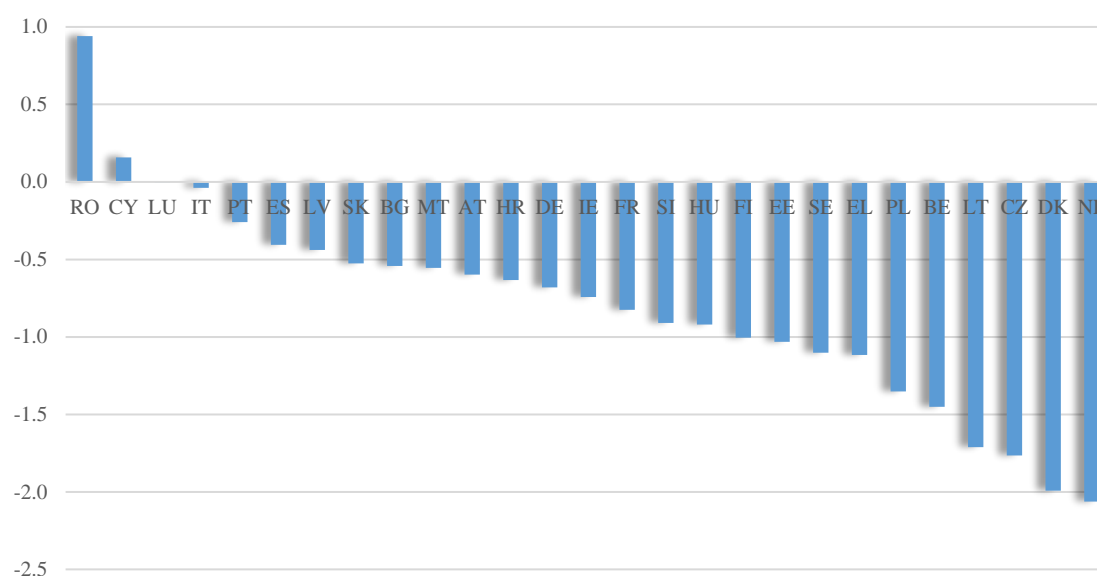
Figure 7 Changes in Gini (%) and AROP (ppts) – Scenario 2



Source: Own elaboration using EUROMOD version I4.0+.

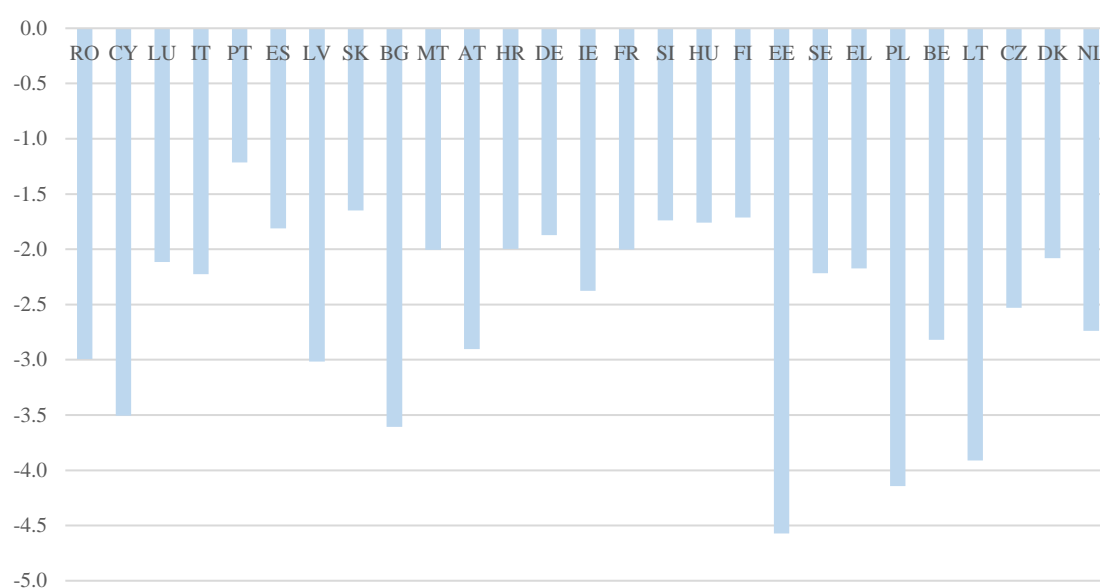
Notes: The poverty line is fixed at 60% of the median equivalised disposable income of the baseline scenario.

Figure 8a Changes in Gini (%) – Scenario 3



Source: Own elaboration using EUROMOD version I4.0+.

Figure 8b Changes in AROP (ppts) – Scenario 3



Source: Own elaboration using EUROMOD version I4.0+.

Notes: The poverty line is fixed at 60% of the median equivalised disposable income of the baseline scenario.

4.3. Focusing on wage earners

In this section, we restrict our analysis to employees. To enhance comparison of results across countries we solely focus on Scenario 1, describing the implication of a uniform 5% increase of employment income across countries. We define employees as individuals whose employment income is at least two thirds of their total income in our baseline. Table A.4 in the Appendix summarises the share of employees across quintiles of disposable income in each EU country.

Wage earners are also categorised in quintiles according to their relative employment income.¹³ In this way we can investigate the impact of fiscal drag across the wage distribution and, in particular, the change in the amounts of personal income tax paid by the poorer and by the richer wage earners.

To illustrate our results we report the case of Czechia (Table 3). In the top half of the table, we find the increase in income taxes (PIT) paid by all groups in Scenario 1 with respect to the baseline. We can see that the proportional increase in PIT is highest for individuals in the first quintile and decreases across the wage distribution. The poorest wage workers end up paying 29.3% more in PIT, with respect to a 9.9% average increase for the whole population. The main reason for this result is that many workers in the first decile of the wage distribution that were not paying PIT in the baseline moved to the first PIT bracket in Scenario 1.

