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Covid 19 and Europe-wide Income Disparities

The Pandemic Stopped the
Previous Decline of Inequality

EUROPA

FRIEDRICH EBERT STIFTUNG

AT A GLANCE

In 2019, before the crisis, EU-wide inequality had reached its lowest level since the 2007 Eastern enlargement. After many years of stagnation, income disparities had eventually started to decline in 2016. The impact of the pandemic is difficult to assess, due to the lack of household survey data. Ignoring the possible changes of the distribution of disposable income within countries in 2020, where available evidence is ambiguous at best, we base our calculations for the EU-wide inequality in 2020 on the meanwhile known disparities of growth between Member States. Our estimate shows that the pandemic slowed down the previous decline strongly, but did not reverse it.

The pandemic arrived in Europe shortly after Great Britain had left the European Union (EU) on January 31, 2020. It hit the EU at a time when its economy had slowed down somewhat but unemployment had reached its lowest level for years while inflation remained stubbornly below its two percent target. Inequality, whose more precise definition will be discussed in detail below, had decreased, too. All these achievements were disrupted by an enormous economic shock that affected both the demand and supply side when the economies of the Member States went into lockdown. In this paper, we will discuss first the complex dimensions of EU-wide inequality before providing estimates of its development up to the pandemic and through its course.

MEASURING EU-WIDE INEQUALITY

The EU, whose income inequality is analysed here, is an entity with 28 (now 27) member states[1]. Therefore, its income distribution can and must be decomposed into the within-country and the between-country distribution. This paper focusses exclusively on inequality of income thus neglecting other inequalities such as those of wealth or life expectancy. The income we consider here is disposable income; that is market income minus taxes plus transfers received (e. g. pensions). Usually, the distribution of disposable income is less unequal than the distribution of market income as the state redistributes income from the rich to poor households. These incomes are adjusted for household type and size, thus becoming so-called »equalized disposable income«. This is the income definition underlying the data mostly used in this paper. Sometimes, we will additionally consider Gross Domestic Product (GDP) per capita.

The income data used here come from come from Eurostat, more precisely from household surveys (EU-SILC = Survey of Income and Living Conditions). These surveys cover all EU member states since 2005 and are based on surveys of approximately 130,000 households with 270,000 persons. As household surveys are notoriously unreliable and patchy at the top and the bottom of the income distribution, all findings based on them are likely to underestimate the true inequality. GDP data come from National Accounts and can only be used to analyse the distribution of income between countries and, within countries, between production factors (giving the wage and profit shares) or regions.

The comparison of incomes of people living in different countries can be based on nominal incomes converted at exchange rates or on real incomes converted at purchasing power parities (PPP). Incomes in poorer countries are usually higher at PPP as price levels there are lower (in particular for non-tradables such as services and rents). The indicators of inequality used here are primarily the quintile (or S80/S20) ratio, which gives the relation between the income of the richest quintile (= 20 percent) of the population to the poorest quintile, the Gini coefficient (ranging from 0 for perfect equality to 1 for total inequality) and the poverty ratio, which is the share of the population with an income below 60 percent of the median income.

In Table 1, the EU population quintiles (approx. 102 million people each) were constructed using different methods. If one adds up the Member States (or parts of them) to get the 20 percent of the EU population, one neglects the differences within the Member States. Similarly, when constructing the quintiles from NUTS1 or NUTS2 regions, the disparities within the regions are neglected. The household level takes account of income differences both within and between Member States, since it uses the national quintiles (but also ignores the differences within the quintiles). That quintile method will be explained in a more detailed way below. All ratios were calculated measuring the respective incomes at exchange rates and PPP. Table 1 shows that the inequality increases with the granularity (choice of smaller regions down to the household level).

At all levels, the inequality decreases over time. That decline is due to the fact that the quintile ratio, used here as an indicator of inequality, measures relative inequality. In the EU context, absolute inequality measuring the difference between incomes, using indicators such as the standard deviation, can and often does increase while the relative inequality decreases (for a detailed analysis see **Dauderstädt 2017**). To illustrate that paradox, we look at the NUTS 2 level, where, in 2000, the richest sub-region in the EU was Inner London West with a per capita income of € 142,100 and the poorest Nord-Est in Romania with € 1,600. In 2018, Inner London West had increased its average per capita income by 50 percent to € 213,400, but for the poorest region (then Severozapaden in Bulgaria), it had jumped by 225 percent to € 5,200. This means, that the absolute gap has increased further (from € 141,500 in 2000 to € 208,200 in 2018), while the relative ratio declined from 109 to 41. In the terminology of convergence theory this is called sigma convergence without beta convergence (Barro/Sala-i-Martin 1992, Islam 2003).

