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# Households' income and the cushioning effect of fiscal policy measures during the Great Lockdown

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# Households' income and the cushioning effect of fiscal policy measures during the Great Lockdown<sup>1</sup>

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## Abstract

We analyse the impact of the COVID-19 crisis on EU households' income and assess the cushioning effect of discretionary policy measures taken by the EU Member States. Our assessment is based on the European Commission Spring 2020 forecasts and counterfactual scenarios under a no policy-change assumption. Our analysis suggests that over the course of 2020, on average, households' disposable income in the EU would fall by -5.9% due to the COVID-19 crisis without discretionary policy measures, and by -3.6% with policy intervention, pointing to a significant cushioning effect of these measures in protecting households against income losses. Furthermore, our results confirm that the impact of the COVID-19 crisis is likely to be highly regressive, with the poorest households' being the most severely hit. However, discretionary policy measures are expected to contain the regressive effects of the recession, resulting in a quite homogeneous impact along the income distribution. Poverty, as measured by the at risk of poverty (AROP) rate, would increase significantly, even in presence of policy measures (+1.7pp), although this result depends on whether we anchor the poverty line to its pre-crisis level. When not doing so, the impact of the COVID crisis on poverty becomes very close to the one observed in the aftermath of the financial crisis (i.e. +0.1pp) once policy measures are considered. Given the sheer size of the COVID shock, we might consider that the anchored poverty line may provide a more reliable assessment of the impact of the Great lockdown on poverty, however. Policy interventions are therefore seen as instrumental in cushioning against the impact of the crisis on inequality and poverty. Finally, our results suggest that the social impact of the Great Lockdown is likely to be much larger than the one experienced during the 2008/2009 financial crisis, at least for what concerns the immediate impact of the crisis.

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## 1. Introduction

Preliminary indicators on job destruction and unemployment benefits claims across European Union (EU) countries suggest that the impact of the COVID-19 pandemic on households will in all likelihood be exceptionally high (OECD, 2020).<sup>2</sup> Early findings suggest that the risk of job loss is highest in southern Europe and France (Doerr and Gambacorta, 2020). At the country level, young, low-educated, low-income workers appear to face the highest income and employment risk (see Pouliakas and Branka (2020) for the EU; Galasso (2020) for Italy; Adams-Prassl et al. (2020b) for Germany; Bradley et al. (2020) for the UK; Beland et al. (2020), Cajner et al. (2020), Cho and Winters (2020), Mongey et al. (2020) and Shibata (2020) for the US; and Aum et al. (2020) for South Korea).<sup>3</sup> For example, Joyce and Xu (2020) find that low earners in the UK are seven times as likely as high earners to have worked in a sector shut down following the lockdown. The consequences of the COVID-19 crisis on households' income in particular, although unknown with precision yet, raise serious concerns.

Policies aimed at protecting those most directly hit by the crisis, either through discretionary measures (e.g., income subsidies or tax rebates), or through automatic stabilisation (e.g. unemployment benefits or lower taxes paid as a result of job loss and/or decrease in market incomes), could partly reduce the toll on household income and consumption.<sup>4</sup> Recent evidence from Denmark (Bennedsen et al., 2020), for instance, shows that without government support, in the form of labour subsidies, firms are expected to have proceeded with layoffs instead. In addition, Chetty et al. (2020) find that stimulus payments to low-income households in the US increased consumer spending sharply.<sup>5</sup>

The existing evidence suggests that Covid-19 crisis will lead to an increase in both poverty and wage inequality in all European countries. Palomino et al. (2020), for instance, estimate the Gini coefficient to increase 2.2% in all Europe. Moreover, historic data suggest that past events of this kind, even though much smaller in scale, have led to significant, persistent increases in the net Gini coefficient (by 1.25% five years after the pandemic) and raised the income shares of higher income deciles (Furceri et al., 2020). Therefore, a micro-based

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<sup>2</sup> OECD (2020), Evaluating the initial impact of COVID-19 containment measures on economic activity, Organisation for Economic Cooperation and Development, Paris.

<sup>3</sup> Two groups moreover seem relatively more affected by the Great Lockdown vis-à-vis the Global Financial Crisis (Shibata, 2020): (i) Women were about one third more likely to work in a sector that is now shut down (Joyce and Xu, 2020); and (ii) Non-whites (i.e. Hispanics and blacks), see e.g. Beland et al. (2020), Cho and Winters (2020), Cowan (2020) and Fairlie et al. (2020), and immigrants, see e.g. Borjas & Cassidy (2020), all for the US. Platt and Warwick (2020) document a similar vulnerability of Pakistanis and Bangladeshis in the UK.

<sup>4</sup> Nevertheless, many individuals would remain vulnerable if ensured 50% of their gross privately earned income (Mi dões, 2020). In the EU, at least 99 million individuals live in households that cannot cover for two months of the most basic expenses only from their savings in bank accounts.

<sup>5</sup> The authors find none to modest short-run employment effects. One possible explanation is that firms have almost entirely stopped posting new vacancies; see e.g. Costa Dias et al. (2020) for the UK and Campello et al. (2020) for the US. Similarly, many of those losing their jobs are currently also not (yet) looking for new ones (Coibion et al., 2020).

distributional analysis of the Great Lockdown and the cushioning policies – like the one done by Figari and Fiorio (2020) for Italy, Bronka et al. (2020) and Brewer and Tasseva (2020) for the UK and O’Donogue et al. (2020) and Breine et al. (2020) for Ireland – covering the whole EU is warranted to inform policy decisions.

This paper provides an assessment of the potential impact of policy measures adopted in the wake of the COVID-19 crisis on household income, poverty and inequality in the EU in 2020. We take into account the macroeconomic scenarios included in the European Commission Spring 2020 forecasts. These forecasts embed the impact of discretionary policy measures taken or announced by governments, including those financed thanks to EU support, following the COVID-19 outbreak, and of automatic stabilisers reflecting the existing features of each member state’s tax and transfer system. To obtain estimates for GDP growth in a world with no discrete policy measures, we construct a counterfactual no policy-change scenario based on estimates for the budgetary impact of these measures (taken from the Stability and convergence programmes) together with estimates on spending and revenue fiscal multipliers taken from the literature. For each of these scenarios, we compute and compare households’ income, inequality and poverty indexes, which allows us to estimate the overall impact of the crisis and the cushioning effect of discretionary measures.

We use EUROMOD, the microsimulation model for the EU, to compute the impact of aggregate GDP and employment changes on households’ incomes. One of the many advantages of EUROMOD is that it enables a consistent EU-wide application and comparison. The lack of up-to-date household survey data on incomes for each of the scenarios, however, poses a methodological challenge. We overcome this by applying a reweighting approach (somewhat similar to O’Donogue et al., 2020; and Breine et al., 2020), which reweights the underlying EUROMOD survey micro data from the European Statistics on Income and Living Conditions (EU-SILC) to mimic the aggregate employment and unemployment figures, as well as other macroeconomic targets in each scenario. The advantage of our approach is that we can precisely introduce changes in the population structure of the survey data, introducing observed labour market trends into our micro data. This allows us to analyse the impact of not only employment and unemployment changes, but also the micro impact of the wage compensation schemes covered by the macro information (e.g. total wage compensation). It is important to note that EUROMOD is a static model, i.e. it only measures the impact of policy and income changes without making assumption about behavioural effects. Given that our analysis focuses on the immediate consequences of the COVID crisis, this seems a rather reasonable assumption.

Our main findings are twofold. First, our simulations show that EU member states’ policy interventions have been instrumental in cushioning against the early impact of the crisis on inequality and poverty. Second, to put our results into perspective, we also provide a direct comparison of the simulated impact of the Great Lockdown to the social impact experienced during in the aftermath of the Great Recession starting in 2008. Our results suggest that the social impact of the Great Lockdown is expected to be much larger than experienced during the Great Recession, at least for what concerns the immediate impact of the crisis.

The rest of the paper is organised as follows. Section 2 describes the methodology used in the analysis. Section 3 presents the main findings. Section 4 concludes and discusses some policy implications.

## **2. Methodology**

### ***2.1. Macroeconomic scenarios***

We build two alternative macroeconomic scenarios expressed in terms of differences to a scenario in which COVID-19 did not happen. First, we compare the Commission 2020 Spring forecasts and the Commission 2019 Autumn Forecast to derive information on the estimated impacts of the COVID-19 crisis, including the shutdown of major parts of the economy, as well as policy measures taken by Member States to counteract the strong impact of the pandemic. In detail, we compare the changes in employment, unemployment and total wage compensation, expected for 2020 in the Spring 2020 forecast with those expected for the same year in the Autumn 2019 forecast.

Second, we consider a counterfactual “COVID without discretionary fiscal policy measures”, or no policy-change, scenario, which allows us to gauge the effect of policy measures taken by EU countries to cushion the impacts of the COVID-19 crisis. This counterfactual no policy-change scenario consists of estimating GDP growth and changes in employment if no discretionary policy measures had been taken to mitigate the socio-economic consequences of the COVID-19 pandemic, and only automatic stabilisers would be at play. Consistent with the first scenario, the changes in employment from the counterfactual scenario are compared to those reported in the Commission 2019 Autumn forecasts to derive the effects of the COVID-19 pandemics in absence of discretionary policy measures.

Both these scenarios are analysed by reweighting the baseline 2019 EUROMOD simulations, applying the predicted changes in target variables. Our results are then reported in terms of difference between the scenarios with (or without) discretionary policy measures and the hypothetical scenario without COVID-19.<sup>6</sup>

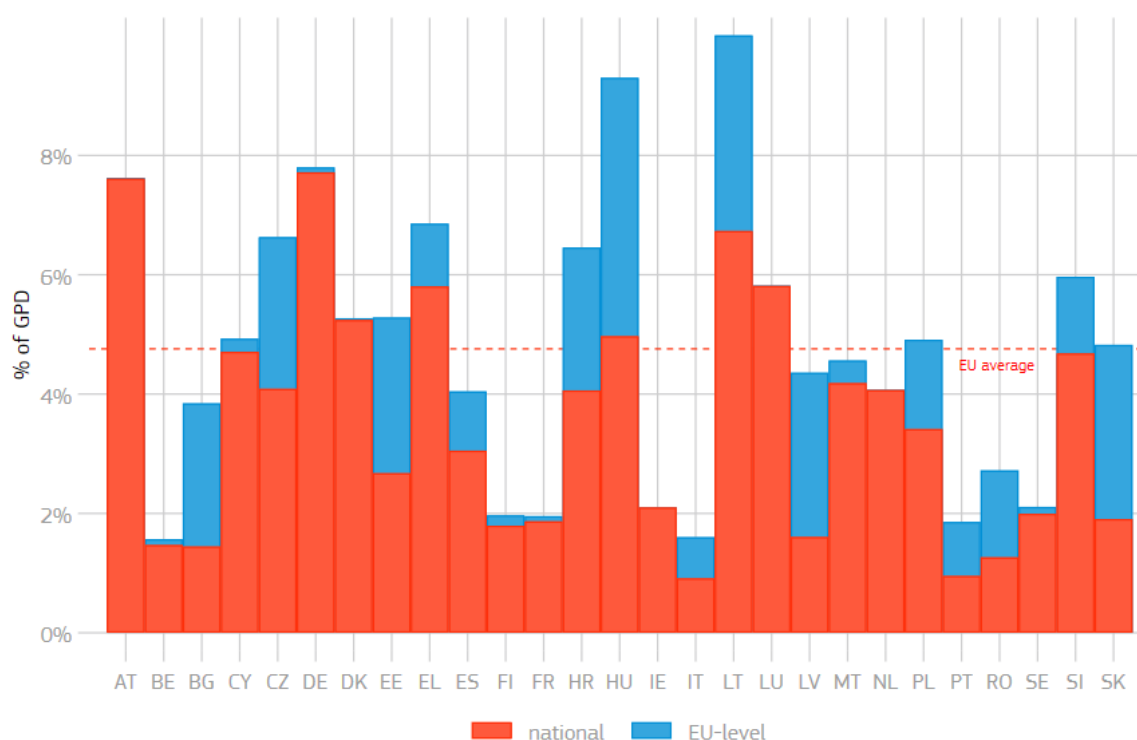
To construct the counterfactual policy scenario, we start by estimating the GDP growth that would be observed in the absence of policy measures. We do this by removing the expected economic effect of COVID-19 related discretionary measures from the Commission Spring Forecasts for GDP growth in 2020, in three main steps. The first step involves obtaining estimates of the budgetary impact of COVID-19 related discretionary policy measures. For national spending and revenue measures, we use the 2020 Stability and Convergence

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<sup>6</sup> Intuitively, the scenario is equivalent to the following: i) reweight EUROMOD 2019 Baseline using the 2019 Commission Autumn Forecast; ii) reweight EUROMOD 2019 Baseline using the 2020 Commission Spring forecast; iii) reweight EUROMOD 2019 Baseline using the predicted changes in the alternative scenario; compare ii) with i) and iii) with i).