Another way of looking at this is to consider the share of the total amount of PIT revenues paid by each quintile. In the bottom half of Table 3, we find the share of PIT paid by workers in each quintile of the wage distribution. In Czechia the first quintile (Q1) contributes 1.5% of the total 4.7 billion EUR collected in the baseline, against 49.1% contributed by the last quintile (Q5). In Scenario 1, not only the total sum of PIT revenues is higher, but it is also split differently between individuals in different quintiles. The share contributed by poorest workers increases by 0.3 percentage points (from 1.5% to 1.8%), while the share contributed by the richest decreases by 0.8 percentage points.

Results for all countries are summarised in Figure 9. The figure describes the change in the share of total PIT paid by taxpayers in the first and in the last quintile of the wage distribution. The redistribution of the shares favours the richest quintile in 21 out of 27 countries. In these countries, individuals with higher employment income end up paying a smaller share of the total PIT revenues after the increase in wages. In countries like Austria, Croatia and the Netherlands, the share contributed by the fifth quintile decreases by more than 1.5 percentage points. Conversely, in France and Sweden the richest wage earners in Scenario 1 pay a larger share of PIT revenues than in the baseline (0.3 and 0.5 percentage points increase respectively).

Observing Figure 9, and the detailed results for each country contained in the Appendix (Table A.5), we believe that the plausible reasons behind these patterns are linked to the structure of PIT schedules in each country. In countries such as Austria, Croatia and the Netherlands (i.e. where the decrease in the share of PIT revenues contributed by the richest is higher), the employment income of Q5 earners in the baseline scenario already places them in the highest tax bracket of personal income tax. This means that, after the 5% increase in wages, the amount of PIT due will increase proportionally. The increase would be more than proportional if wage indexation pushed them into a higher bracket, and their additional income became (at least partly) subject to a higher marginal tax rate.

To provide an example, let's look at Croatia, where the share of PIT paid by the richest quintile decreases the most (-1.5 percentage points). Indeed, the lowest employment income in Q5 is approximately 17,500 EUR in the baseline, significantly above the lower bound of the highest tax bracket (approximately 4,000 EUR in 2021). Therefore, for these individuals the additional

¹³ Quintiles are fixed on the baseline scenario.

income earned in Scenario 1 is subject to the same marginal tax rate than the income of the baseline.

France is one of the countries in which the richest taxpayers end up contributing a larger share of total PIT revenues in Scenario 1. Here, the fifth quintile of the employment income distribution starts at approximately 52,800 EUR. An employee earning this amount in 2021 would pay the marginal tax rate corresponding only to the third out of the five tax brackets of the French personal income tax. The wage increase, therefore, pushes many of those taxpayers into the fourth or the fifth bracket in Scenario 1.

Finally, Bulgaria is a country with a flat personal income tax schedule. This is reflected in our results, as the shares of PIT contributed by the first and the last quintile (and of the other quintiles, as shown in Table A.4) do not change. Additional incomes are subject to the same rate, regardless of the position of taxpayers in the distribution of employment income.

Table 3 Effect of fiscal drag on the amount of income tax paid by wage quintile in Czechia (yearly amounts, EUR)

Czechia			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	69,685,473	90,077,875	29.3
Quintile 2	498,606,956	568,642,321	14.1
Quintile 3	695,634,292	769,738,645	10.6
Quintile 4	1,110,311,576	1,220,104,066	9.9
Quintile 5	2,290,929,488	2,476,655,501	8.1
All	4,665,167,548	5,125,218,350	9.9
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	1.5	1.8	0.3
Quintile 2	10.7	11.1	0.4
Quintile 3	14.9	15.0	0.1
Quintile 4	23.8	23.8	0.0
Quintile 5	49.1	48.3	-0.8
All	100.0	100.0	0.0

Source: Own elaboration using EUROMOD version I4.0+. The population is restricted to wage earners, as defined in section 4.3

Figure 9 Percentage point change in the share of personal income tax paid by the first and the fifth quintile of the distribution of employment income



Source: Own elaboration using EUROMOD version I4.0+. The population is restricted to wage earners, as defined in section 4.3

4.4. Existing automatic inflation mechanisms

Until now we have examined how a wage indexation policy would affect the fiscal and redistributive mechanisms built in the PIT systems of countries under the assumption of unadjusted PIT schedules. In this section we set to explore the impact of the automatic indexation mechanisms embedded in those schedules. According to the existing evidence most EU countries do not index or automatically adjust their PIT policy in a statutory and non-ad-hoc way (Balasundharam et al, 2023; EUROMOD Country Reports). Out of the 17 EU countries in which the increase in direct tax revenues in Scenarios 1 and 2 is more than 120% of the employment income increase (i.e. orange and red countries of Figure 3), only four had such adjustments in place in 2022: Belgium, Germany, the Netherlands and Slovakia. Since 2023, Austria also joined this group of countries.

In order to quantify the fiscal and distributional impact of the existing mechanisms, we build a new counterfactual scenario in which we combine the actual 2022 (or 2023, in the case of Austria) PIT schedule of those countries with our second scenario, i.e. the scenario in which employment incomes increase by the forecasted GDP-based inflation for 2022 (by 3.4% in Austria, 4.5% in Belgium, 5.4% in Germany, 3.3% in the Netherlands and 6.6% in Slovakia).¹⁴

¹⁴ Contrary to PIT, most countries have some form of indexation mechanisms for pensions and benefits. However, those mechanisms vary widely both across countries and across policies within countries. The evaluation of their fiscal and distributional impact is beyond the scope of this analysis.