THE PRE-PANDEMIC STATE OF EU-WIDE INEQUALITY IN 2019

In order to gain a realistic estimate of the EU-wide inequality we use the quintile method which meets the requirement to combine both, within- and between-country inequality. We take the 140 national quintiles (= five quintiles times 28 Member States) to construct the European quintiles.[2] The following table 2 lists the average per capita income of all 140 national quintiles at exchange rates (not PPP!). The shading indicates which national quintiles belong to the poorest (red) respectively richest (green) European quintile each comprising approximately 102 million people. The differently coloured Q4 of Poland contributes only partially to the poorest European quintile as does the German Q4 to the richest.

In order to calculate the European S80/S20 ratio and Gini coefficient, we order the national quintiles according to their per capita income (see Figure 1 based on the data for 2019). The two curves in figure 1 give the accumulated population (upper curve) and income (lower curve) with the total population (approx. 505 million) and income (approx. 10.3 trillion Euro) nor-

Table 1
Quintile ratios of income in the EU

Compared entity	Neglected disparities	2000	2010	2018/19
Member States PPP	Income disparities within Member States	3,1	2,02	1,8
Member States		5,48	3,81	3,15
NUTS 1 PPP	Income disparities within NUTS1 regions			2,48
NUTS 1				4,02
NUTS2 PPP	Income disparities within NUTS2 regions	4	2,8	2,77
NUTS2				4,49
Households PPP	Income disparities within national quintiles		6,99	5,87/5,56
Households			9,48	8,45/7,9
To compare with: USA states	Income disparities within federal states			1,69

Source: Eurostat (NAMA_10R_2GDP) and author's calculations; households **Dauderstädt 2020**.
Notes: As data for NUTS 1 and 2 are lacking for France until 2014 the values for 2000 and 2010 are taken from an earlier analysis of the author at a time when these data were still available from Eurostat.

Table 2
Average per capita income of all 140 national quintiles in 2019 (at exchange rates)

Country	Q1	Q2	Q3	Q4	Q5
Bulgaria	1.612 €	2.948 €	4.227 €	5.904 €	13.061 €
Romania	1.270 €	2.670 €	3.854 €	5.315 €	8.976 €
Croatia	3.150 €	5.496 €	7.299 €	9.511 €	14.966 €
Latvia	3.100 €	5.785 €	8.240 €	11.347 €	20.263 €
Lithuania	3.041 €	5.444 €	7.624 €	10.676 €	19.519 €
Poland	3.410 €	5.540 €	7.143 €	9.115 €	14.900 €
Estonia	4.762 €	8.137 €	11.442 €	15.348 €	24.201 €
Hungary	2.865 €	4.579 €	5.854 €	7.444 €	12.088 €
Slowakia	4.127 €	6.575 €	8.141 €	9.998 €	13.771 €
Czech Republic	5.707 €	8.133 €	10.011 €	12.438 €	19.044 €
Portugal	4.576 €	7.629 €	10.029 €	13.105 €	23.573 €
Greece	3.536 €	6.181 €	8.244 €	10.908 €	18.036 €
Malta	7.560 €	11.668 €	15.494 €	19.923 €	31.550 €
Spain	5.760 €	10.875 €	15.110 €	20.469 €	34.215 €
Slovenia	7.647 €	11.327 €	14.074 €	17.261 €	25.856 €
Italy	6.433 €	12.622 €	17.203 €	22.733 €	38.641 €
Cyprus	8.435 €	12.357 €	16.236 €	20.835 €	38.618 €
Germany	10.016 €	18.288 €	23.503 €	29.783 €	48.910 €
France	11.852 €	18.602 €	23.305 €	28.916 €	50.130 €
Belgium	12.536 €	18.957 €	24.459 €	30.140 €	45.277 €
UK	9.959 €	16.437 €	21.901 €	29.488 €	53.708 €
Austria	12.543 €	20.258 €	25.672 €	32.274 €	51.999 €
Finland	13.653 €	19.818 €	24.961 €	31.543 €	50.313 €
Netherlands	12.538 €	19.427 €	24.621 €	30.873 €	49.279 €
Sweden	10.834 €	18.679 €	24.467 €	30.889 €	46.896 €
Ireland	13.892 €	19.937 €	25.573 €	33.181 €	55.770 €
Danemark	15.358 €	24.426 €	30.724 €	38.412 €	62.712 €
Luxemburg	16.024 €	27.526 €	36.478 €	48.493 €	85.523 €