Programmes (SCP) submitted by the EU Member States.<sup>7</sup> In the same vein, we include EU-funded public spending through the European Structural and Investment Funds (ESIF) and the Coronavirus Response Investment Initiative (CRII), since they make up a significant share of spending measures in some Member States.<sup>8</sup> The exact amounts for the EU-funded spending by Member States were obtained from the European Commission (EC)'s Directorate General (DG) BUDG. Loans and guarantees ensuring businesses' liquidity are disregarded as either they have no direct budgetary impact or their economic impact is highly uncertain. A summary of the budgetary impact of all the discretionary policy measures removed in the counterfactual scenario is presented in Figure 1.

Figure 1: COVID-19 related discretionary measures with a budgetary impact in 2020



*Note: includes spending and revenue measures and EU-level spending, excludes guarantees*

It is important to note that the counterfactual scenario solely corrects for discretionary measures taken in response to the pandemic, which include only newly introduced policies or significant change to existing policies. For example, for countries that already had wage compensation schemes in place before the crisis (e.g. the Cassa Integrazione in Italy) and did

<sup>7</sup> The only exception is the Netherlands, since the Dutch Stability Programme did not report any estimates of COVID-19 related measures. Instead, data were taken from the Netherlands Bureau for Economic Policy Analysis (CPB) her June projections.

<sup>8</sup> As this mainly concerns a re-orientation of existing EU funds – in contrast to the future recovery package – their distribution across Member States follows the existing agreements, with a focus on newer Member States.

not change the scheme significantly, the automatic changes in spending with these schemes is not included in Figure 1. Similarly, some countries reported large volume effects in the existing unemployment scheme (e.g. Belgium), which are not included. Therefore, the no-policy counterfactual does not allow for conclusions on the impact of automatic stabilisers. Nevertheless, we follow this approach for two important reasons. First, using one, heavily standardized, source (cf. the SCPs) allows for the best possible consistent comparison across countries of our final results. Second, since the counterfactual builds on the Spring 2020 Forecast, it is suitable to rely on the same set of information used to construct said forecast.

The second step involves obtaining estimates of fiscal multipliers, using results from well-established academic contributions, in order to obtain a set of representative small, average and large multipliers.<sup>9</sup> This results in an average multiplier close to, but below, one for public spending – in line with the calibration of the QUEST model. Similarly, the resulting average multiplier for the overall budget balance (0.8) is closely in line with, although slightly above, the average multiplier used in the recommendations under the EU’s excessive deficit procedure in the recent past.<sup>10</sup> Using the annual values for the multipliers obtained from the literature, we estimate quarterly values, by making assumptions on the intensity of the impact of policy measures in each stage of the observed/expected progression of lockdown measures. We consider three possible scenarios for the quarterly evolution of the multipliers, a low, a medium and a high scenario. The multipliers considered in each quarter in each of the three scenarios are presented in Figure 2.

We start from an average multiplier in the first quarter of 2020 as no or little lockdown measures were in place. In the second quarter, the multiplier is assumed to drop considerably in the low scenario, slightly drop in the medium scenario and stay the same in the high scenario, reflecting different possibilities for the severity of the impact of lockdown measures. The impact of discretionary fiscal measures is then expected to strengthen in the third quarter, as lockdown measures are lifted and a possible overshooting of consumption may be observed, with a small increase in the multiplier in the low scenario, a big increase in the medium scenario, and a very big increase in the high scenario. Finally, the situation is assumed to reverse to values closer to the average in the fourth quarter, staying exactly on average in the low scenario, slightly above average in the medium scenario and well above average in the high scenario.

The third step involves multiplying the estimated budgetary impact of the discretionary budget measures (as a percentage of GDP) by the estimated fiscal multipliers, to obtain the

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<sup>9</sup> For example, Gechert (2015) provides a comprehensive meta-analysis of spending and revenue multipliers estimated using both macroeconomic models as well as structural models. Coenen et al. (2012) reconcile the fiscal multipliers from seven prominent structural policy models, including those by the European Central Bank (NAWM), the European Commission (QUEST), the IMF (GIMF) and the OECD (OECD Fiscal). Kilponen et al. (2019), in their turn, look across the dynamic macro models used by the member institutions of the European System of Central Banks. Finally, van der Wielen (2020) documents recent, empirical estimates, with a particular focus on the EU.

<sup>10</sup> As documented by Górnicka et al. (2018), the average multiplier between 2012 and 2015 amounted to 2/3.



GDP impact of these measures, for each of the three multiplier scenarios, low, medium and high. The result of this multiplication is subtracted from DG ECFIN’s Spring Forecasts for GDP growth, resulting in three no policy-change scenarios for GDP growth, as summarised in Figure 3. As can be seen, discretionary policy measures are expected to play a considerable role in mitigating the recessionary impact of the pandemic, with GDP growth for the EU average being between 1.4 and 3.5 percentage points lower in the no policy-change scenario.

Figure 2: Budget balance multipliers used for 2020 no policy-change scenarios

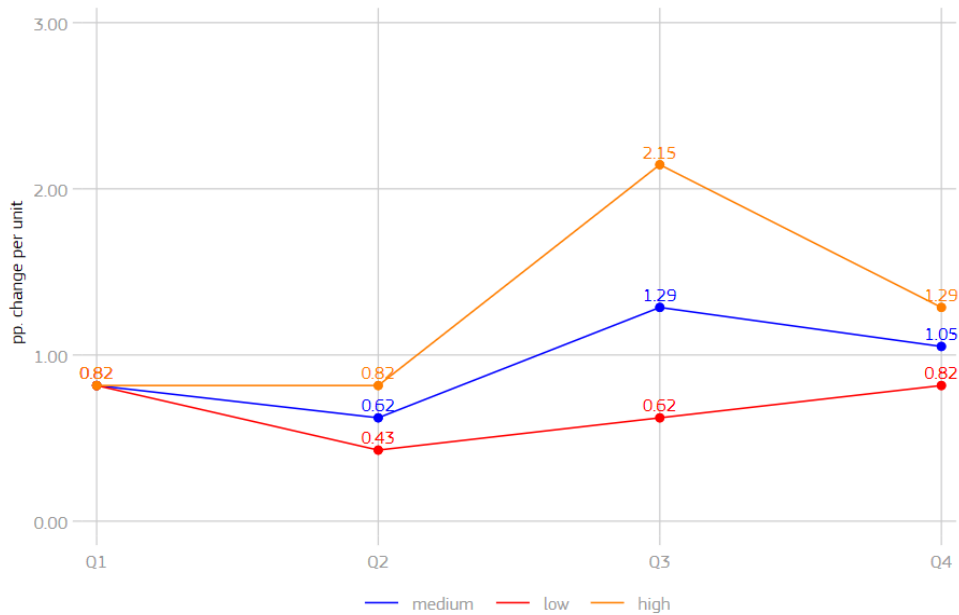
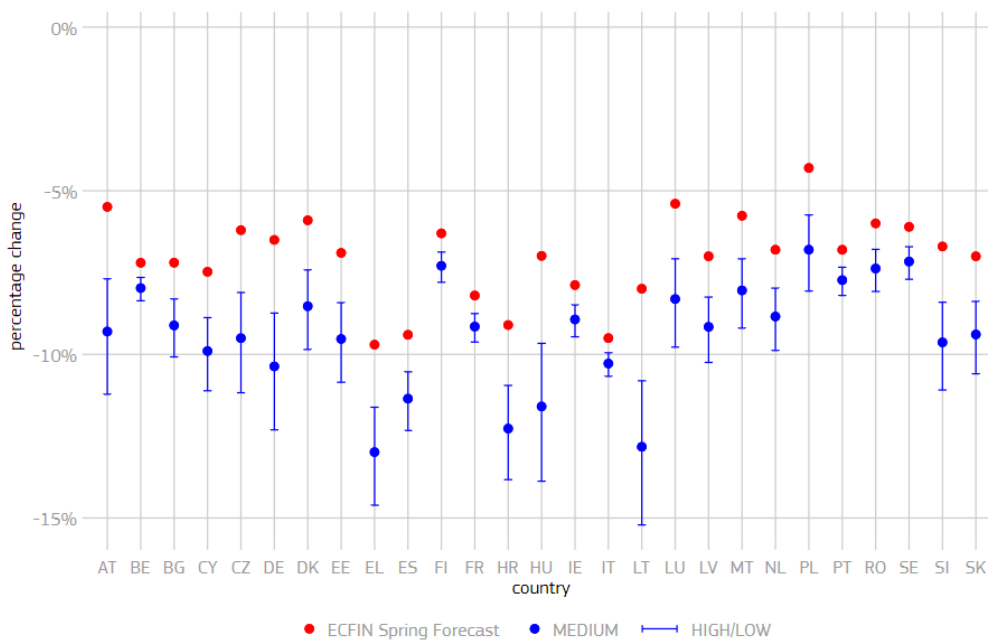


Figure 3: 2020 GDP growth - Commission 2020 Spring Forecast vs. No Policy-change Scenarios



Finally, to implement the no policy-change scenario in the microanalysis, the estimated GDP growth values are translated into an expected impact on employment (expressed in comparison to employment changes reported in the Commission 2019 Autumn forecast). The Trade-SCAN model – see e.g. Román et al. (2019) – is used twice to do this. First, the whole economy GDP estimates are brought to the sectoral level using the latest sectorial distribution estimated in Trade-SCAN, e.g. accounting for the relatively large burden of the overall shock on sectors such as “Accommodation and food services”. Second, using the GDP-employment relationship by sector inherent in the Trade-SCAN model, the sectoral GDP changes are translated into sectoral employment changes. Lastly, the sectoral employment changes are aggregated to obtain aggregate employment changes for each Member State. The results for the aggregate employment changes in each of the scenarios, together with the employment changes considered in the Commission Spring forecasts can be seen in Table A2 in the Annex, together with a depiction of the relationship between GDP growth and employment changes underlying the estimates in the different scenarios in Figure A1.

## **2.2. EUROMOD**

Our analysis makes use of EUROMOD, the EU microsimulation model, version I2.0+. Making use of representative survey data from the European Statistics on Income and Living Conditions (EU-SILC), the model is a static tax-benefit calculator, designed to provide results which are representative at the country-level and validated against aggregate national statistics. The model simulates the personal income taxes, social benefits and social security contributions in all EU countries and can be used to study the effect of actual and perspective policy reforms on household incomes, inequality, poverty and the government’s fiscal balance<sup>11</sup>.

The scope of EUROMOD simulations includes direct taxes and non-contributory benefits in place in each country as of 30 June 2019. Some contributory benefits, such as unemployment benefits, are also simulated in most countries, making assumptions on working history for eligibility purposes where needed. In countries where simulations of unemployment benefits are not satisfactory, the value recorded in the underlying EU-SILC data is used instead. Consistent with the 2020 Spring forecasts, this paper takes into account the impact of short term working (STW) schemes on wages.

We apply our reweighting methodology to EUROMOD simulations based on data from 2017 EU-SILC, containing incomes of 2016, and 2019 policy system (see Annex 4 for further details on this approach).<sup>12</sup> Non simulated tax-benefit instruments are updated to their 2019

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<sup>11</sup> For a detailed description of EUROMOD and of the scope of its simulation see Figari and Sutherland (2013).

<sup>12</sup> In a number of countries, the national version of SILC has been used either directly or to complement the information contained in the EU-SILC UDB distributed by EUROSTAT.

values making use of specific uprating factors (see EUROMOD Country Reports 2019 for more information on the data used and uprating factors).<sup>13</sup>

### ***2.3. Reweighting – Introducing the macro shock at the micro level***

To perform the analysis using EUROMOD, we reproduce the 2020 macroeconomics scenarios previously described in the EU-SILC data, which underlies the datasets used by EUROMOD. To do this, we rely on a reweighting approach, using it to translate the changes in several aggregate variables present in the macroeconomic scenarios into changes at the microeconomic level.