Our findings suggest that the newly-legislated automatic adjustments in Austria's PIT system are able to over-compensate for the fiscal drag effects caused by a 3.4% increase in employment incomes. In Belgium and Germany, the mechanisms in place compensate for almost half of the fiscal drag effect; in the Netherlands and Slovakia they compensate for around 15% of the fiscal drag caused by the above-mentioned employment income increases.¹⁵ The increase in the Gini index with respect to the baseline ranges from 0.9% in the Netherlands to 2.6% in Slovakia. It is slightly larger compared to Scenario 2 in Austria, Germany, and the Netherlands, suggesting that the upper part of the income distribution is benefitting relatively more from the adjustment mechanisms in place. The difference between the two scenarios is very close to zero in Belgium and Slovakia, for different reasons; in Slovakia, because the adjustment of the tax-benefit parameters is quite small compared to the increase in employment incomes, and in Belgium because all the spectrum of the income distribution seems to be benefitting from the indexation of the tax brackets. Finally, compared to the baseline, the decreases in AROP are larger in this scenario with respect to Scenario 2. The additional poverty decreases range from 0.1 percentage point in the Netherlands to 0.5 percentage points in Austria. This suggests that even non-perfect indexation mechanisms can have a positive impact on poverty.

5. Concluding remarks

Until the early 1980s, wage indexation policies were frequently used as a way to protect the purchasing power of households. In the context of the current inflationary shock, several forms of wage indexation policies have been advocated in EU countries to counteract the negative effect of the growth in consumer prices. In this study, we set out to explore the first-order effects of wage indexation through its fiscal drag and benefit erosion channels. We investigate how exposed are EU tax and benefit systems to those phenomena, in a context of high inflation, where wage indexation regains a relevant role from a policy perspective.

We use EUROMOD, the tax-benefit microsimulation model of the EU, to construct three hypothetical scenarios. In the first one, we assume that employment incomes increase by a uniform 5% in all EU countries. In the second one, we assume that employment incomes increase by the forecasted GDP-based inflation for 2022. In our last scenario, on top of the employment income increase assumed in scenario 2, we also index all benefits and pensions to the forecasted CPI-based inflation of 2022. Our baseline scenario refers to the tax-benefit policies in place as of June 2021, in all EU countries. We believe that 'what if' scenarios can provide valuable benchmarks to which real policies can be compared to.

We first assess the impact of wage indexation -and its subsequent fiscal drag and benefit erosion effects- on the public budget. The latter is defined as the sum of direct taxes and social insurance contributions, minus pensions, means-tested benefits and non means-tested benefits.

Our results confirm the theoretical predictions regarding the role of fiscal drag and benefit erosion on public finances in the short-term, estimating a net positive budgetary impact in all EU countries. The magnitude of the budgetary impact varies greatly among countries and

¹⁵ For Belgium, this is due to the fact that tax brackets adjust once per year using the previous year's inflation rate. In Slovakia the basic personal allowance is anchored to the Minimum Living Standard (MLS), which is adjusted each year according to inflation; in 2022 the MLS increased by 1.5%, whereas the forecasted GDP-inflation was equal to 6.6%.

depends on the absolute value of direct taxes and social insurance contributions in our baseline scenario.

By comparing the results in the first two counterfactual scenarios, we observe that in most countries the relative magnitude of fiscal drag/benefit erosion is not affected by the magnitude of the increase in employment income. In other words, the public budget appears to grow by the same proportion of the wage increase, regardless of the magnitude of the wage increase. Results on the third counterfactual scenario show that in almost half of the countries, fiscal drag causes an increase in the public budget which is large enough to finance a full indexation of benefits and pensions to inflation. The latter is also associated with a decrease in income inequality in the vast majority of EU Member States.

Finally, we restrict our analysis to wage workers and investigate the impact of fiscal drag on individuals in different quintiles of the wage distribution. Our results show that, in most countries, the share of total income tax paid by the richest employees would be smaller after the uniform increase in wages than in the baseline. This pattern can be mostly explained by the structure of personal income tax schedules in each country. In countries where the richest wage earners are in the highest tax brackets in the baseline, their contribution to total income tax revenues decreases in Scenario 1. Conversely, if the wage increase pushes them into a higher tax bracket, their contribution increases, as part of their additional income is subject to a higher marginal tax rate.

A certain amount of caution is called for when interpreting these results. First, we do not account for any second-order effects of changes in employment incomes, such as changes at the extensive or the intensive margin of labour supply. However, second order effects of wage indexation policies are likely to be limited, as observed by Koester & Grapow (2021). The distributional (and fiscal) impact of such changes is a matter of empirical investigation and may vary considerably, depending on their location at the income distribution (i.e. affecting low or high-income earners) and on whether they lead to increased or decreased levels of employment.

Second, as in the first and second scenarios all policies are kept constant, the results of those scenarios do not account for any existing indexation rules of the tax-benefit systems. This is, of course, a stylised assumption. As seen in the previous section, only a handful of EU countries have systematic indexation rules that can reduce the magnitude and the adverse distributional effects of PIT-driven fiscal drag; most Member States still lack automatic indexation and adapt their personal income tax policies in ad hoc ways, if at all (Beer et al., 2023). This assumption allows us to stress the importance of tax-benefit indexation, as it allows us to identify the countries whose tax/benefit systems are most prone to fiscal drag and benefit erosion. In other words, in order to get the most out of wage indexation in those countries, this policy would have to be associated to transparent indexation rules for the whole tax-benefit system, or other ad-hoc compensation mechanisms that shelter employees from the adverse effects of fiscal drag and benefit erosion.

Keeping in mind the above-mentioned caveats, this research offers a sound approximation of the first-order fiscal and distributional impact of a wage indexation mechanism in all EU Member States. Given the public interest in the question addressed and the potential scope for improving policies currently in place, research based on microsimulation can offer useful insights on this complex issue, and an evidence-based way to identify the policies that are better suited to mitigate the impact of high inflation on European households.