Source: Eurostat; the values for France and UK are extrapolated from 2018 as the 2019 values were not yet available from Eurostat.

malized to 1. As is to be expected, the population curve grows faster than the income curve. The curves are not smooth as quintiles of large and rich countries contribute more to the accumulated population respectively income than those of smaller and poorer countries.

From figure 1, the values of three indicators of inequality can be deduced: the S80/S20 or quintile ratio the Gini coefficient, and the median income.

S80/S20 ratio: If we identify the point where the (upper) population curve reaches 20% (= 0.2) and look at the share of total accumulated income at that point (marked by the left black vertical line in Figure 1) we find that the poorer fifth of the EU receives about 0.05 (or 5 %) of the total income. The 42 national quintiles involved are the ones shaded red in table 2. In a similar way, we start at the point where the population curve reaches 0.8 and find (by following the right black vertical line in Figure1) that the income curve has a value of 0.6, implying that the income of the richest European quintile receives 0.4 (or 40 %) of the total income. The 26 national quintiles making up the richest EU quintile are shaded green in table 2. The exact ratio of these two income shares is the S80/S20 indicator (or quintile ratio) with a value of 7.9. This means that, measured at exchange rates, the richest EU quintile earns almost eight times as much as the poorest quintile.

Figure 1
**Accumulated population and income (at exchange rates and normalized between 0 and 1)
of the national quintiles (ordered from poorest to richest) in 2019**
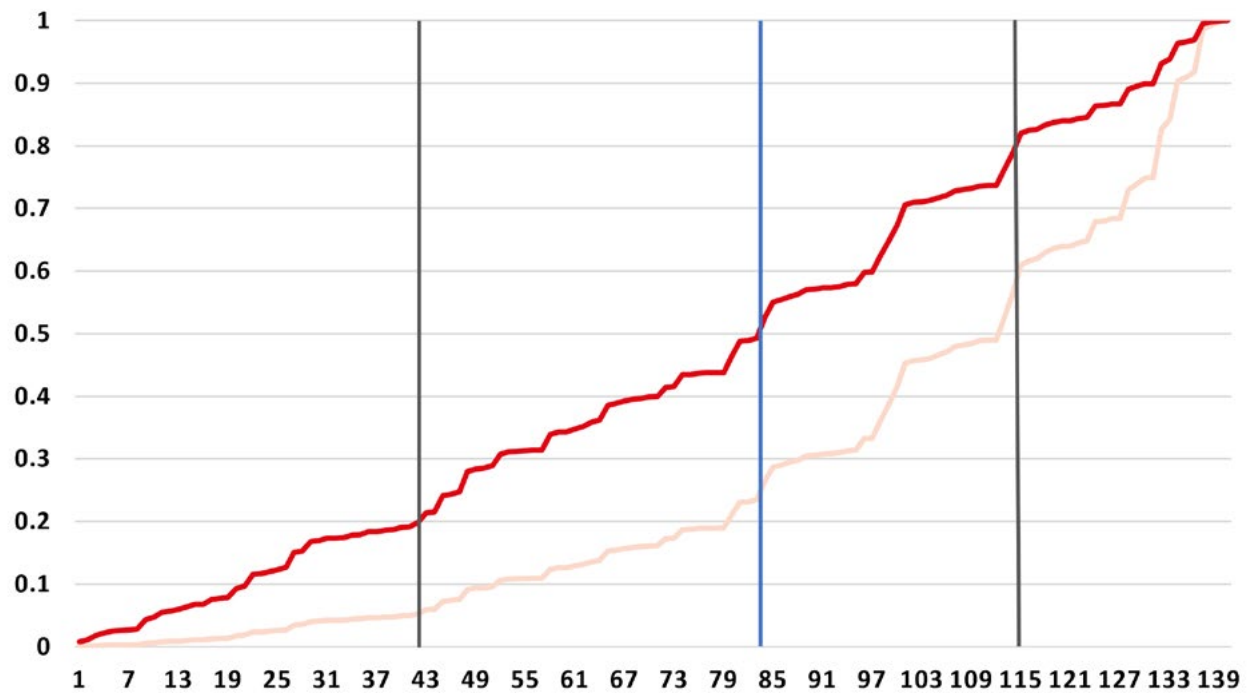
Source: Eurostat and author's calculation