To estimate the size of the aggregate shock in the scenario with discretionary policy changes, we consider the differences between the Commission Autumn forecasts (before the COVID-19 outbreak) and the Spring forecast (after the outbreak) for the year 2020. The counterfactual scenario focuses on differences between Commission Autumn forecasts for the year 2020 and “modified” Spring forecast for the same year, i.e. excluding the employment consequences of the discretionary policy changes. We then introduce these shocks into the micro data, following the reweighting approach proposed by Pacifico (2014), which we summarise below

Formally, let us consider a survey of  $N$  individuals and  $K$  individual-level variables, such as income, gender, working status and age:  $x_i = (x_{i,1}, x_{i,2}, \dots, x_{i,K})$ . The survey weight is defined as a vector  $s = (s_1, s_2, \dots, s_N)$  of all individual weights. The estimated  $1 \times K$  vector of survey totals is given by:

$$t = \sum_{i=1}^N s_i * x_i$$

Since we are interested in introducing a shock into our data, we are particularly interested in changes to specific group totals (while other population characteristics might stay the same) to get a realistic dataset for 2020 that includes our shock. It is possible to compute a new vector of survey weights  $w = (w_1, w_2, \dots, w_N)$  that is as close as possible to the original weights and that respects the following calibrating conditions,

$$t_{new} = \sum_{i=1}^N w_i * x_i$$

where  $t_{new}$  is the  $1 \times K$  vector of projected total values including the shock. Let us assume that the distance between the original and the new weights is following a distance function  $g(s_i, w_i)$ , then the new weights can be obtained by minimising a Lagrangian function with respect to the new weights:

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<sup>13</sup> <https://www.euromod.ac.uk/using-euromod/country-reports>.

$$L = \sum_{i=1}^N g(s_i, w_i) + \sum_{k=1}^K \lambda_k * \left( t_k - \sum_{i=1}^N w_i * x_{i,k} \right)$$

where  $w = (\lambda_1, \lambda_2, \dots, \lambda_K)$  are the Lagrange multipliers. The solution of the minimization problem depends on the properties of the chosen distance function. We use the distance function proposed by Deville and Särndal (1992) which keeps the calibrated weights within a known range set.<sup>14</sup>

In sum, the proposed approach follows the three steps below:

- 1) The macroeconomic forecast scenarios are used to change the micro data used in EUROMOD in accordance with the employment shock in each country. The number of employed is reduced accordingly, while the number of unemployment recipients is increased. Additionally, to account for wage compensation schemes and potential wage losses, in the scenario with discretionary policy changes we also adjust for the expected change in total wage compensation of employees and self-employed in each country. In the alternative scenario, i.e. in absence of discretionary policy changes, the total wage bill will change only as a consequence of the unemployment increase.
- 2) Reweighting at the household level is used to introduce a new micro structure in the unemployed population that reflects the micro structure of the shock scenario. The target number of unemployed, as derived in the first step, is recreated in the EU-SILC data. Detailed information can be found in Table 1.
  - We reweight total employment and total wage receivers, given the changes that are projected by the differences in the Autumn 2019 and Spring 2020 forecasts.
  - We reweight total unemployment and total unemployment benefit receivers, given the reduction in employment observed.
  - In the scenario with discretionary policy changes, we adjust the wage compensation of employees in our data given the expected shock on wages. This measure accounts for wage compensation schemes. We also adjust the total wage compensation of self-employed.
  - We ensure that the population structure stays the same, by controlling for several age groups (0-15 years, 16 to 40, 41-65 years, as well as 65+) as well as for gender shares.
- 3) Individual unemployment benefits as well as personal income taxes, social insurance contributions and other benefits from the reweighted simulation of EUROMOD are aggregated at the country level to analyse the impact of the changes on the labour market (unemployment, wage loss) on households' income. This leads to a forecast of the macro statistics that correspond to the given shock.

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<sup>14</sup> For more information, see Pacifico (2014).

Our approach allows us to generate a new dataset that is not only similar in expected employment shocks due to COVID-19, but also in terms of the impact on wages, including wage compensation schemes. Our EUROMOD baseline policy system is 2019. We do the reweighting based on the expected percentage change in the macro-economic variables of interest.

Table 1: Shock translation into EUROMOD

	Information	EUROMOD	shock/constant
Labour market structure	employment increase (farmer, self-employed, employees)	les=1,2,3	shock
	employment income receivers	yem>0 & yem>ils_b1_bun	shock
	Unemployment	les=5	shock
	unemployment benefit receivers	ils_b1_bun>0	shock
	Pensioners	les=4	constant
	Students	les=6	constant
	Inactive	les=7	constant
	sick or disabled	les=8	constant
	other labour market status	les=9	constant
	Wage	Yem	Shock
wage self employed	Yse	Shock	
demographic characteristics	Gender	Dgn	constant
	population group (0-15)	Dag	constant
	population group (16-40)	Dag	constant
	population group (41-65)	Dag	constant
	population group (>65)	Dag	constant

### 3. Main findings

In this section, we present the main results of our analysis on the impact of the COVID-19 crisis, obtained by comparing the two COVID scenarios, with and without discretionary policy measures. Section 3.1 contains EU level analysis, excluding Poland and Romania due to data limitation.<sup>15</sup> Section 3.2 contains country specific results. Here we consider only the medium scenario for the “COVID without policy changes” scenario, leaving the analysis of the low and high scenarios for future work.

#### *3.1. Impact of COVID-19 on household income, inequality and poverty at the EU-level*

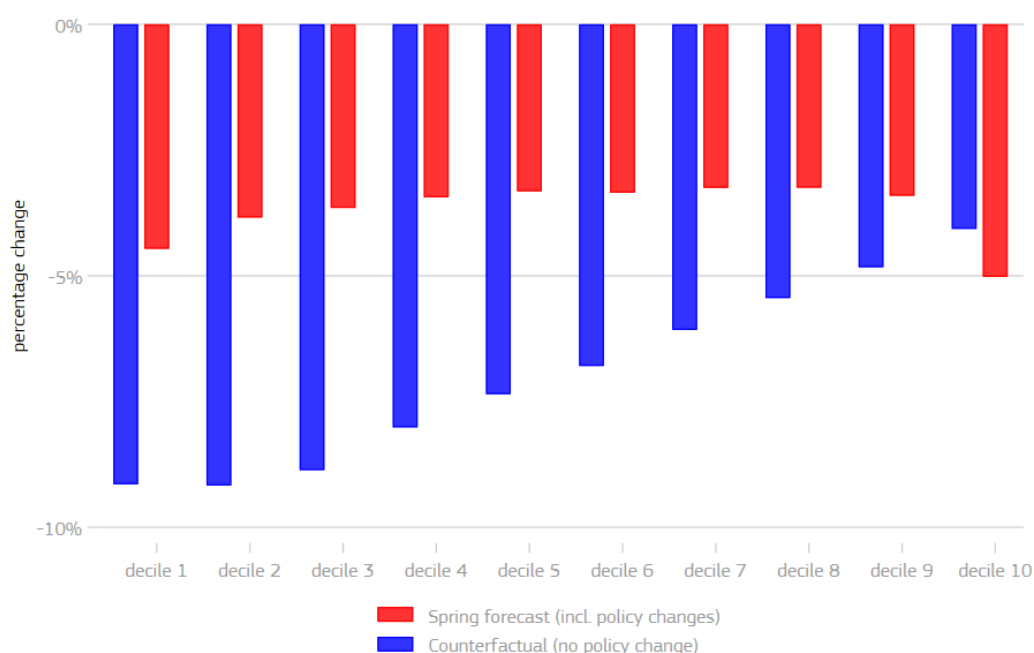
Figure 4 provides results on the impact of COVID-19 on households’ equivalised disposable income by income decile in the EU, for the two COVID scenarios considered. On average, household income would fall by -5.9% due to the impact of COVID-19 without policy measures, while policy intervention reduces this impact to -3.6%. In absence of policy responses, the COVID-19 pandemic would have a clear regressive effect on households’ income, with the poorest households’ being the most hardly hit. The first three lowest income deciles would experience a fall in net disposable income oscillating between -9.0% and 8.6%. The fall in income for the highest income deciles (deciles 8-10) would represent approximately only half of the falls experienced by the bottom income deciles: between -5.2% and -3.9%. The COVID pandemic would therefore affect households disproportionately, affecting poorest household much more severely, although all households would potentially experience a fall in their disposable income. Looking at the policy change scenario, we can see that the measures taken by government lead to a reduction of the regressive effect, resulting in a homogeneous impact of about -4% all along the income distribution. This highlights that policy measures taken by the governments to counteract the regressive effect of the COVID crises are likely to be quite effective.

Figure 4 shows that observations in the richest decile would be worse off in the scenario taking into account discretionary policy changes than in the one not taking them into account. The result is driven by the fact in the latter scenario only changes in employment/unemployment are taken into account in the reweighting, while in the scenario with discretionary policy changes also the changes in the total wage compensation are considered. Intuitively, in the scenario with discretionary policy changes households suffer less from unemployment, but more from the reduction in wage compensation. This explains why richest households experience, in our setting, a larger reduction in disposable income than they would in absence of discretionary policy changes.

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<sup>15</sup> The analysis excludes Poland and Romania. Romania is excluded because of the significant underreporting of unemployment benefits in the EUROMOD input datasets. Poland is excluded because the drop in the total wage compensation arising from the comparison between Commission Autumn 2019 and Spring 2020 Forecasts significantly outweighs the predicted change in employment. This appears to be at odds with theory and the observed trends in other countries.

Figure 4: Impact of COVID-19 on household disposable income in the EU



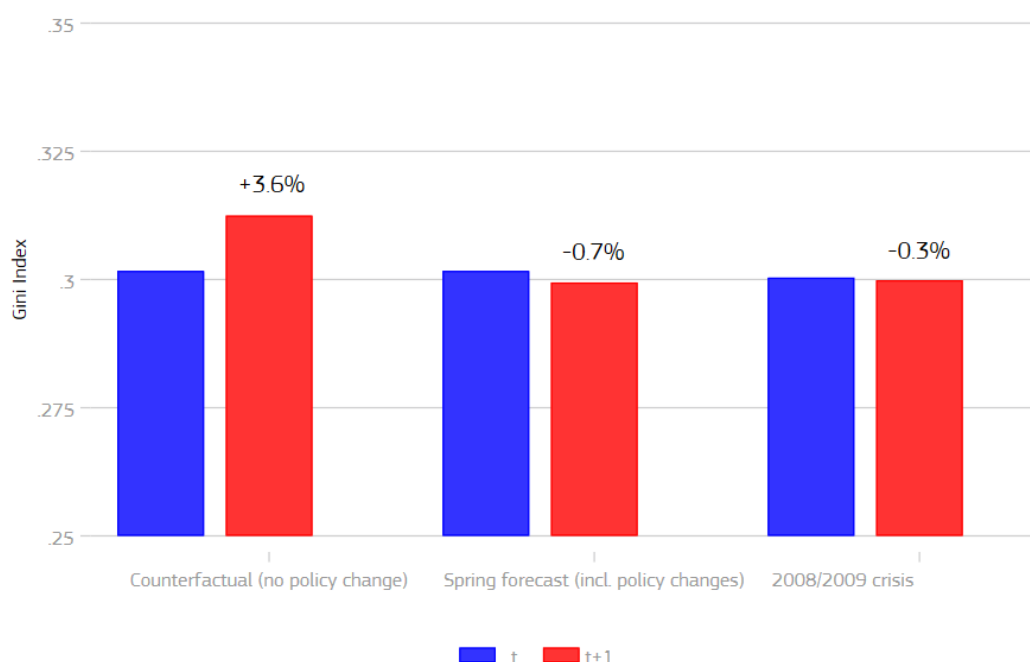
*Note: The impact of COVID-19 concerns 2020 (source: EUROMOD simulation) and is estimated using household net disposable income by income decile. Households ranking is based on the income distribution of each scenario (baseline, Counterfactual and Spring forecast). Results are weighted (population) average of country results.*

Figure 5 provides a synthetic view on the impact of the COVID crisis on income inequality by reporting the Gini index obtained according to the two simulated scenarios, and comparing these results with the impact of the 2008/2009 financial crisis.<sup>16</sup> This figure shows a number of important results. First, in absence of policy responses, the COVID-19 pandemic would trigger a substantial increase in inequality, as measured by the Gini index. This increase is expected to be 3.6%. Policy measures, however, are able to counteract the inequality increasing effect of the COVID pandemic to a large extent, as inequality in the scenario including policy measures would fall by 0.7%.<sup>17</sup> As a matter of fact, the 2008/2009, similarly led to a small decrease in income inequality on average for the EU (-0.3%, sources: Eurostat and authors' calculations).

<sup>16</sup> Note that the starting level of the Gini index is taken from Eurostat and concerns the year 2018 (year  $t$  in the graph) which is the latest available year covering all EU countries. The simulated percentage changes in the Gini index are obtained from EUROMOD and applied to this value. The Gini indices for the income reported in years 2008 and 2009 are taken from the same Eurostat database.