References

- Amores, A.F., Basso, H., Bischl, S., De Agostini, P., De Poli, S., Dicarolo, E., Flevotomou, M., Freier, M., Maier, S., García-Miralles, E., Pidkuyko, M., Ricci, M. and Riscado, S., Inflation, Fiscal Policy and Inequality, European Commission, 2023, JRC135517.
- Amores, A.F., Christl, M., De Agostini, P., De Poli, S. and Maier, S., Limiting prices or transferring money An ex ante assessment of alternative measures to cope with the hike in energy prices, European Commission, 2023, JRC134801.
- Ascari, G, Branzoli, N. & Castelnuovo, E. (2011) ‘Trend Inflation, Wage Indexation, and Determinacy in the U.S.’, *Quaderni di Dipartimento*, No. 153, Università degli Studi di Pavia, Dipartimento di Economia Politica e Metodi Quantitativi (EPMQ), Pavia.
- Atkinson, A. B., Leventi, C. Nolan, B., Sutherland, H., & Tasseva, I. (2017), ‘Reducing poverty and inequality through tax–benefit reform and the minimum wage: the UK as a case-study’, *Journal of Economic Inequality* 15(4), 303–23.
- Attinasi, M.G. et al. (2016) ‘The effect of low inflation on public finances’, *Banca d’Italia, Beyond the Austerity Dispute: New Priorities for Fiscal Policy*, No 20.
- Balasundharam, V., Kayastha, A. & Poplawski-Ribeiro M. (2023) ‘Inflation Indexation in Public Finances: A Global Dataset on Current Practices’, *IMF Working Paper* 23/264.
- Ball, L., & Cecchetti, S. G. (1991) ‘Wage indexation and discretionary monetary policy’, *The American Economic Review*, 81(5), 1310-1319.
- Beer, S., Griffiths, M. & Klemm, A. (2023), ‘Tax Distortions from Inflation: What are they and How to Deal with them?’, *IMF Working Papers* 23/18.
- Checherita-Westphal, C. (2022). ‘Public wage and pension indexation in the euro area’, *Economic Bulletin Boxes*, 1.
- Cowell, F. A. (2000), Measurement of inequality. In: Atkinson, A.B. and Bourguignon, F., eds. *Handbook of Income Inequality*. Amsterdam: North Holland, 87–166.
- European Commission (2022), ‘European Economic Forecast, Autumn 2020’, *Luxembourg: EC*, Available at: https://economy-finance.ec.europa.eu/system/files/2023-02/ip187_en.pdf accessed 30 March 2023.
- Eurostat (2023), Euroindicators on annual inflation rates, 23 February 2023, <https://ec.europa.eu/eurostat/documents/2995521/16056046/2-23022023-AP-EN.pdf/4a097379-8598-01ff-12d8-75d72570ca85>.
- Fischer, S. (1983), ‘Indexing and inflation’, *Journal of Monetary Economics*, 12(4), 519-541.
- Foster, J., Greer, J., & Thorbecke, E. (1984), ‘A Class of Decomposable Poverty Measures’, *Econometrica* 52(3), 761–766.

- Fuenmayor Fernández, A., Granell, R., Higón-Tamarit, F. J. & Sanchis-Llopis, J. A. (2005), 'Inequality Effects of Inflation: The 'Bracket Creep' Effect in the Spanish Income Tax System', *LINEEX Working Paper No. 08/05*.
- Gautier, E., Roux, S. & Suarez Castillo, M. (2022), 'How do wage setting institutions affect wage rigidity? Evidence from French micro data', *Labour Economics*, Vol. 78.
- Holland, A. S. (1995), 'Inflation and wage indexation in the postwar United States', *The Review of Economics and Statistics*, 172-176.
- Immervoll, H. (2005), 'Falling up the stairs: The effects of 'bracket creep' on household incomes', *Review of Income and Wealth* 51(1), 37–62.
- International Monetary Fund (2023), 'Fiscal Monitor: On the Path to Policy Normalization'. *IMF*.
- Jaravel, X. (2021), 'Inflation inequality: Measurement, causes, and policy implications', *Annual Review of Economics*, 13, 599-629.
- Koester, G., & Grapow, H. (2021), 'The prevalence of private sector wage indexation in the euro area and its potential role for the impact of inflation on wages', *ECB Economic Bulletin*, Issue 7/2021.
- Lee, S. K. (2011), 'The Effect of fiscal drag on tax revenue and tax burden', *Institutional Economics and National Competitiveness*, 205-225.
- Levy, H., Nogueira, J. R., Siqueira, R. B. D., Immervoll, H., & O'Donoghue, C. (2010), 'Simulating the impact of inflation on the progressivity of personal income tax in Brazil', *Revista Brasileira de Economia*, 64, 405-422.
- Immervoll, H., Levy, H., Lietz, C., Mantovani, D., & Sutherland, H. (2006), 'The sensitivity of poverty rates to macro-level changes in the European Union', *Cambridge Journal of Economics* 30(2), 181–199.
- Maier, S., Ricci, M., Almeida, V., Christl, M., Cruces, H., De Poli, S., Grünberger, K., Hernández, A., Hufkens, T., Hupteva, D., Ivaškaitė-Tamošiūnė, V., Jędrych, M., Mazzon, A., Palma, B., Papini, A., Picos, F., Tumino, A., Vázquez, E. (2022), 'EUROMOD Baseline Report', JRC Working Papers on Taxation and Structural Reforms No 1/2022, European Commission, Seville, JRC128718.
- Matsaganis, M., & Theodoropoulou, S. (2022) 'The return of inflation', *Policy*.
- OECD (2023), 'Taxing Wages 2023: Indexation of Labour Taxation and Benefits in OECD Countries', *OECD Publishing*, Paris, <https://doi.org/10.1787/8c99fa4d-en>.
- Paulus, A., Sutherland, H., & Tasseva, I. (2020), 'Indexing Out of Poverty? Fiscal Drag and Benefit Erosion in Cross-National Perspective', *Review of Income and Wealth*, 66(2), 311-333.

- Ragan Jr, J. F., & Bratsberg, B. (2000) 'Un-COLA: Why Have Cost-of-Living Clauses Disappeared from Union Contracts and Will They Return?', *Southern Economic Journal*, 67(2), 304-324.
- Sutherland, H., Hancock, R., Hills, J., & Zantomio, F. (2008), 'Keeping up or falling behind? The impact of benefit and tax uprating on incomes and poverty', *Fiscal Studies* 29(4), 467–498.
- Sutherland, H., & Figari, F. (2013), 'EUROMOD: the European Union tax-benefit microsimulation model', *International Journal of Microsimulation* 6(1), 4–26.
- Tanzi, V., Blejer, M.I. and Teijeiro, M.O. (1987) 'Inflation and the Measurement of Fiscal Deficits', Staff Papers, Vol. 34, No 4, International Monetary Fund.