Gini: The lower income curve is the so-called Lorenz curve. The Gini is defined as half the area between the Lorenz curve and the diagonal (line of perfect equality). Its value is 0.36 (at exchange rates without PPP) and 0.32 at PPP.

The **median income** is defined as the income where half the population (here about 252 million) earns more (and the other half less) than that amount. It is indicated in figure 1 by the blue central line that intersects with the upper population curve at 0.5. The income gained by the poorer half (intersection of that vertical line with the lower income curve) is about 24 % of the total income. The average income is to be found where the lower income curve reaches 0.5 (actually, slightly to the left of the right vertical black line). The fact that the median income is lower than the average income (and their difference) is another indicator of inequality. The more equal the distribution of income is, the smaller is the gap between the median and the average income.

Based on the median income, whose value was approximately 17,200 € at exchange rates and 18,100 € at PPP in 2019, one can calculate the poverty rate. The poverty rate is defined as the share of population whose income is lower than 60 % of the median income (sometimes a lower threshold of 50 % is used). Thus, the threshold income was 10,320 € at exchange rates and 10,860 € at PPP. The respective shares of the population with an income below these values has been 30.7 % at exchange rates and 22.4 % at PPP. As with other measures of inequality we observe a lower value at PPP. If we used the lower 50 %-threshold, the poverty rate would be significantly lower (by about nine percentage points). The EU-wide poverty rate is much higher than national poverty rates.
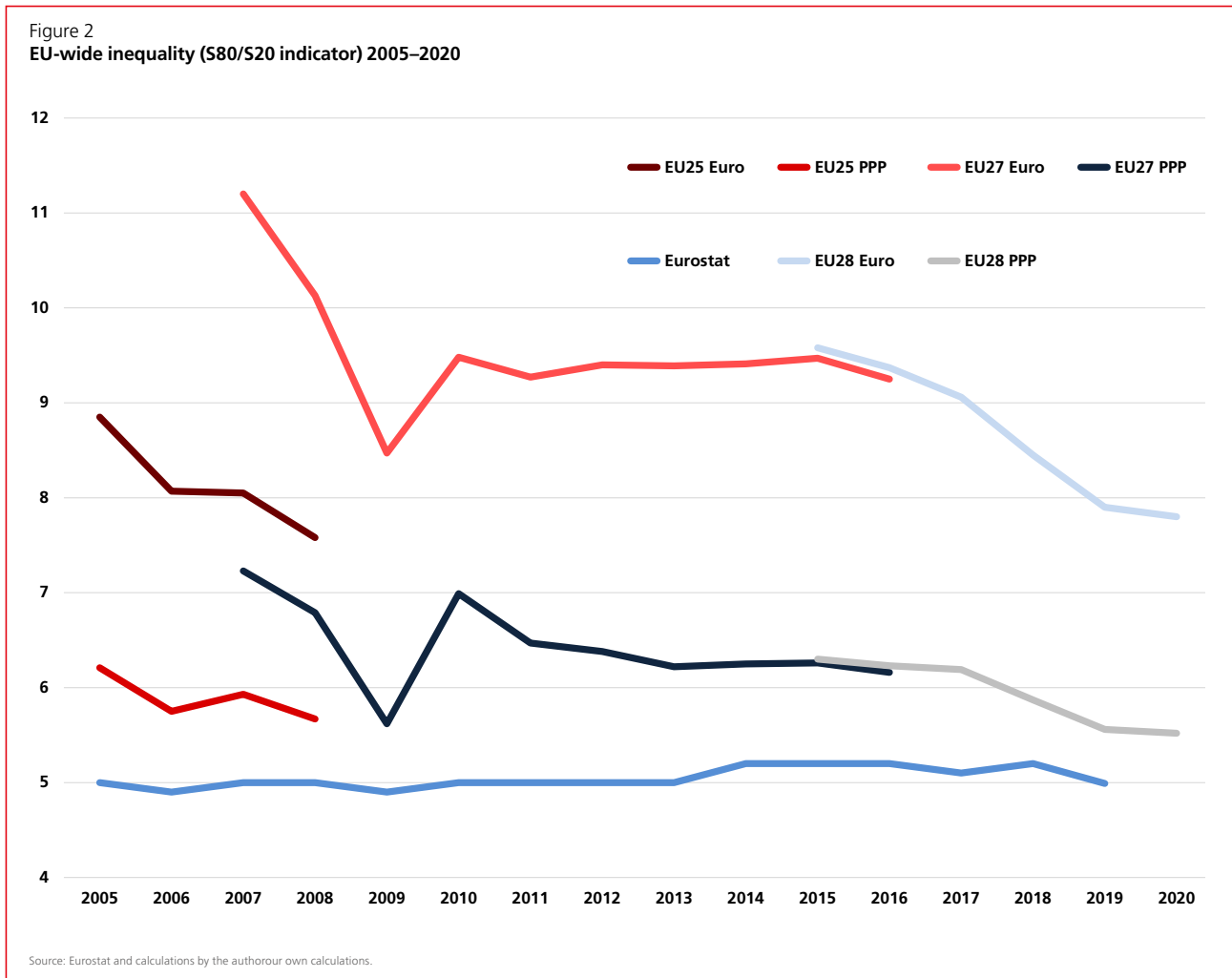
THE SLOW DECLINE OF THE EU-WIDE INEQUALITY