<sup>17</sup> Results on Gini are likely to be influenced by the high impact of policy changes on high income households. As explained above, this result might be driven by the fact that in the scenario with policy changes, we consider not only changes in unemployment but also the reduction in wage compensation.

Figure 5: Impact of COVID-19 on income inequality in the EU



*Note: The impact of COVID-19 concerns the year 2020 (source: EUROMOD simulation). The starting level of the Gini index is the weighted (population) average for 2018 (Source: Eurostat, EU-SILC database). The impact of the 2008/2009 crisis compares households' net disposable income between these two years (Source: Eurostat, EU-SILC database). Year t corresponds to 2019 for the COVID crisis and to 2008 for the 2008/2009 crisis.*

Figure 6 provides evidence on the potential impact of COVID-19 on poverty, measured by the at risk of poverty (AROP) rate (using the 60% of median income as threshold), and compares the simulated effect of the COVID crisis with the 2008/2009 crisis. These results are obtained by anchoring the poverty lines to their 2019 values. According to the results, the AROP rate would increase significantly due to the COVID pandemic, moving from 16.8% (2018 data, source: EUROSTAT) on average in the EU, up to 21.6% (no policy change). When we account for policy measures, this increase is less pronounced, from 16.8% to 18.5%. By comparison, the 2008/2009 crisis implied much lower increases in the AROP rate, from 16.2 to 16.3%, i.e. +0.1 percentage point (+1% in terms of percentage variation).

Figure 7 provides evidence on the potential impact of COVID-19 on poverty, measured by the at risk of poverty (AROP) rate (using the 60% of median income as threshold), when we do not anchor the poverty line to the pre-crisis level. Again, the AROP rate would increase significantly due to the COVID pandemic, but to a smaller extent. Policy measures can almost offset this increase in the AROP rate. When analysing this results we have to keep in mind that the poverty line drops substantially in this analysis due to the income shock of the COVID crisis.

Given the sheer size of the COVID shock we might consider that the anchored poverty line may provide a more reliable assessment of the impact of the Great lockdown on poverty.

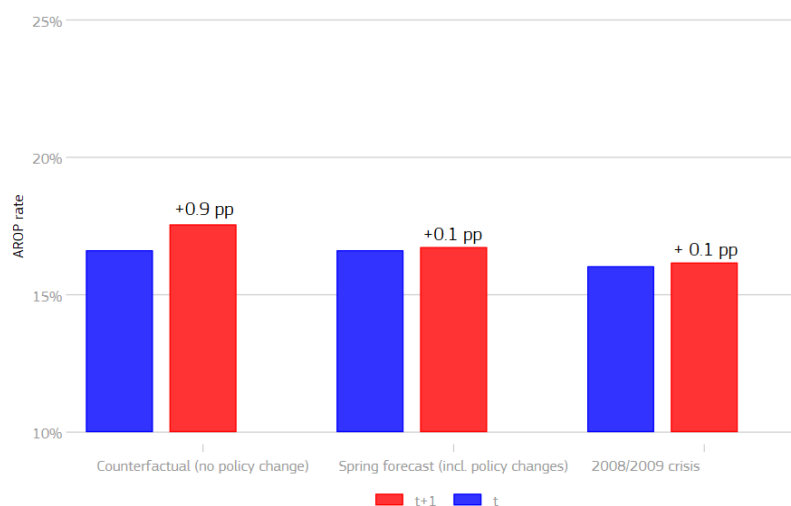


Figure 6: Impact of COVID-19 on poverty in the EU



Note: The impact of COVID-19 concerns 2020 (source: EUROMOD simulation). The starting level of the AROP indicator is the weighted (population) average for 2018 (Source: Eurostat, EU-SILC database). The impact of the 2008/2009 crisis compares AROP indicator between these two years (Source: Eurostat, EU-SILC database). The year  $t$  corresponds to 2019 for the COVID crisis and to 2008 for the 2008/2009 crisis.

Figure 7: Impact of COVID-19 on poverty (non-anchored) in the EU



Note: The impact of COVID-19 concerns 2020 (source: EUROMOD simulation). The starting level of the AROP indicator is the weighted (population) average for 2018 (Source: Eurostat, EU-SILC database). The impact of the 2008/2009 crisis compares AROP indicator between these two years (Source: Eurostat, EU-SILC database). The year  $t$  corresponds to 2019 for the COVID crisis and to 2008 for the 2008/2009 crisis.

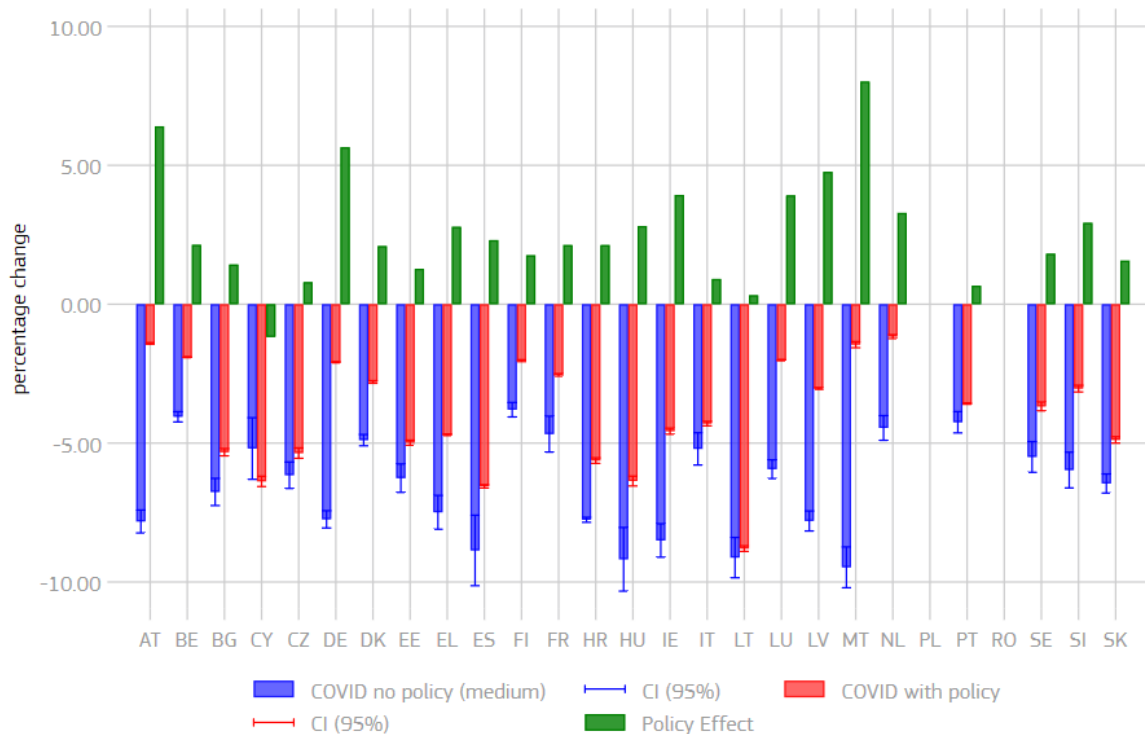
### 3.2. Country-specific results

Additionally to the aggregate results at the EU-level, this subsection takes a closer look at the distributional impacts of the COVID-19 crisis, considering each of the EU member states separately. Our reweighting methodology introduces some uncertainty in the model, since we

could end up with different solutions, when we reweight our population. Therefore, we report the confidence intervals of our report by using a bootstrapping method (see section 3.3 for an in-depth discussion).

Figure 8 shows the impact of the COVID-19 crisis on household equivalised disposable income. We consider first the medium policy scenarios (i.e. taking average values of the fiscal multipliers as indicated in Section 2.1). The income loss is expected to be especially high in countries such as Austria, Germany, Denmark, Spain, Hungary, Ireland, Lithuania and Malta. Still, policy measures can offset this income loss substantially. In countries such as Austria, Germany, Denmark, Malta and the Netherlands, policy measures taken can reduce the income losses substantially. Despite the policy measures, we expect the biggest impact of the COVID pandemic on equivalised disposable household income in countries such as Bulgaria, Spain, Estonia, Croatia, Hungary and Lithuania. For Cyprus, there is also no difference in the replacement rate between wage compensation and unemployment benefits, which potentially explain the results.

Figure 8: Impact of the COVID-19 crisis on equivalised disposable household income in EU countries

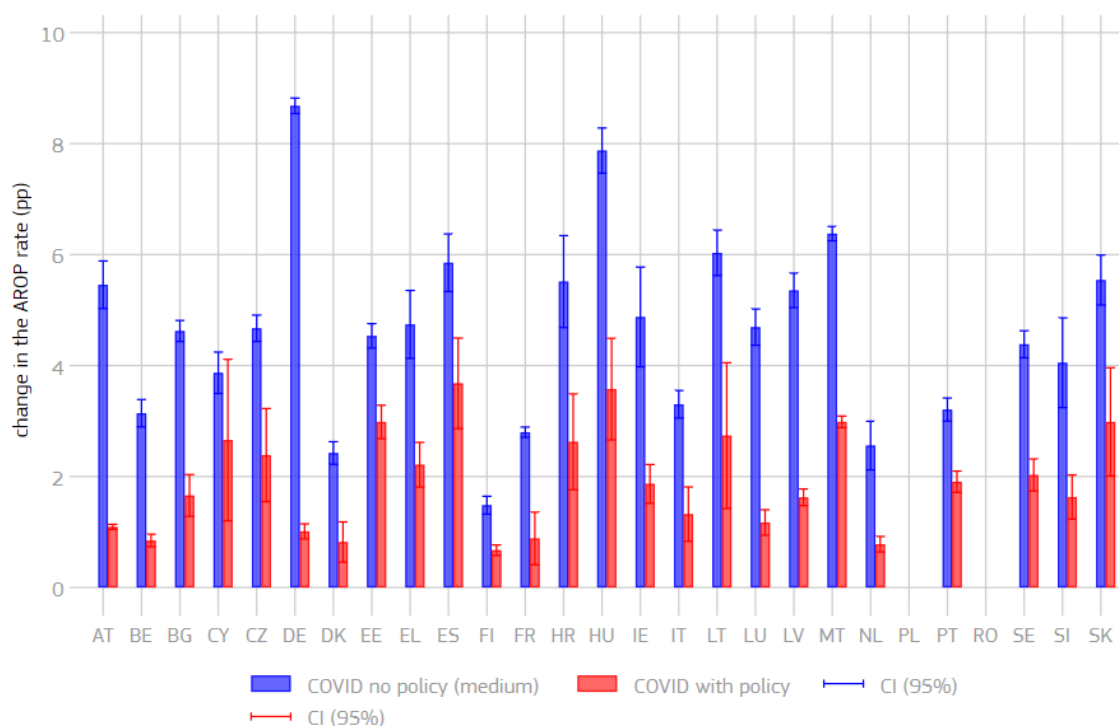


Additionally, we can also see that there is substantial uncertainty in our methodology regarding some countries (see Figure A5 in the Annex), therefore an interpretation of the results for those countries have to be taken with extreme care. Considering the low and high scenarios (corresponding to low and high fiscal multipliers) instead would not significantly change the interpretation of our results concerning the no-policy change scenarios, although in some cases the impact of the crisis would be rather pronounced under the high scenarios

compared to the medium one (as in the case of Austria, Germany, Denmark, Hungary or Lithuania, for instance).