Appendix

Table A.1 Inflation forecast

Country	CPI inflation	GDP inflation
BE	7.8	4.5
BG	11.9	9.5
CZ	11.7	7.4
DK	5.1	3.3
DE	6.5	5.4
EE	11.2	8.1
IE	6.1	4.8
EL	6.3	4.8
ES	6.3	3.7
FR	4.9	2.2
HR	6.1	3.8
IT	5.9	3.1
CY	5.2	4.5
LV	9.4	7.2
LT	12.5	7.4
LU	6.8	4.0
HU	9.0	5.6
MT	4.5	2.8
NL	7.4	3.8
AT	6.0	3.4
PL	11.6	10.0
PT	4.4	2.9
RO	8.9	9.5
SI	6.1	3.3
SK	9.8	6.6
FI	4.5	3.8
SE	5.3	4.3

Source: AMECO (Autumn 2022 vintage).

Table A.2 Change in direct taxes and means-tested benefits (MTB) as % of change in employment income – Scenarios 1 and 2

Country	Scenario 1			Scenario 2		
	Change in employment income (1)	Change in direct taxes as % of (1)	Change in MTB as % of (1)	Change in employment income (2)	Change in direct taxes as % of (2)	Change in MTB as % of (2)
EL	5.0	76.3	40.6	4.8	76.2	39.0
DK	5.0	77.3	23.2	3.3	77.1	25.2
HU	5.0	80.9	1.8	5.6	80.9	1.8
FR	5.0	83.0	44.1	2.2	82.3	50.3
PL	5.0	85.1	18.9	10.0	85.8	19.3
BG	5.0	90.4	30.2	9.5	90.5	32.0
IT	5.0	92.9	25.2	3.1	92.6	25.5
RO	5.0	96.0	23.3	9.5	95.7	25.5
FI	5.0	108.4	31.3	3.8	108.1	31.5
SE	5.0	112.2	32.5	4.3	111.8	32.9
LT	5.0	120.7	47.2	7.4	120.8	40.6
PT	5.0	122.1	50.7	2.9	120.6	49.8
LV	5.0	124.3	31.1	7.2	124.5	30.9
BE	5.0	126.6	11.3	4.5	126.5	11.1
LU	5.0	127.1	60.3	4.0	126.8	61.8
IE	5.0	133.0	21.0	4.8	132.9	21.2
EE	5.0	134.5	31.1	8.1	134.4	30.8
DE	5.0	137.9	55.4	5.4	138.0	55.1
SI	5.0	138.8	59.4	3.3	138.6	61.9
ES	5.0	139.0	19.3	3.7	138.8	19.7
AT	5.0	146.6	16.1	3.4	146.1	17.2
CZ	5.0	161.3	117.9	7.4	162.2	114.4
NL	5.0	163.0	32.6	3.8	162.5	33.2
SK	5.0	163.1	68.4	6.6	163.4	59.2
MT	5.0	164.6	30.7	2.8	164.5	27.4
CY	5.0	164.7	45.4	4.5	164.3	46.4
HR	5.0	186.0	71.4	3.8	183.1	77.8

Note: Countries are ranked according to the magnitude of the change in direct taxes in Scenario 1.

Source: Own elaboration using EUROMOD version I4.0+.

Table A.3 Changes in percentage points of the at risk of poverty rates calculated using a floating poverty line

Country	SCENARIO 1	SCENARIO 2	SCENARIO 3
BE	0.6	0.6	-0.8
BG	0.5	1.0	-0.3
CZ	0.5	0.8	-0.4
DK	0.7	0.5	-0.6
DE	0.5	0.5	-0.1
EE	0.7	1.2	-0.3
IE	0.7	0.7	-0.4
EL	0.1	0.1	-0.6
ES	0.2	0.0	-0.1
FR	0.8	1.0	-0.2
HR	0.5	0.3	-0.1
IT	0.1	0.0	-0.6
CY	0.8	0.6	-0.5
LV	0.4	0.6	-0.4
LT	0.7	0.9	-0.4
LU	0.4	0.3	-0.1
HU	0.6	0.7	0.1
MT	0.4	0.1	-0.5
NL	0.7	0.5	-1.4
AT	0.1	0.0	-0.5
PL	0.5	1.0	0.0
PT	0.5	0.2	-0.2
RO	0.4	0.9	0.6
SI	0.8	0.5	0.0
SK	0.9	0.9	0.1
FI	0.8	0.6	-0.3
SE	0.9	0.8	-0.2

Source: Own elaboration using EUROMOD version I4.0+.

Table A.4 Percentage of individuals earning prevalently employment income in each quintile of the disposable income distribution calculated in the baseline

Country	Q1	Q2	Q3	Q4	Q5	ALL
BE	0.2	39.0	24.0	65.6	81.6	41.3
BG	0.0	30.9	41.4	64.8	76.6	42.5
CZ	0.1	23.1	29.2	69.5	80.7	39.9
DK	5.6	44.0	43.8	76.0	77.1	49.3
DE	0.8	44.2	48.5	67.0	78.9	47.9
EE	3.6	35.1	42.7	79.9	87.5	49.8
IE	0.1	40.1	37.2	70.4	76.2	41.0
EL	0.2	27.6	25.6	46.0	48.5	25.5
ES	1.9	47.1	46.2	63.2	66.2	42.8
FR	0.1	34.8	47.4	62.2	64.9	41.2
HR	0.1	10.4	25.8	68.9	77.0	35.8
IT	0.1	15.2	23.5	51.4	55.6	28.1
CY	0.6	32.1	50.4	69.2	70.0	43.2
LV	1.1	25.4	41.7	78.4	87.9	46.9
LT	0.1	26.4	42.7	73.5	78.2	43.8
LU	0.3	29.0	63.1	65.8	70.7	44.5
HU	1.1	38.9	41.3	65.9	74.0	43.3
MT	0.0	30.4	43.3	65.9	80.0	43.8
NL	3.5	48.2	42.3	66.9	72.1	46.6
AT	1.1	43.2	50.4	59.6	70.2	44.9
PL	0.1	22.2	32.4	64.7	76.5	37.8
PT	0.2	24.7	48.4	72.4	65.0	40.7
RO	0.0	1.3	27.8	55.7	85.2	34.0
SI	0.1	11.8	37.3	69.7	81.3	40.0
SK	0.3	18.2	31.8	71.6	87.7	41.2
FI	7.4	28.8	37.2	71.5	77.5	44.5
SE	0.4	40.8	42.0	80.4	83.7	49.4