The 2019 pre-crisis value of EU-wide inequality is the lowest since 2008 with a value of 7.9 for the quintile ratio at exchange rates and 5.56 at PPP. Figure 2 presents the development of that ratio since 2005 at exchange rates and PPP. The lowest curve that oscillates around the value of 5 is the official Eurostat value for the whole EU. It is much lower and more stable than our values because it neglects the income disparities between countries, which are very important in the EU. It just gives the average, weighted by population, of the national values of the quintile ratio. The slow and mixed changes of national inequality translate into a quite stable development of the EU value calculated this way.

The other curves represent the values of the quintile ratio calculated by the above-mentioned quintile method, which have been published by the author (often with his co-author Cem Keltek) since 2008. As one can observe in figure 2, EU-wide inequality declined between 2005 and 2009. The apparent jump in 2007 is caused by the inclusion of Romania and Bulgaria as they joined the EU in 2007. The accession of two poor and large countries strongly increased the inequality. A similar, albeit much smaller, jump occurred in 2013 with the accession of Croatia.

In 2009, the financial crisis and the Great Recession hit the EU and caused inequality to increase substantially. That rise was partially reversed in 2011. Afterwards, the EU entered a phase when inequality did change little. The former declining trend, mainly caused by higher growth in poorer countries, did not

Figure 2
EU-wide inequality (S80/S20 indicator) 2005–2020

Source: Eurostat and calculations by the authorour own calculations.

continue until 2017. In 2017, inequality eventually resumed its decline, reaching a new all-time low (for the EU-27+) in 2019. The value shown in figure 2 for 2020 is an estimate whose derivation is explained in the next section.

It is important to note that this decline (and its earlier rises) has mainly resulted from changes in the between-country inequality. The within-country inequality has changed but slightly, at least in the average of all Member States, as can be seen in the lowest curve in figure 2. Decompositions of the EU-wide inequality into a between-country and a within-country component, using the decomposable Theil index, have shown that the total inequality is caused to 80 % by within-country inequality (see Blanchet et al. 2019 or Filauro 2018). This value is much lower than for the USA, where within-country inequality is much more important while between-states inequality is lower than in the EU (see table 1, last row).

Yet, in spite of its weight in total inequality, the evolution of EU-wide inequality is driven mostly by the higher growth of poorer Member States, in particular of the new Member States in Central and Eastern Europe (CEE). Their nominal GDP has grown by 51 % between 2008 and 2019 while that of the richer Member States in the Northwest of the EU has increased by just 20 % during the same period. These structural features need to be taken into account when we analyse the impact of the pandemic.