Figure 9 shows the impact of the COVID crisis on poverty, measured by the AROP rate, where the poverty line is anchored to the value of the 2019 EUROMOD baseline simulations. Not surprisingly, the AROP rate jumps substantially in the counterfactual scenario, where no policy measures are taken. This is due to a substantial household income decrease due to the strong increase in unemployment that differs across countries. Substantial increases of over 5pp in the AROP would take place in many member states due in absence of policy interventions. Especially high poverty rates would be observed in the hypothetical scenario with no policy intervention (blue bars) in Germany, Bulgaria, Spain, Hungary and Latvia. Strong increases can be also seen in Malta, Austria and Slovakia. When we consider the policy measures taken by the governments, we can see that the impact of COVID on the AROP rate can be alleviated in many countries and in some even almost offset, particularly in Germany, Denmark, Finland, France and Luxemburg.<sup>18</sup>

Figure 9: Impact of the COVID-19 crisis on poverty (AROP rate) in EU countries

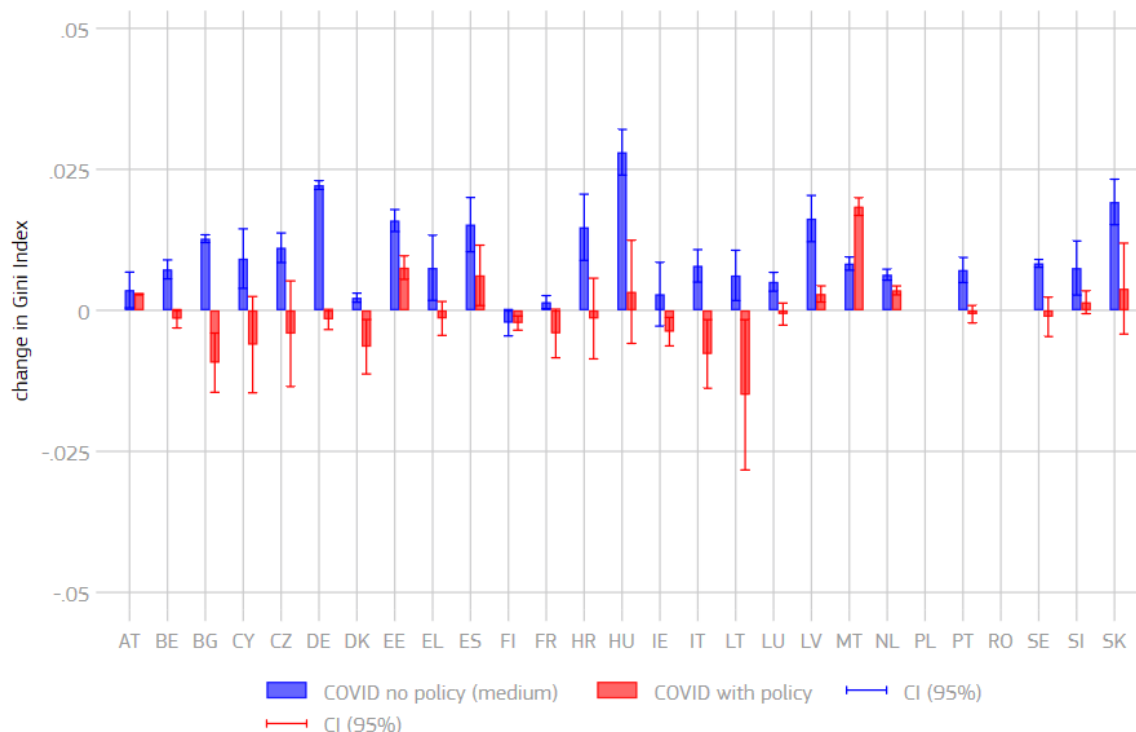


<sup>18</sup> If we consider the non-anchored poverty rate in Figure A4 in the Annex, we can see that the impact on the poverty rate is not as strong as in the case of an anchored poverty rate. The results are driven by a substantial drop of the poverty line in both, the COVID scenario with and without policy measures compared to baseline. As Figure 7 already showed, both shock scenarios lead to a severe reduction in equivalised disposable household income, shifting the income distribution and therefore the poverty line to the left. Keeping this in mind it is not surprising that in the case of the shock scenarios, the non-anchored poverty reacts less to the COVID shocks than the non-anchored one.

Figure 10 shows the impact of the COVID crisis on inequality, measured by the Gini index. In most countries, policy measures are able to offset the inequality-increasing pattern of the COVID pandemic, but there are some exceptions. For example in Austria, Denmark, Estonia, Spain and Malta policy measures can only partially attenuate the increase in the Gini index. It is also worth noting that in some countries, the confidence intervals are quite large, such as in Eastern European countries, such as Bulgaria, Czechia and Hungary.

The above results are driven by the impact of the COVID shock on household income. While in the scenario of COVID without policy measures all people losing their job are sent to unemployment, in the case of the COVID scenario with policy measures, the government tries to counteract the loss in household income by policies such as wage compensation schemes. To get a clearer picture on the impacts on the income distribution, we additionally take a closer look at the impacts on household income by income decile in each country, see figures A5 in the Annex. We can see that in most of the countries, policy measures can offset the regressive impact of the COVID pandemic, but still we can see that there is substantial uncertainty in our results when it comes to the impact on the top and the bottom part of the income distribution.

Figure 10: Impact of the COVID-19 crisis on inequality (Gini index) in EU countries



### 3.3. Robustness of the country specific results

We must acknowledge that our approach faces some limitations, due to the need to make strong assumptions regarding the way the macroeconomic shock related to the COVID-19 is

translated at the micro-level and in the determination of the baseline scenario. We have conducted a number of robustness checks in order to address these limitations.

First, we use the policy system of 2019, with underlying EU-SILC data from 2017 (income year 2016) which are updated to 2019 prices. Second, the concept of expenditures and revenues of EUROMOD might be different to standard national accounting concepts that are used on macro level. To overcome both problems, we stick to reporting and using percentage changes when introducing the shock in the data.

Our method generates a new population (given the expected labour market and demographic changes) due to reweighting. Therefore, we are not able to follow the same person in both populations. We have to change the income deciles accordingly when comparing scenarios. This approach is in line with comparing changes over years.

When we introduce the unemployment shock, we assume that all new unemployed have similar characteristics as the current unemployment pool. Hence, we cannot take into account the fact that the newly unemployed might differ from the pool of currently unemployed. It should also be noted that reweighting may perform worse compared to a transition approach in times of rapid economic changes, e.g. if individuals entering in unemployment have characteristics completely different from the characteristics of the unemployed observed in the base year.

Furthermore we do not have information on which employees are especially hit by a wage loss (that also stems from short-time working schemes). By using a reweighting approach, the survey weights of employees with higher wages are shifted to employees with lower wages. This approach does not take into account any distributional pattern that wage loss could potentially have. Other studies show, that essential workers are often based in the lower income deciles, while home-office possibilities are typically more likely for high-income earners, see for instance Galasso (2020) for an analysis specific to the COVID pandemic on labour markets. Hence, there is evidence that people in the middle-upper part of the distribution are more likely to move to short-time work. Additionally, since we do not explicitly simulate compensation schemes but we rather reweight to take them into account, the potentially heterogeneous effect of these schemes across the income distribution (like e.g. upper limits in the wage compensation schemes, which lead to higher wage drops in the upper income distribution) are also not considered in our approach.

To ensure the robustness of our results, we introduce a bootstrapping procedure that allows the algorithm to be more flexible in the weight choice. In the baseline, the algorithm specifies the upper and lower bound of the ratio between the new and the original weight when the Deville and Sarndal's distance function is used. To ensure that the choice of the boundaries does not affect our solution, we do bootstrapping on randomly chosen bounds in the

algorithm.<sup>19</sup> Therefore, we get a sequence of results that allow us to build an average effect with a standard error.

The bootstrapping procedure allows us to test the statistical significance of our results. The confidence intervals are represented in all the country specific figures, and additionally, Table A4 in the Annex summarizes the standard errors in the EU-27 for specific indicators. We can see that these standard errors are especially high in countries such as Cyprus, Lithuania, Czechia and Hungary. Additionally, we can see that when looking at the distributional country-specific analysis, the uncertainty of the results is especially high in those countries and especially in the higher deciles. This is driven by the fact that the share of employees, who are those hit by the crises (either by losing their job or going into wage compensation) is the highest in the upper deciles in most countries. This limitation must be taken into account when considering our results on the distributional effects of our different scenarios.

We must also keep in mind that our approach randomly reduces wages, although the COVID-shock might hit specific groups of worker (high-skilled vs low-skilled, male vs. female, young vs. old), and sectors differently. Our simulations capture sector composition of the change in employment/unemployment when converting the GDP shock into employment shocks without considering the differential wage impact across sectors, see Section 2.

Using information available in the EU-SILC data on sector of activity we can partially account for these effects. In such case the differential impact of the crisis by worker category would reflect *only* the sectoral differences in skill/gender/age composition of the workforce. This is consistent with Fana et al. (2020) who argue that the sectorial impact of the crisis affects substantially the distributional impact. These authors show that those sectors that were closed or only partly active have on average lower wages than those that were likely to be essential or where teleworking was possible. Consequently, the sectorial structure of the shock can potentially have an important impact on the income distribution that we do not account for.

Those patterns seem to be quite similar across countries, as highlighted in Table A3 in the Annex. Therefore, as an additional robustness check, we consider the impact on the wage loss (wage compensation) only in those sectors that are mostly affected by the COVID-19 pandemic. Following Fana et al. (2020) those are: Construction, Wholesale and retail, Hotels and restaurants and Transport and communication.

Figure 11 compares the results of our simulations on the impact of COVID-19 on households' income in our main scenario (including policy measures) with a scenario where the sector dimension is considered as described above. In some cases the simulated change in households' disposable income is larger or smaller than in our main results. These differences are arguably very small, however. For instance, the largest difference in results can be observed for Sweden (+0.33pp) indicating a larger (in absolute terms) decrease in

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<sup>19</sup> In the baseline, the value default for the upper bound is 3 and for the lower bound 0.2.

households' disposable income, which represents only a very small portion of the simulated fall (-3.68%) in our main results. Results at decile level reveal the same type of results and leave the distributional pattern of COVID across countries broadly unchanged compared to our main results too<sup>20</sup>.

Figure 11: Accounting for sector specific shocks: differences in households' disposable income in benchmark results vs. results incorporating sector-specific impact of COVID-19

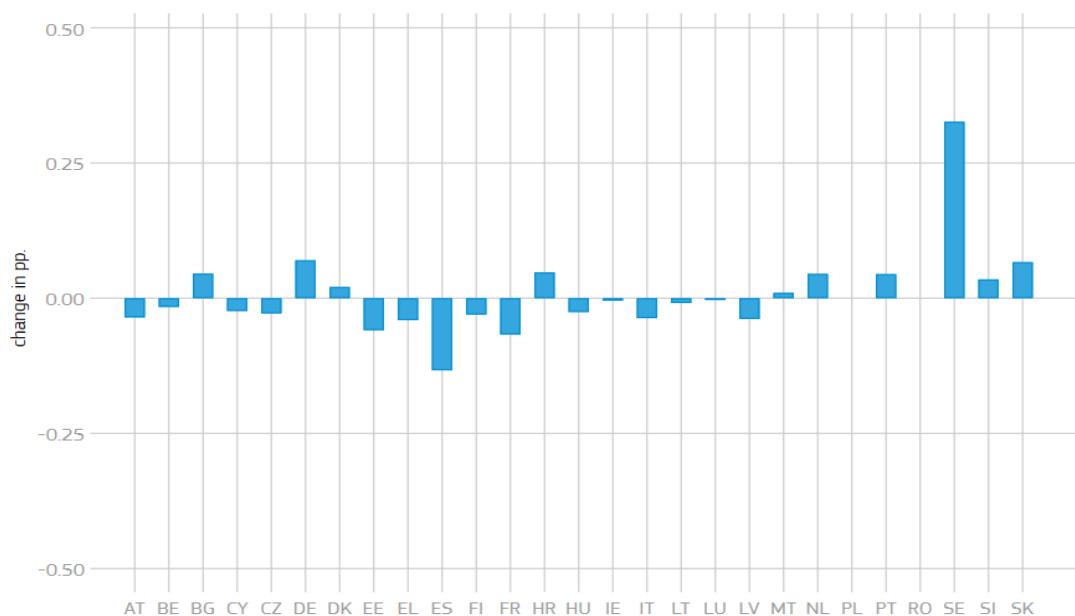


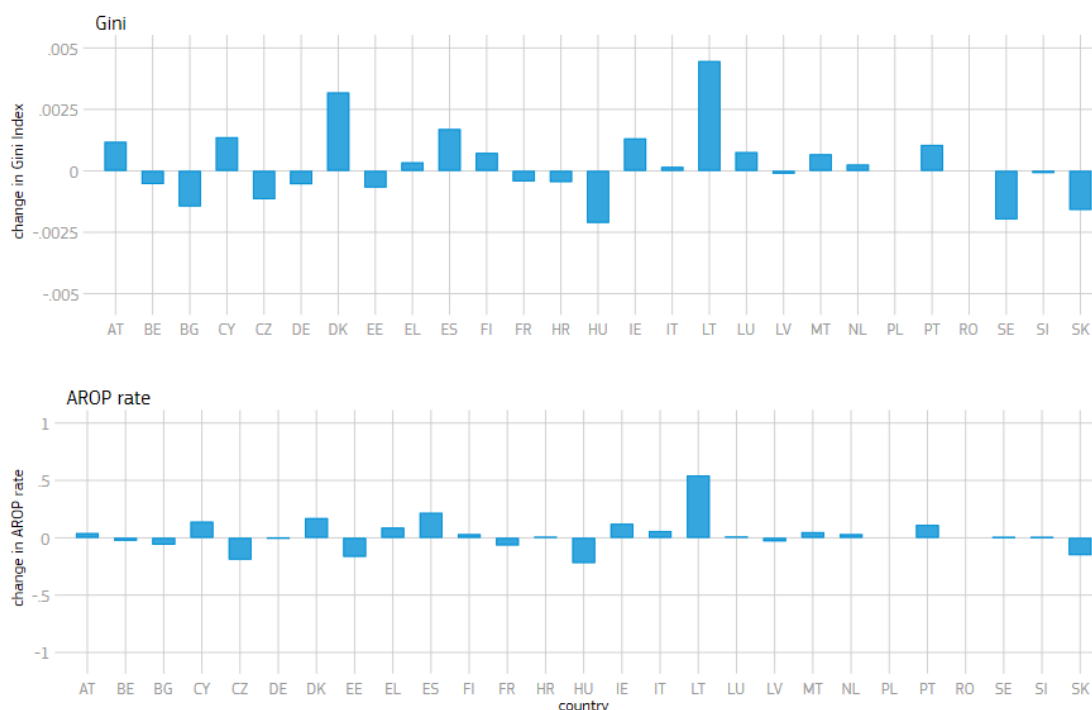
Figure 12 highlights the impact of the sector allocation on the AROP rate as well as on the Gini compared to our benchmark results incorporating the impact of policy change. Not surprisingly, the impact on both measures is quite similar in all countries, since both, the AROP and the Gini are measures of income inequality. While in most countries, the sector specific shock would lead to a higher AROP rate and Gini coefficient, in some the opposite holds true. While the increase in both measures is especially high for Bulgaria, Spain, Ireland, Latvia, for Czechia, Germany and Hungary we see a substantial decrease in both the Gini and the AROP rate, when we use a sector specific shock.