Source: Own elaboration using EUROMOD version I4.0+.

Table A.5 Effect of fiscal drag on the amount of income tax paid by wage quintile (yearly amounts, EUR)

Belgium			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	51,429,396	74,465,604	44.8
Quintile 2	2,555,042,544	2,960,005,728	15.9
Quintile 3	6,788,848,920	7,486,781,184	10.3
Quintile 4	11,001,359,496	11,976,554,604	8.9
Quintile 5	24,793,743,108	26,526,746,592	7.0
All	45,190,422,528	49,024,555,008	8.5
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.1	0.2	0.0
Quintile 2	5.7	6.0	0.4
Quintile 3	15.0	15.3	0.3
Quintile 4	24.3	24.4	0.1
Quintile 5	54.9	54.1	-0.8
All	100.0	100.0	0.0
Bulgaria			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	100,538,864	105,222,029	4.7
Quintile 2	224,484,662	235,465,861	4.9
Quintile 3	325,566,484	341,645,384	4.9
Quintile 4	508,489,492	533,429,491	4.9
Quintile 5	1,132,605,308	1,189,981,597	5.1
All	2,291,684,816	2,405,744,350	5.0
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	4.4	4.4	0.0
Quintile 2	9.8	9.8	0.0
Quintile 3	14.2	14.2	0.0
Quintile 4	22.2	22.2	0.0
Quintile 5	49.4	49.5	0.0
All	100.0	100.0	0.0
Denmark			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	2,191,841,841	2,263,565,230	3.3
Quintile 2	6,751,761,962	7,107,310,812	5.3
Quintile 3	10,167,733,564	10,736,992,397	5.6
Quintile 4	13,237,901,228	13,984,927,288	5.6
Quintile 5	25,184,126,988	26,693,181,594	6.0
All	57,533,364,408	60,785,975,042	5.7
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	3.8	3.7	-0.1

Quintile 2	11.7	11.7	-0.1
Quintile 3	17.7	17.7	0.0
Quintile 4	23.0	23.0	0.0
Quintile 5	43.8	43.9	0.1
All	100.0	100.0	0.0
Germany			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	3,089,194,092	3,431,713,752	11.1
Quintile 2	18,180,895,992	20,160,607,092	10.9
Quintile 3	37,378,475,628	40,904,622,828	9.4
Quintile 4	63,223,543,200	68,728,215,228	8.7
Quintile 5	144,911,954,724	156,865,553,076	8.3
All	266,784,055,296	290,090,704,896	8.7
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	1.2	1.2	0.0
Quintile 2	6.8	6.9	0.1
Quintile 3	14.0	14.1	0.1
Quintile 4	23.7	23.7	0.0
Quintile 5	54.3	54.1	-0.3
All	100.0	100.0	0.0
Estonia			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	17,344,356	18,829,128	8.6
Quintile 2	75,577,284	86,147,880	14.0
Quintile 3	206,887,896	227,351,604	9.9
Quintile 4	404,562,228	440,584,284	8.9
Quintile 5	813,499,320	857,470,404	5.4
All	1,517,871,072	1,630,383,360	7.4
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	1.1	1.1	0.0
Quintile 2	5.0	5.3	0.3
Quintile 3	13.6	13.9	0.3
Quintile 4	26.6	27.0	0.4
Quintile 5	53.6	52.6	-1.0
All	100.0	100.0	0.0
Ireland			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	89,365,548	99,382,848	11.2
Quintile 2	698,398,164	791,553,276	13.3
Quintile 3	2,081,391,444	2,314,389,684	11.2
Quintile 4	4,588,641,504	5,028,035,268	9.6
Quintile 5	13,349,156,004	14,292,388,512	7.1

All	20,806,952,448	22,525,750,272	8.3
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.4	0.4	0.0
Quintile 2	3.4	3.5	0.2
Quintile 3	10.0	10.3	0.3
Quintile 4	22.0	22.3	0.3
Quintile 5	64.2	63.5	-0.7
All	100.0	100.0	0.0
Greece			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	61,549,956	61,604,232	0.1
Quintile 2	85,371,600	88,735,848	3.9
Quintile 3	227,761,764	279,763,956	22.8
Quintile 4	605,405,496	692,861,064	14.4
Quintile 5	2,037,648,576	2,220,941,088	9.0
All	3,017,737,344	3,343,906,176	10.8
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	2.0	1.8	-0.2
Quintile 2	2.8	2.7	-0.2
Quintile 3	7.6	8.4	0.8
Quintile 4	20.1	20.7	0.7
Quintile 5	67.5	66.4	-1.1
All	100.0	100.0	0.0
Spain			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	165,882,444	180,573,300	8.9
Quintile 2	344,973,396	371,684,628	7.7
Quintile 3	1,838,735,304	2,671,714,800	45.3
Quintile 4	11,302,151,172	12,621,527,172	11.7
Quintile 5	41,575,609,536	44,929,843,164	8.1
All	55,227,353,088	60,775,342,080	10.1
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.3	0.3	0.0
Quintile 2	0.6	0.6	0.0
Quintile 3	3.3	4.4	1.1
Quintile 4	20.5	20.8	0.3
Quintile 5	75.3	73.9	-1.3
All	100.0	100.0	0.0
France			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	4,968,239,988	5,166,327,024	4.0
Quintile 2	11,864,328,096	12,476,489,136	5.2