THE IMPACT OF THE PANDEMIC

The statistical base to assess EU-wide inequality in 2020 during the pandemic and the ensuing economic crisis is much weaker. We cannot use the EU-SILC household surveys like in the former years as these data will be published by Eurostat but in autumn 2021. Thus, we have to estimate the evolution of inequality by analyzing the probable development of the within-country and the between-country inequality. Let's start with the effects of the crisis on the income distribution within countries.

Again, the data base is weak. A detailed analysis of all 28 EU Member States is beyond the scope of this paper. The case of Germany (see box) provides a first picture of the ambiguities involved. The pandemic and the associated lockdowns hit people working in personal services who could not work from home harder than those in better remunerated administrative or management jobs. There are also clear indications that the inequality of wealth has grown as asset prices have increased strongly in the wake of ultra-loose monetary policies. On the one hand, additional wealth should translate into higher capital incomes in the medium term (e.g. when rents increase). On the other hand, zero or negative interest rates reduce income from savings. The resulting total effect on the income of the richer, asset-owning strata remains hard to guess.

Nonetheless, it seems quite likely that the distribution of market income has worsened in 2020. But the income we have

considered in the former years and want to estimate now is disposable income (see above first section). The inequality of disposable income usually is much lower than that of market income because the redistribution through the tax and welfare systems shifts income from the richer strata of the population to the poorer. During the pandemic, all countries have adopted measures to protect jobs and income. Government budget deficits increased dramatically as tax revenues declined and spending on income support, furlough wages and stimulus programs increased. In the end, it is possible that disposable income did not change a lot. Actually, in the USA, disposable incomes of some poorer strata have increased during several months in 2020 when support payments were higher than the former income for low-wage earners. The case of Germany (see box) seems to confirm that ambiguous finding. If it is true for other Member States with less generous income support during the pandemic, remains open.

Given all these uncertainties regarding the development of within-country inequality in 2020, we now focus on the changes in the between-country distribution of income. The data base is much better here as the actual estimates of GDP growth by Eurostat, the OECD or the IMF are already pretty reliable. GDP per capita differs from disposable income, but one can safely assume that both measures change in the same direction by a similar rate.

The Covid 19 pandemic has affected the EU Member States to different degrees. Countries depending on tourism suffered more than those relying on manufacturing. Less indebted Member States such as Germany could afford stronger fiscal support programs than already highly indebted countries. These qualities, however, are not closely correlated with levels of per capita income before the crisis. In a similar way, it is not clear if poorer countries will experience a stronger de-

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The pandemic's impact on within-country inequality: The case of Germany

There are some German studies that indicate a rise of inequality during the pandemic in 2020. According to Hoevermann/Kohlrausch 2020, people with lower incomes reported higher losses of earnings than those with higher incomes in a German survey (albeit with a limited sample). Butterwegge 2020 fears rising income disparities and sees a higher inequality of wealth. Analyzing the German low-wage sector, Schulten (2020) expects more poverty. These authors doubt, that short-time work compensation by the state (and the employers) will stabilize incomes sufficiently. But as actual data are not yet available, the findings are based on scant evidence.

Other research presents a more ambiguous picture: A study by the German Institute for Economic Research (DIW, Deutsches Institut of Wirtschaftsforschung; Schröder et al. 2020) assesses (Fig. 3 on p. 6) that the perception of economic distress has been on a similar level and much less dispersed between income groups in 2020 than in former years. The shares of people reporting rising, constant and declining incomes are very similar for all three income terciles (see table 3). Bögnas and Kellermann (2020) see rising disparities, which are largely compensated by state support measures, but could reemerge in the future. Research by the Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung) finds that low-wage earners are more affected by unemployment than other wage groups (Bach et al. 2021).