Additionally to those robustness checks, Figure A3 in the Annex highlights the impact of the assumptions underlying the macroeconomic scenario on which the counterfactual scenario in section 2.1 is constructed. We conclude that the country-specific impact can differ substantially depending on the choice of the multipliers when creating the counterfactual scenarios. Using multipliers to the higher end of the spectrum (as often found for recessions in narratively identified empirical models), for instance, would result in considerably more negative growth rates in the counterfactual scenario. Nonetheless, the physical lockdown of

<sup>20</sup> Only for the 1<sup>st</sup> and 10<sup>th</sup> decile results can vary more for some countries.

economies is likely to have temporarily limited marginal propensities to consume and, thus, the size of the multiplier for the fiscal impulses enacted in this period.

Figure 12: Accounting for sector specific shocks: differences in inequality and poverty in benchmark results vs. results incorporating the sector-specific impact of COVID-19



#### 4. Conclusion

The consequences of the COVID-19 crisis on households’ income, although still unknown with precision, raise serious concerns. In this paper, we provided an assessment of the potential impact of the policy measures adopted in the wake of the COVID-19 crisis on household income, poverty and inequality in the EU in 2020. In particular, we used the EUROMOD microsimulation model for the EU to compute the impact of aggregate GDP and employment changes on households’ incomes.

We built our results around two macroeconomic scenarios. The first scenario corresponds to the Commission 2020 Spring Forecast, including the estimated impacts of the COVID-19 crisis, such as the shutdown of major parts of the economy as well as policy measures taken by Member States to counteract the strong impact of the pandemic. The second scenario is a no policy-change scenario, excluding discretionary fiscal policy measures. This hypothetical scenario is built to gauge the effect of the policy measures taken by EU countries. Both scenarios are evaluated in terms of differences with the economy in absence of COVID-19.



Next, we reweighted the underlying EUROMOD survey micro data from the European Statistics on Income and Living Conditions (EU-SILC) to mimic the aggregate employment figures in each scenario. In particular, we make use of the information on employment and unemployment changes in the forecasts, as well as changes in the total wage compensation for employees and the self-employed to simulate the impact of COVID on (un)employment, as well as on wage compensations.

Our analysis suggests that over the course of 2020, on average, households' disposable income in the EU would fall by -5.9% due to the COVID-19 crisis without discretionary policy measures, and by -3.6% with policy intervention, pointing to a significant cushioning effect of these measures protecting households against income losses. Furthermore, our results confirm that the impact of the COVID-19 crisis is likely to be highly regressive, with the poorest households' being the most severely hit. However, discretionary policy measures are expected to contain the regressive effects of the recession. Policy interventions are therefore instrumental to cushion against the impact of the crisis on inequality and poverty.

In addition to the aggregate results at EU-level, we presented results for each of the EU member states. Despite some exceptions, member states' policy measures prove their worth in limiting poverty and inequality at the country level. Poverty, as measured by the at risk of poverty rate (AROP) rate, would increase significantly in absence of policy measures. However, when accounting for the policy measures taken by the governments we observe that the impact of COVID on the AROP rate can be alleviated in many countries and in some almost offset, especially in Germany, Denmark, Finland, France and Luxemburg. In most countries, policy measures are able to offset the inequality-increasing pattern of the COVID pandemic, with some exceptions. For example, in Estonia and Spain policy measures can only partially alleviate the increase in the Gini index.

Finally, our results suggest that the social impact of the Great Lockdown is likely to be much larger than experienced during the Great Recession, at least for what concerns the immediate impact of the crisis. According to our results, we expect the AROP rate to increase significantly due to the COVID pandemic: from 16.8% to 18.6% with or 21.4% without policy measures. By comparison, the 2008/2009 crisis implied much lower increases in the AROP rate, from 16.2% to 16.3%. Finally, it should be noted that these results are obtained when anchoring the poverty rate to its pre-crisis level, which seems the most appropriate way of measuring it given size of the COVID shock. When considering a non-anchored poverty line, our results suggest that the increase in poverty would be much more contained and comparable to the one observed in the immediate aftermath of the 2008/2009 crisis, however.

## References

- Adams-Prassl, A., Boneva, T., Golin, M., and Rauh, C. (2020). Inequality in the Impact of the Coronavirus Shock: Evidence from Real Time Surveys. IZA Working Paper 13183, IZA - Institute for Labor Economics, Bonn.
- Aum, S., Lee, S. Y. and Shin, Y. (2020). COVID-19 doesn't need lockdowns to destroy jobs: The effect of local outbreaks in Korea, NBER Working Paper 27264, National Bureau of Economic Research, Cambridge (US).
- Beirne, K., Doorley, K., Regan, M., Roantree, B. and Tuda, D. (2020). The Potential Costs and Distributional Effect of Covid-19 Related Unemployment in Ireland. EUROMOD Working Paper 05/20, Institute for Social and Economic Research, University of Essex, Essex, UK.
- Beland, L.-P., Brodeur, A. and Wright, T. (2020). COVID-19, Stay-At-Home Orders and Employment: Evidence from CPS Data, IZA Working Paper 13282, IZA - Institute for Labor Economics, Bonn.
- Bennedsen, M., Larsen, B., Schmutte, I. and Scur, D. (2020). Preserving job matches during the COVID-19 pandemic: Firm-level evidence on the role of government aid, *Covid Economics*, 27, 1-30.
- Borjas, G. J. and Cassidy, H. (2020). The adverse effect of the COVID-19 labor market shock on immigrant employment, NBER Working Paper 27243, National Bureau of Economic Research, Cambridge (US).
- Bradley, J., Ruggieri, A., and Spencer, A. H. (2020). Twin peaks: Covid-19 and the labor market, *Covid Economics*, 29, 164-192.
- Brewer, M. and Tasseva, I. (2020). Did the UK policy response to Covid-19 protect household incomes?. EUROMOD Working Paper 12/20, Institute for Social and Economic Research, University of Essex, Essex, UK.
- Bronka, P., Collado, D., and Richiardi, M. (2020). The Covid-19 crisis response helps the poor: The distributional and budgetary consequences of the UK lockdown, *Covid Economics*, 26, 79-106.
- Cajner, T., Crane, L. D., Decker, R. A., Grigsby, J., Hamins-Puertolas, A., Hurst, E., Kurz, C. and Yildirmaz, A. (2020). The U.S. Labor Market During the Beginning of the Pandemic Recession, BFI Working Paper 2020-58, Becker Friedman Institute, University of Chicago, Chicago (US).
- Campello, M., Kankanhalli, G. and Muthukrishnan, P. (2020). Corporate hiring under COVID-19: Labour market concentration, downskilling, and income inequality, NBER Working Paper 27208, National Bureau of Economic Research, Cambridge (US).
- Chetty, R., Friedman, J. N., Hendren, N., Stepner, M. and the Opportunity Insights Team (2020). How Did COVID-19 and Stabilization Policies Affect Spending and Employment? A New Real-Time Economic Tracker Based on Private Sector Data. Opportunity Insights Working Paper.
- Cho, S. J. and Winters, J. V. (2020). The Distributional Impacts of Early Employment Losses from COVID-19, IZA Working Paper 13266, IZA - Institute for Labor Economics, Bonn.
- Coenen, G., Erceg, C. J., Freedman, C., Furceri, D., Kumhof, M., Lalonde, R., Laxton, D., Lindé, J., Mourougane, A., Muir, D., Mursula, S., de Resende, C., Roberts, J., Roeger, W., Snudden, S., Trabandt, M. and in 't Veld, J. (2012). Effects of Fiscal Stimulus in Structural Models, *American Economic Journal: Macroeconomics*, 4(1): 22-68.
- Coibion, O., Gorodnichenko, Y. and Weber, M. (2020). Labor markets during the COVID-19 crisis: A preliminary view, NBER Working Paper 27017, National Bureau of Economic Research, Cambridge (US).
- Costa Dias, M., Norris Keiller, A., Postel-Vinay, F., and Xu, X. (2020). Job vacancies during the Covid-19 pandemic, IFS Briefing Note 289, Institute for Fiscal Studies, London.
- Cowan, B. W. (2020). Short-run effects of COVID-19 on U.S. worker transitions, NBER Working Paper 27315, National Bureau of Economic Research, Cambridge (US).
- Deville, J.-C., and C.-E. Särndal. 1992. Calibration estimators in survey sampling. *Journal of the American Statistical Association* 87: 376-382

- Doerr, S. and Gambacorta, L. (2020), Covid-19 and regional employment in Europe, BIS Bulletin, Bank of International Settlements, Basel.
- Fairlie, R. W., Couch, K. and Xu, H. (2020). The impacts of COVID-19 on minority unemployment: First evidence from april 2020 CPS microdata, NBER Working Paper 27246, National Bureau of Economic Research, Cambridge (US).
- Fana, M., Tolan, S., Torrejón, S., Urzi Brancati, C., Fernández-Macías, E. (2020): The COVID confinement measures and EU labour markets, COVID & Empl Working Group.
- Figari, F. and Fiorio, C. V. (2020). Welfare Resilience in the Immediate Aftermath of the COVID-19 Outbreak in Italy. EUROMOD Working Paper 12/20, Institute for Social and Economic Research, University of Essex, Essex, UK.
- Figari, F. and Sutherland, H. (2013). EUROMOD: the European Union tax-benefit microsimulation model, *International Journal of Microsimulation*, 6(1): 4-26.
- Furceri, D., Loungani, P., Ostry, J. D. and Pizzuto, P. (2020). Will Covid-19 affect inequality? Evidence from past pandemics, *Covid Economics*, 12, 138-157.
- Galasso, V. (2020). Covic: Not a great equaliser, *Covid Economics*, 19, 241-255.
- Gechert, S. (2015). What fiscal policy is most effective? A meta-regression analysis, *Oxford Economic Papers*, 67(3): 553-580.
- Górnicka, L., Kamps, C., Koester, G. and Leiner-Killinger, Nadine (2020). Learning about fiscal multipliers during the European sovereign debt crisis: evidence from a quasi-natural experiment, ECB Working Paper 2154, European Central Bank, Frankfurt.
- Joyce, R. and Xu, X. (2020). Sector shutdowns during the coronavirus crisis: which workers are most exposed?, IFS Briefing Note 278, Institute for Fiscal Studies, London.
- Kilponen, J., Pisani, M., Schmidt, S., Corbo, V., Hledik, T., Hollmayr, J., Hurtado, S., Júlio, P., Kulikov, D., Lemoine, M., Lozej, M. and Lundval, H. (2019). Comparing Fiscal Consolidation Multipliers across Models in Europe, *International Journal of Central Banking*, 15(3): 285-320.
- Midões, C. (2020). Who can live without two months of income?, *Covid Economics*, 18, 157-169.
- Mongey, S., Pilossoph, L. and Weinberg, A. (2020). Which workers bear the burden of social distancing policies?, *Covid Economics*, 12, 69-86.
- O'Donoghue, C., Sologon, D. M., Kyzyma, I. and McHale, J. (2020). Modelling the Distributional impact of the Covid-19 Crisis, *Fiscal Studies*, forthcoming.
- OECD (2020). Evaluating the initial impact of COVID-19 containment measures on economic activity, Organisation for Economic Cooperation and Development, Paris.
- Pacifico, D. (2014). sreweight: A Stata command to reweight survey data to external totals. *The Stata Journal*, 14(1): 4-21.
- Palomino, J. C., Rodríguez, J. G. and Sebastian, R. (2020). Wage inequality and poverty effects of lockdown and social distancing in Europe, *Covid Economics*, 25, 186-229.
- Platt, L. and Warwick, R. (2020). Are some ethnic groups more vulnerable to COVID-19 than others?, The IFS Deaton Review, Institute for Fiscal Studies, London.
- Pouliakas, K., and Branka, J. (2020). EU Jobs at Highest Risk of COVID-19 Social Distancing: Will the Pandemic Exacerbate Labour Market Divide? IZA Working Paper 13281, IZA - Institute for Labor Economics, Bonn.
- Román, M. V., Rueda-Cantuche, J. M., Amores A. F., Arto, I. and Pérez, M. (2019). Trade-SCAN 1.1 – a tool for Trade Supply Chain Analysis, JRC Scientific Information Systems and Databases, Publications Office of the European Union, Luxembourg.
- Sutherland, H. and Figari, F. (2013). EUROMOD: the European Union tax-benefit microsimulation model. *International Journal of Microsimulation*, 6(1), 4-26

- Shibata, I. (2020). The Distributional Impact of Recessions: the Global Financial Crisis and the Pandemic Recession, IMF Working Paper 96, International Monetary Fund, Washington D.C. (US).
- van der Wielen, W. (2020). The macroeconomic effects of tax changes: Evidence using real-time data for the European Union, *Economic Modelling*, 90(C): 302-321.