Quintile 3	16,751,774,184	17,830,090,896	6.4
Quintile 4	23,896,471,188	25,496,623,428	6.7
Quintile 5	67,911,824,136	73,068,195,696	7.6
All	125,392,637,952	134,037,725,184	6.9
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	4.0	3.8	-0.1
Quintile 2	9.5	9.3	-0.1
Quintile 3	13.4	13.3	-0.1
Quintile 4	19.1	19.0	0.0
Quintile 5	54.2	54.5	0.3
All	100.0	100.0	0.0

Croatia

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	3,303,952	3,447,999	4.4
Quintile 2	12,858,974	19,115,816	48.7
Quintile 3	69,326,892	84,191,453	21.4
Quintile 4	192,710,800	219,176,085	13.7
Quintile 5	653,807,598	712,919,396	9.0
All	932,008,233	1,038,850,742	11.5
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.3	0.3	0.0
Quintile 2	1.4	1.8	0.5
Quintile 3	7.4	8.1	0.7
Quintile 4	20.7	21.1	0.4
Quintile 5	70.2	68.6	-1.5
All	100.0	100.0	0.0

Italy

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	-199,975,452	-125,397,312	-37.3
Quintile 2	4,710,656,424	5,626,368,780	19.4
Quintile 3	11,031,826,452	12,362,785,740	12.1
Quintile 4	18,366,180,600	20,464,141,092	11.4
Quintile 5	56,379,590,220	60,547,077,180	7.4
All	90,288,279,552	98,874,974,208	9.5
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	-0.2	-0.1	0.1
Quintile 2	5.2	5.7	0.5
Quintile 3	12.2	12.5	0.3
Quintile 4	20.3	20.7	0.4
Quintile 5	62.4	61.2	-1.2
All	100.0	100.0	0.0

Cyprus

	BASELINE	SCENARIO 1	DIFFERENCE
--	-----------------	-------------------	-------------------

	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	1,350,888	1,358,064	0.5
Quintile 2	3,224,316	3,333,300	3.4
Quintile 3	4,037,244	4,220,316	4.5
Quintile 4	27,681,960	36,935,748	33.4
Quintile 5	529,509,096	581,159,136	9.8
All	565,803,504	627,006,576	10.8
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.2	0.2	0.0
Quintile 2	0.6	0.5	0.0
Quintile 3	0.7	0.7	0.0
Quintile 4	4.9	5.9	1.0
Quintile 5	93.6	92.7	-0.9
All	100.0	100.0	0.0
Latvia			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	26,409,636	29,555,724	11.9
Quintile 2	132,531,756	146,660,892	10.7
Quintile 3	275,543,400	297,780,720	8.1
Quintile 4	470,143,800	503,645,040	7.1
Quintile 5	1,111,707,000	1,178,307,768	6.0
All	2,016,335,616	2,155,950,144	6.9
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	1.3	1.4	0.1
Quintile 2	6.6	6.8	0.2
Quintile 3	13.7	13.8	0.1
Quintile 4	23.3	23.4	0.0
Quintile 5	55.1	54.7	-0.5
All	100.0	100.0	0.0
Lithuania			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	53,306,244	60,991,536	14.4
Quintile 2	288,489,696	316,730,772	9.8
Quintile 3	539,522,520	580,055,232	7.5
Quintile 4	874,593,216	931,742,952	6.5
Quintile 5	1,838,793,252	1,940,192,820	5.5
All	3,594,705,024	3,829,713,408	6.5
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	1.5	1.6	0.1
Quintile 2	8.0	8.3	0.2
Quintile 3	15.0	15.1	0.1
Quintile 4	24.3	24.3	0.0
Quintile 5	51.2	50.7	-0.5

All	100.0	100.0	0.0
Luxemburg			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	4,612,308	7,725,588	67.5
Quintile 2	90,045,468	106,761,636	18.6
Quintile 3	298,345,740	338,036,940	13.3
Quintile 4	795,338,556	871,835,064	9.6
Quintile 5	2,408,898,036	2,581,984,980	7.2
All	3,597,240,192	3,906,344,064	8.6
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.1	0.2	0.1
Quintile 2	2.5	2.7	0.2
Quintile 3	8.3	8.6	0.4
Quintile 4	22.1	22.3	0.2
Quintile 5	67.0	66.1	-0.9
All	100.0	100.0	0.0
Hungary			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	338,699,870	352,272,407	4.0
Quintile 2	838,202,079	876,874,890	4.6
Quintile 3	1,151,901,845	1,205,963,706	4.7
Quintile 4	1,445,235,319	1,515,246,279	4.8
Quintile 5	2,356,532,829	2,474,729,610	5.0
All	6,130,572,176	6,425,087,143	4.8
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	5.5	5.5	0.0
Quintile 2	13.7	13.6	0.0
Quintile 3	18.8	18.8	0.0
Quintile 4	23.6	23.6	0.0
Quintile 5	38.4	38.5	0.1
All	100.0	100.0	0.0
Malta			
	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	462,576	749,856	62.1
Quintile 2	13,467,648	16,750,668	24.4
Quintile 3	48,113,652	56,255,544	16.9
Quintile 4	108,936,900	121,694,304	11.7
Quintile 5	334,813,560	362,278,620	8.2
All	505,794,336	557,728,992	10.3
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.1	0.1	0.0
Quintile 2	2.7	3.0	0.3

Quintile 3	9.5	10.1	0.6
Quintile 4	21.5	21.8	0.3
Quintile 5	66.2	65.0	-1.2
All	100.0	100.0	0.0