Table 3: Income changes per tercile

Changes during the pandemic	1. Tercile	2. Tercile	3. Tercile
Rise of income	2 %	1 %	0 %
Decline of income	23 %	17 %	25 %
No change of income	73 %	82 %	72 %
Don't know	3 %	1 %	3 %

Source: DIW, Schröder et al. 2020

Other studies expect no changes in the distribution of income (Bruckmeier et al. 2020). For Germany, the impact of the pandemic seems to be quite different depending on the focus on gross or net incomes due to generous state income support programs. According to a simulation study, Bruckmeier et al. (2020; Fig. 1) assume that gross incomes decline by 3 % on average and, for the different income deciles, between 4.3 % (for the 1. decile) and 2.8% (the 10. decile), thus implying a slightly increasing inequality of market incomes. However, for the disposable income, their findings are quite different: Here, the average decline is just 0.1 % with rising incomes in the lower deciles and declining ones for the higher deciles (Fig. 2). Research by the German Economic Institute (Institut der Deutschen Wirtschaft, close to employers) gets similar results with strong declines of market incomes in the lower income deciles that are largely compensated, thus stabilizing disposable incomes (Breznoska et al. 2021).

To sum up: The picture for Germany is ambiguous and based on tenuous data. While the inequality of market incomes is likely to have increased in 2020, the distribution of disposable incomes might have not changed much or even improved.
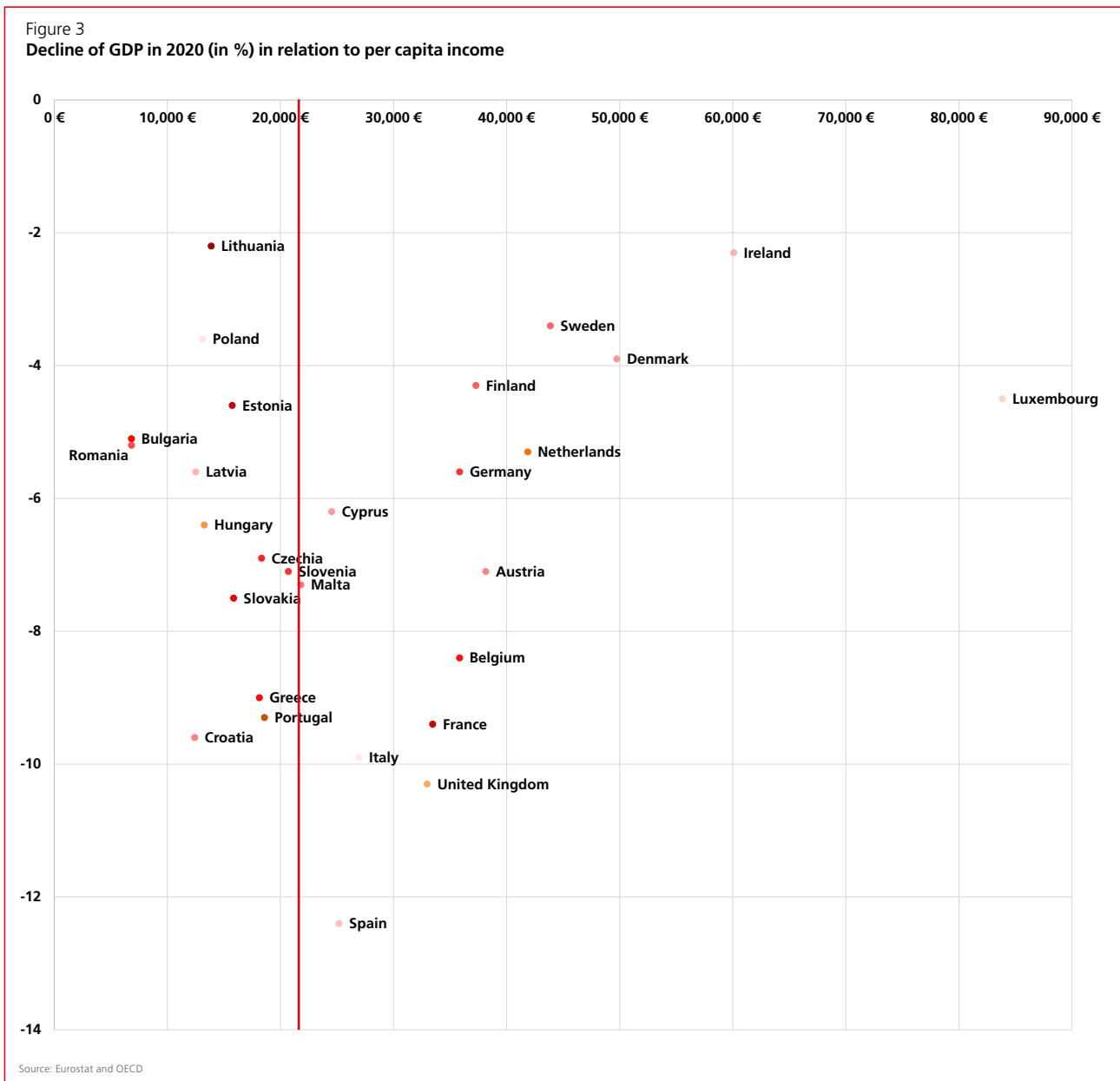
cline of GDP than richer Member States. As Figure 3 shows, the dispersion within both income brackets, the poorer ones with incomes below 25,000 € (to the left of the red vertical line) and the richer ones, is very high although the richest Member States tend to have smaller recessions. As the bulk of national quintiles forming the poorest EU quintile comes from those poorer countries (see table 2) on the left side of figure 3 and the bulk of those forming the richest EU quintile from the richer Member States (see table 2) on the right side, the overall effect on the EU quintile ratio is likely to be rather weak.