## Annex

### Annex 1: Changes in COVID scenario

Table A1: Shock scenario by country

	AT	BE	BG	CY	CZ	DE	DK	EE	EL
Compensation of Employees	-3.47%	-4.48%	-6.73%	-12.46%	-8.43%	-3.76%	-5.71%	-8.29%	-11.32%
Compensation of Self Employed	-0.60%	-5.51%	-8.48%	-11.70%	-9.16%	-5.45%	-6.66%	-7.71%	-5.39%
Total Hours Work Growth	-4.59%	-7.02%	-3.49%	-9.59%	-4.77%	-4.89%	-2.87%	-9.39%	-12.71%
Total Employment Growth	-2.02%	-1.87%	-2.52%	-4.71%	-3.70%	-0.95%	-2.49%	-5.71%	-5.86%
	ES	FI	FR	HR	HU	IE	IT	LT	LU
Compensation of Employees	-11.20%	-5.28%	-5.39%	-9.84%	-9.50%	-8.08%	-9.49%	12.70%	-4.61%
Compensation of Self Employed	-12.57%	0.06%	-3.51%	-4.84%	-4.49%	13.06%	-10.02%	15.28%	-4.85%
Total Hours Work Growth	-9.87%	-3.08%	-9.84%	-5.95%	-3.84%	-5.83%	-9.28%	-7.91%	-5.84%
Total Employment Growth	-6.56%	-2.89%	-1.86%	-4.99%	-3.98%	-4.24%	-2.02%	-3.56%	-2.50%
	LV	MT	NL	PL	PT	RO	SE	SI	SK
Compensation of Employees	-4.39%	-3.35%	-3.49%	-12.40%	-6.18%	15.82%	-6.27%	-5.78%	-7.91%
Compensation of Self Employed	-3.58%	3.03%	-3.58%	-15.82%	-12.05%	14.59%	-9.04%	-2.14%	-7.26%
Total Hours Work Growth	-6.87%	-7.99%	-5.57%	-4.18%	-7.26%	-2.59%	-4.55%	-3.16%	-5.06%
Total Employment Growth	-2.63%	-4.83%	-3.04%	-4.38%	-3.97%	-2.59%	-2.50%	-4.14%	-3.61%

*Annex 2: Employment changes in no policy-change scenarios*

Table A2: Employment changes in no policy-change scenarios

Country	EMPLOYMENT IMPACT (% change)			
	Commission Spring Forecasts	LOW	MEDIUM	HIGH
AT - Austria	-1.4	-7.17	-8.66	-10.45
BE - Belgium	-1.0	-7.03	-7.33	-7.69
BG - Bulgaria	-2.5	-8.11	-8.90	-9.84
CY – Cyprus	-2.5	-8.40	-9.36	-10.51
CZ - Czechia	-3.1	-8.16	-9.57	-11.24
DE - Germany	-0.9	-8.59	-10.20	-12.10
DK - Denmark	-1.6	-7.33	-8.42	-9.73
EE - Estonia	-5.7	-8.67	-9.82	-11.18
EL- Greece	-3.7	-11.32	-12.65	-14.23
ES - Spain	-8.7	-9.99	-10.77	-11.69
FI - Finland	-2.5	-6.23	-6.61	-7.07
FR - France	-9.1	-8.22	-8.59	-9.04
HR - Croatia	-3.9	-10.51	-11.77	-13.27
HU - Hungary	-3.8	-9.65	-11.57	-13.85
IE - Ireland	-2.5	-8.90	-9.37	-9.93
IT - Italy	-7.5	-10.27	-10.61	-11.01
LT - Lithuania	-3.5	-10.42	-12.36	-14.67
LU - Luxembourg	0.9	-6.73	-7.91	-9.30
LV - Latvia	-2.6	-8.30	-9.21	-10.30
MT - Malta	-1.8	-5.46	-6.21	-7.10
NL - Netherlands	-2.4	-7.74	-8.58	-9.59
PL - Poland	-4.5	-5.40	-6.40	-7.59
PT - Portugal	-3.4	-6.66	-7.01	-7.44
RO - Romania	-2.5	-5.57	-6.05	-6.62
SE - Sweden	-2.5	-6.70	-7.15	-7.70
SI - Slovenia	-2.7	-7.70	-8.82	-10.15
SK - Slovakia	-3.4	-8.14	-9.11	-10.28
<b>AVERAGE</b>	<b>-4.4</b>	<b>-8.04</b>	<b>-8.97</b>	<b>-10.09</b>

While the employment impact in the no policy-change scenario is logically more severe than in the Spring Forecast, which accounts for the mitigating impact of compensation measures such as Short-Term Work schemes, the no policy-change scenario is in line with the historically observed relationship between GDP growth and employment changes. This is illustrated in Figure A1, which plots the relationships observed for each of the EU Member

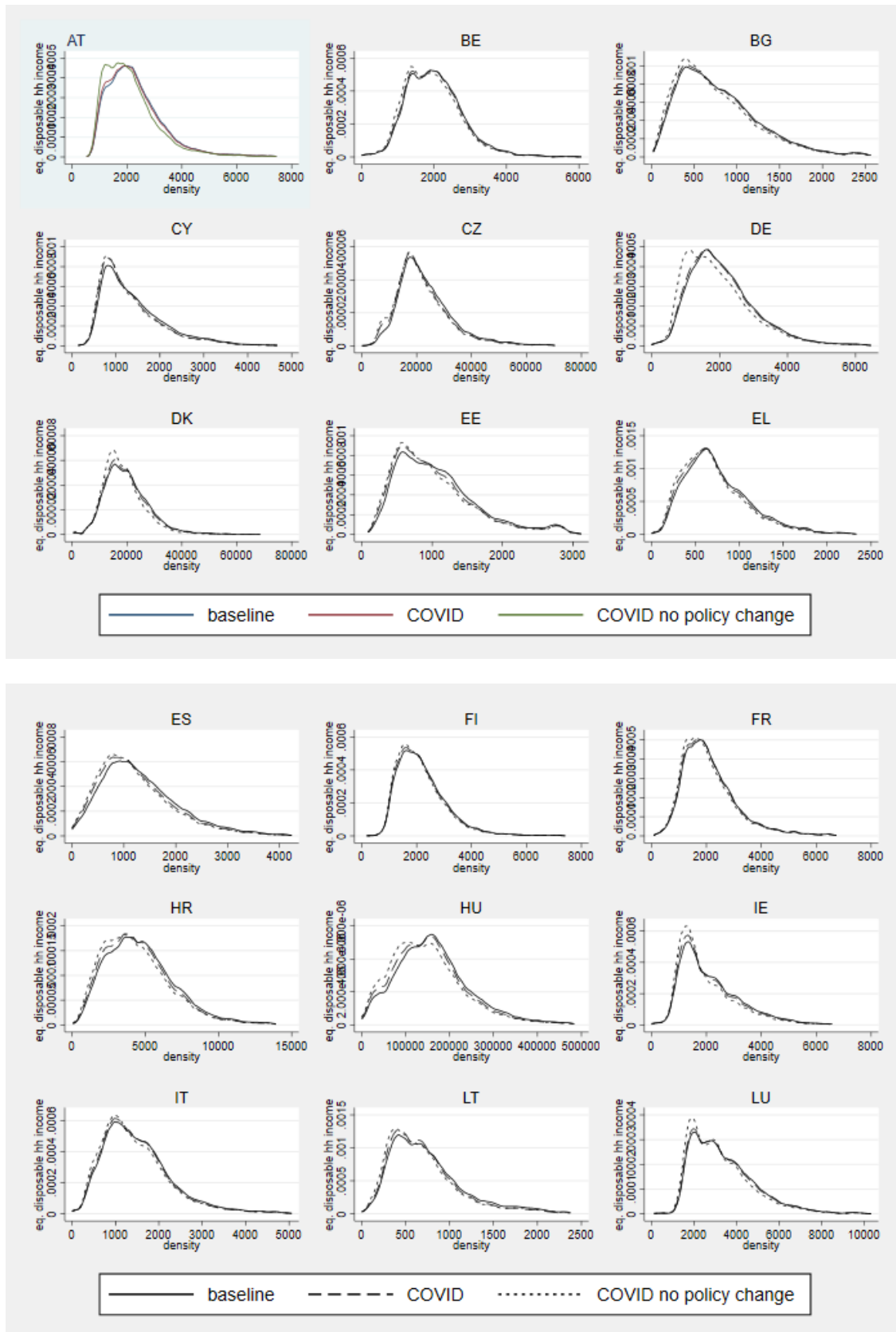
States since 2001 (as coloured dots). Moreover, it shows those for the Spring Forecast (hollow circles) and those for the no policy-change scenario (green diamonds).

Figure A1: GDP growth vs % change in employment

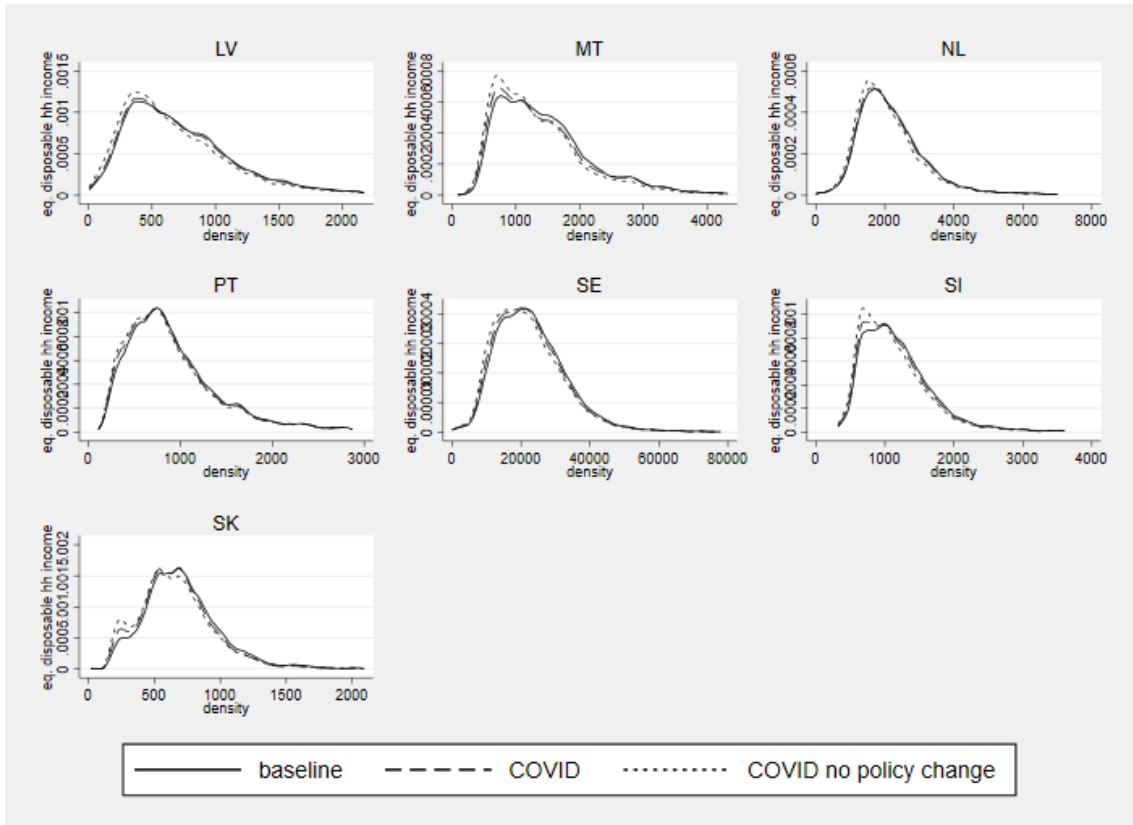


### Annex 3: Shock scenarios and the impact on the income distribution

Figure A2: Shock scenarios and the impact on the income distribution I







#### *Annex 4: Notes on the EUROMOD Methodology*

The proposed approach follows the three steps below:

- 4) The European Commission Spring forecasts are used to **change the micro data** used in EUROMOD in accordance with the employment shock and incorporating the country specific scenarios. The number of employed is reduced accordingly, while the number of unemployment recipients is increased. Additionally, to account for wage compensation schemes and potential wage losses, we also adjust for the expected change in total wage compensation of employees and self-employed in each country.
- 5) **Reweighting** on household level is used to introduce a new micro-structure in the unemployed population that reflects the micro structure of the shock scenario. The target number of unemployed derived in the first step is recreated in the EU-SILC data. We adjust our unemployment in the SILC data by reweighting.<sup>21</sup>
- 6) Individual unemployment benefits as well as personal income taxes, social insurance contributions and other benefits from the reweighted simulation of EUROMOD are aggregated at the country level to analyse the impact of the changes in unemployment on households' income. This leads to a forecast of the macro-statistics that correspond to the given shock.

As any simulation exercise, the approach presented above is subject to some caveats:

- We use the policy system of 2019, with underlying EU-SILC data from 2017 (income year 2016) which are updated to 2019 prices.
- The concept of expenditures and revenues of EUROMOD might be different to standard National Accounting concepts. Therefore, we stick to reporting percentage changes for our forecasts.
- Our method generates a new population (given the expected employment changes) due to reweighting. Therefore, we are not able to follow the same person in both populations. We have to change the income deciles accordingly when comparing scenarios. This approach is in line with comparing changes over years, which has of course some limitations.
- One assumption that we have to use, is that all unemployed have similar characteristics as the current unemployment pool. We can not take into account that new unemployed might differ from the pool of currently unemployed.

Moreover, from a methodological point of view it is worth noting that:

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<sup>21</sup> Since coverage rates of unemployment benefits can vary substantially across groups, having detailed information of a certain shock would increase the precision of our forecast of the unemployment expenditures. We account for coverage of unemployed, by not only adjusting the number of unemployed, but also the number of unemployment benefit receivers. Our approach assumes new unemployment to be similar to the unemployment observed, given their characteristics (unemployment duration, benefit amount...), which is of course a strong assumption.

- While EUROMOD is based on household data, some benefits and taxes (especially on the firm side) are not included in the data. Additionally, indirect taxes and in-kind benefits cannot be taken into account on the household side.
- Although the proposed methodology captures the heterogeneity in unemployed characteristics, an (un-)employment shock originated by aggregated demand will generate the same pool of unemployed as an aggregated supply shock of the same size. A possible way to overcome this limitation is to use additional information on the type of shock in the selection process. For example, different types of shock may affect workers asymmetrically with respect to the skill level or industries. We can simulate this with our approach, but detailed information on the sector/skill shocks would be needed for this purpose.
- It should be noted that reweighting may perform worse compared to a transition approach in times of rapid economic changes, e.g. if individuals entering in unemployment have characteristics completely different from the characteristics of the unemployed observed in the base year.

### Annex 5: Robustness of the results regarding Macro scenarios

We consider three possible Macro scenarios for the quarterly evolution of the multipliers described in section 2.1.: a low, a medium and a high scenario. The multipliers considered in each quarter in each of the three scenarios are presented in Figure 2. Figure A5 highlights the variation of the country specific results, in those different scenarios.

Figure A3: Impact of the Macro scenarios on country specific results



*Annex 6: Additional figures and tables*

Table A3: Average wage percentile of jobs in each of the categories

	Essential	Teleworkable	Partly active	Mostly non-essential	Closed	All sectors
DE	46.1	67.6	36.8	55.3	27.5	50
FR	45.5	64.1	41.4	51.1	35.5	50
IT	53.6	72.5	38.2	45.8	25.6	50
ES	53.8	71.7	34.9	47.4	31.6	50
PL	45.6	69.8	36.0	50.4	33.6	50
NL	48.5	69.2	35.9	51.6	26.8	50
RO	50.6	66.7	39.3	50.3	27.0	50
CZ	53.5	67.2	36.5	47.1	29.4	50
SE	42.7	64.0	43.6	51.3	29.0	50
BE	46.4	67.1	36.4	51.0	30.1	50
HU	49.9	61.2	40.5	47.8	41.6	50
AT	48.2	66.6	38.0	56.0	25.0	50
GR	44.4	74.9	40.9	48.3	29.0	50
PT	44.3	74.2	48.5	33.2	36.7	50
BG	48.9	67.4	43.8	45.1	36.5	50
FI	41.4	69.4	40.5	56.7	29.7	50
SK	50.6	61.3	37.8	51.3	31.1	50
DK	46.6	71.5	37.9	51.1	23.9	50
IE	51.2	75.0	28.4	52.8	21.3	50
HR	53.5	68.1	36.5	45.3	31.0	50
LT	46.6	66.1	43.0	49.4	32.1	50
SI	48.7	69.8	42.8	42.9	33.4	50
LV	48.9	65.8	42.1	46.7	35.0	50
EE	47.8	61.7	43.0	52.9	30.9	50
CY	53.3	72.3	37.2	42.9	25.3	50
LU	44.0	61.9	29.5	53.1	24.5	50
MT	51.8	67.3	32.4	44.5	40.3	50

Source: Fana et al. (2020)

Table A4: Standard deviation for Gini and AROP rate estimates (sorted)

country	Gini		country	AROP
AT	0.00004		AT	0.02
NL	0.00040		FI	0.05
FI	0.00064		MT	0.05
LV	0.00073		BE	0.06
PT	0.00079		DE	0.07
MT	0.00080		NL	0.07
DK	0.00082		LV	0.08

BE	0.00083		PT	0.10
DE	0.00091		DK	0.12
LU	0.00100		LU	0.12
SI	0.00103		EE	0.15
EE	0.00106		SE	0.15
IE	0.00129		IE	0.18
EL	0.00153		BG	0.19
SE	0.00178		SI	0.20
FR	0.00220		EL	0.21
BG	0.00268		FR	0.24
ES	0.00273		IT	0.25
IT	0.00310		ES	0.42
HR	0.00365		CZ	0.43
SK	0.00411		HR	0.44
CY	0.00436		HU	0.47
HU	0.00466		SK	0.5
CZ	0.00478		RO	0.53
LT	0.00679		LT	0.67
PL	0.00716		CY	0.74
RO	0.00746		PL	0.77
Total	0.00249		Total	0.27

Figure A4: Impact of the COVID-19 crisis on non-anchored poverty (AROP rate) in EU countries

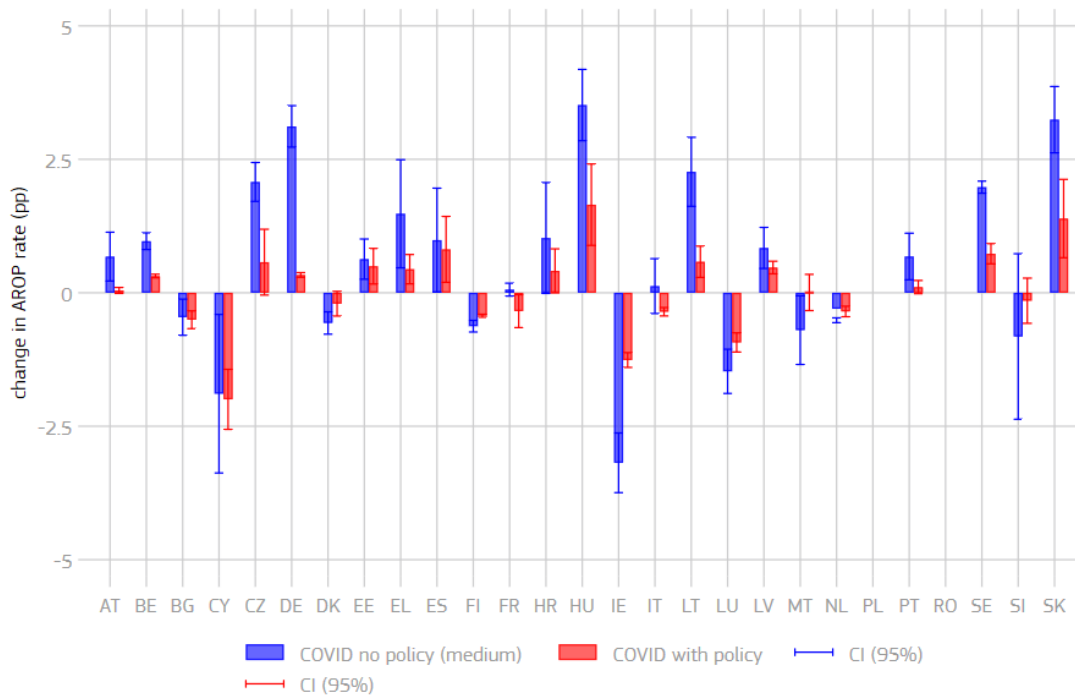
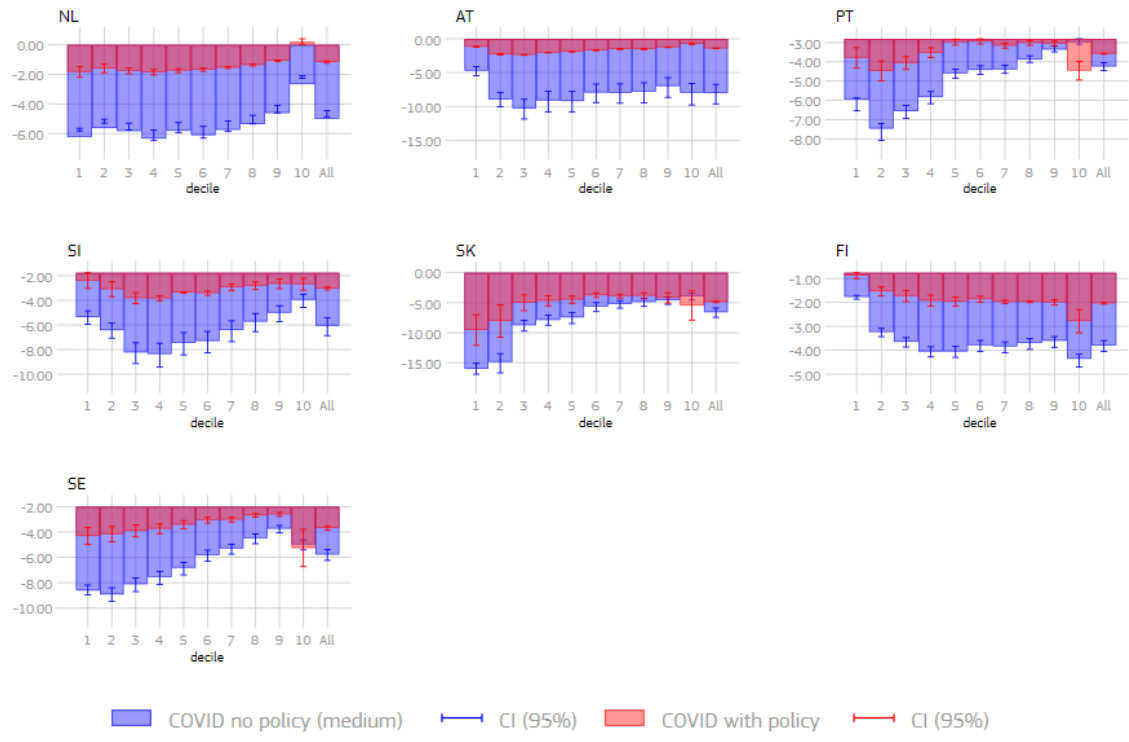


Figure A5: Change (%) in equivalent disposable household income by decile







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