Netherlands

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	178,108,872	183,888,144	3.2
Quintile 2	522,078,948	583,113,804	11.7
Quintile 3	1,950,916,668	2,336,251,668	19.8
Quintile 4	7,067,581,212	8,440,228,392	19.4
Quintile 5	31,872,413,988	34,857,264,060	9.4
All	41,591,098,368	46,400,747,520	11.6
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.4	0.4	0.0
Quintile 2	1.3	1.3	0.0
Quintile 3	4.7	5.0	0.3
Quintile 4	17.0	18.2	1.2
Quintile 5	76.6	75.1	-1.5
All	100.0	100.0	0.0

Austria

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	-306,935,796	-316,233,216	3.0
Quintile 2	50,333,196	196,346,940	290.1
Quintile 3	1,913,920,908	2,264,592,648	18.3
Quintile 4	4,341,783,804	4,910,636,388	13.1
Quintile 5	14,507,535,132	15,848,032,128	9.2
All	20,506,636,800	22,903,374,336	11.7
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	-1.5	-1.4	0.1
Quintile 2	0.3	0.9	0.6
Quintile 3	9.3	9.9	0.6
Quintile 4	21.2	21.4	0.3
Quintile 5	70.8	69.2	-1.6
All	100.0	100.0	0.0

Poland

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	1,051,506,401	1,138,412,137	8.3
Quintile 2	2,459,852,621	2,621,141,521	6.6
Quintile 3	3,482,777,370	3,692,652,538	6.0
Quintile 4	4,959,080,608	5,244,372,063	5.8
Quintile 5	10,931,037,634	11,679,794,809	6.8
All	22,884,254,741	24,376,372,488	6.5

	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	4.6	4.7	0.1
Quintile 2	10.8	10.8	0.0
Quintile 3	15.2	15.1	-0.1
Quintile 4	21.7	21.5	-0.2
Quintile 5	47.8	47.9	0.1
All	100.0	100.0	0.0

Portugal

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	93,346,812	98,673,420	5.7
Quintile 2	220,472,364	264,342,888	19.9
Quintile 3	619,833,180	711,003,084	14.7
Quintile 4	1,613,844,708	1,803,305,088	11.7
Quintile 5	7,753,159,392	8,354,448,336	7.8
All	10,300,656,384	11,231,772,672	9.0

	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	0.9	0.9	0.0
Quintile 2	2.1	2.3	0.2
Quintile 3	6.0	6.3	0.3
Quintile 4	15.7	16.1	0.4
Quintile 5	75.3	74.4	-0.9
All	100.0	100.0	0.0

Romania

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	431,879,488	473,717,728	9.7
Quintile 2	755,651,448	802,971,957	6.3
Quintile 3	905,872,810	949,037,927	4.8
Quintile 4	1,218,888,741	1,277,392,490	4.8
Quintile 5	1,783,612,811	1,869,726,871	4.8
All	5,095,905,258	5,372,847,166	5.4

	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	8.5	8.8	0.3
Quintile 2	14.8	14.9	0.1
Quintile 3	17.8	17.7	-0.1
Quintile 4	23.9	23.8	-0.1
Quintile 5	35.0	34.8	-0.2
All	100.0	100.0	0.0

Slovenia

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	124,769,460	136,574,940	9.5
Quintile 2	222,897,372	243,567,732	9.3
Quintile 3	341,165,964	371,576,952	8.9

Quintile 4	525,777,312	567,449,088	7.9
Quintile 5	1,266,770,976	1,359,621,804	7.3
All	2,481,381,120	2,678,790,528	8.0
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	5.0	5.1	0.1
Quintile 2	9.0	9.1	0.1
Quintile 3	13.8	13.9	0.1
Quintile 4	21.2	21.2	0.0
Quintile 5	51.0	50.8	-0.3
All	100.0	100.0	0.0

Slovakia

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	95,345,676	111,363,528	16.8
Quintile 2	275,555,700	306,533,568	11.2
Quintile 3	422,877,372	464,722,380	9.9
Quintile 4	577,035,504	627,033,840	8.7
Quintile 5	1,016,036,016	1,097,391,528	8.0
All	2,386,850,304	2,607,044,928	9.2
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	4.0	4.3	0.3
Quintile 2	11.5	11.8	0.2
Quintile 3	17.7	17.8	0.1
Quintile 4	24.2	24.0	-0.1
Quintile 5	42.6	42.1	-0.5
All	100.0	100.0	0.0

Finland

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline
Quintile 1	366,449,088	372,497,928	1.6
Quintile 2	1,264,757,280	1,408,514,016	11.4
Quintile 3	2,643,256,884	2,925,646,572	10.7
Quintile 4	4,449,557,568	4,847,455,512	8.9
Quintile 5	10,976,934,144	11,747,328,372	7.0
All	19,700,955,648	21,301,443,072	8.1
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	1.9	1.8	-0.1
Quintile 2	6.4	6.6	0.2
Quintile 3	13.4	13.7	0.3
Quintile 4	22.6	22.8	0.2
Quintile 5	55.7	55.2	-0.6
All	100.0	100.0	0.0

Sweden

	BASELINE	SCENARIO 1	DIFFERENCE
	Total taxes paid	Total taxes paid	% of Baseline

Quintile 1	1,107,991,870	1,147,727,500	3.6
Quintile 2	4,428,193,507	4,689,153,050	5.9
Quintile 3	6,748,528,110	7,179,451,864	6.4
Quintile 4	9,280,254,408	9,976,615,230	7.5
Quintile 5	23,092,014,360	25,065,274,215	8.6
All	44,656,983,840	48,058,220,856	7.6
	% tax paid in each quintile	% tax paid in each quintile	P.p. w.r.t. Baseline
Quintile 1	2.5	2.4	-0.1
Quintile 2	9.9	9.8	-0.2
Quintile 3	15.1	14.9	-0.2
Quintile 4	20.8	20.8	0.0
Quintile 5	51.7	52.2	0.5
All	100.0	100.0	0.0

Source: Own elaboration using EUROMOD version I4.0+. The population is restricted to wage earners, as defined in section 4.3