Due the data deficiencies and uncertainties, we calculate our estimate of the EU-wide inequality for 2020 exclusively on the base of the reported changes of between-country inequality. Such an approach is also justified by the fact, visible in figure 2, that the dynamics of EU-wide inequality were primarily driven by changes of the between-country inequality. Even the big rise of inequality during the financial crisis in 2009/10 (that could bode ill for 2020, too) was only accompanied by a

small increase of the average S80/S20 ratio (from 4.9 in 2009 to 5.0 afterwards).

That means calculating the average per capita income for each national quintile by correcting its amount by the – in 2020 everywhere negative – GDP growth rate of the whole economy and by the average population growth rate in 2020. This implies that the total annual changes of income are equally distributed over all five quintiles in every country. Of course, this assumption is very unlikely to be correct, but it is the best educated guess. Distributing the income decline arbitrarily in another way is hard to justify. An extrapolation into 2020 of the distribution of changes, say, between 2018 and 2019, does not make sense either as the distribution of positive growth is unlikely to be the same as that of decreasing GDP.

Using this method, we obtain the following estimates: The inequality measured by the quintile ratio declined slightly (in comparison with 2019). The estimated values for 2020 (also

Figure 3
Decline of GDP in 2020 (in %) in relation to per capita income

Source: Eurostat and OECD

shown in figure 2) are 5.52 at PPP (5.56 in 2019) and 7.78 at exchange rates (7.9 in 2019). These values are shown in figure 2 for the year 2020. Obviously, the pandemic and the crisis slowed but did not completely stop the decline of inequality that could be observed since 2017. The Gini shows a similar picture of almost no change between 2019 and 2020 with values of 0.32 at PPP and 0.36 at exchange rates.

The poverty rate has developed in a strange way: Measured at PPP, it has increased by three percentage points in 2020 and reached the amount of 25.1 % while at exchange rates it has slightly declined to 29.6 % (from 30.7 in 2019). This paradox resembles the uneven evolution of inequality since 2017 when it declined faster at exchange rates than at PPP (see the two respective curves in figure 2). It can be possibly explained by the fact that with relatively stable exchange rates within the EU (let alone the Euro area) the catch-up growth of poorer Member States is accompanied by higher inflation than in the richer Member States which, in turn, reduces the purchasing power of incomes in the poorer countries.

To sum up: The impact of the pandemic on EU-wide inequality appears to be weak. The ensuing recession has slowed down the recent declining trend but not reversed it as the financial crisis had in 2009/2010. Given the uncertainties mentioned above, this assessment must be considered provisional as it neglects the development of inequality within countries. The final judgement will be available from Eurostat in autumn this year.

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NOTES

1 The last year considered is 2020, when the UK initially was still a member state. For reasons of comparability, Great Britain will be included in the analysis throughout this period.

2 This method saves much effort as it does not process the income data of the about 130.000 households covered be the EU SILC survey but provides a very good estimate that is almost identical to the results of studies using the total data base. This analysis uses the latest available statistical data (i.e. for 2019) from Eurostat.

3 We have carried out these studies annually since 2011. The respective papers can be found at **www.fes.de** or **www.Dauderstaedt.de**.