Chapter 6
What Role for Macroeconomic Environment on Living Standards in Times of Crisis and Uncertainty

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6.1 Introduction

Macroeconomic uncertainty and economic downturns have been threatening living standards in the euro area for more than a decade!

The global financial crisis of 2007–2008 led to an economic crisis with unprecedented consequences in post-war history. The "financial-crisis-caused" economic downturn was followed by a sovereign debt crisis that spread quickly across the euro area. The debt restructuring of several euro area states, amid recession, spiked the levels of economic uncertainty and exacerbated the European economic environment. Estimates from the European Central Bank (2016, p. 72) indicated that the increase in uncertainty dampened real GDP growth for up to three quarters.

Presumably at the crisis end in 2017 (Buti 2017), most member states of the European Union (EU) reached their pre-crisis levels of GDP, half of them reached their pre-crisis levels of gross fixed capital formation, and only 10 reached their pre-crisis levels of employment (Vlachos and Bitzenis 2019). The effect of COVID-19 pandemic on economic activity eventually halted the slow pace of several euro area states' economic recovery, which had been accompanied by an increasing tax burden and the negative effects of austerity measures on human development. The COVID-19 (and the preceding prolonged economic) crisis spread economic insecurity across income groups and occupational classes, even in low-inequality, encompassing welfare European states (Ranci et al. 2021).[1] The estimates from

[1] For example, the COVID-19 pandemic has uneven effects on the self- employed because they are less protected by the social safety net.

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H. BEN AMEUR et al. (eds.), *Crises and Uncertainty in the Economy*,
https://doi.org/10.1007/978-981-19-3296-0_6

the European Central Bank indicate that uncertainty shocks may dampen real GDP growth for up to four quarters and that the spike in macroeconomic uncertainty is likely to have contributed significantly to the decline in euro area real GDP in 2020 (Gieseck and Rujin 2020, p. 64).

All these events have been major obstacles that prevented the achievement of Europe 2020 Strategy goals of employment and inclusive growth.[2] The Europe 2020 strategy had set the target of "lifting at least 20 million people out of the risk of poverty or social exclusion" by 2020 compared to year 2008. Since 116.1 million people were at risk of poverty or social exclusion in the EU-27 in 2008 (including the United Kingdom and excluding Croatia), the target value to be reached was 96.1 million in 2020.[3] Data from Eurostat indicates that people at risk of poverty or social exclusion in the EU were approximately 110 million in 2018 (including data for the United Kingdom).[4]

The aim of this chapter is to examine the impact of macroeconomic factors on living standards in times of macroeconomic uncertainty. The goal is to estimate and discuss the effect of macroeconomic factors on the living standards of euro area states that were mostly hit by this century's (henceforth) great recession. The findings will provide economic policy orientations to achieve Europe 2030 goals on poverty reduction.

The effect of COVID-19 pandemic on economic activity halted the anemic pace of economic recovery in member states who bore the brunt of the great recession, such as Greece, Italy, Portugal and Spain. Real GDP recorded for these economies in 2020, was still below their respective levels in 2007–2008.[5] The macroeconomic uncertainty which influenced their economic performance during and after the great recession, mainly due to public opposition and domestic political pressures (Cabral et al. 2013), will influence the speed of their economic recovery, this time due to the increase in uncertainty caused by the pandemic.

In light of recent evidence on the effects of macroeconomic uncertainty on economic growth and human development, such as Benigno et al. (2020. pp. 16–17)[6] who find that higher uncertainty causes declines in output, consumption, investment, and employment (hours worked) and support the findings of previous

[2] Banking and debt crises decrease the income of the lowest quintile in high-income countries by approximately 13% and 17%, respectively (Rewilak 2018).

[3] 2008 data for the EU-27 were used as the baseline year for monitoring progress towards the Europe 2020 strategy's poverty target. Please see the following link: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Europe_2020_indicators_-_poverty_and_social_exclusion&oldid=394836#cite_note-1 (accessed December 1, 2021).

[4] People at risk of poverty or social exclusion in the EU-27 were approximately 96 million in 2019. See https://ec.europa.eu/eurostat/data/database (accessed December 1, 2021).

[5] GDP in 2020, chain linked volumes (index = 2015). See https://ec.europa.eu/eurostat/data/database (accessed December 1, 2021).

[6] Paper prepared for the European Parliament's Committee on Economic and Monetary Affairs (ECON) as an input to the Monetary Dialogue of 19 November 2020 between ECON and the President of the European Central Bank.

studies on the economic impact of uncertainty (Bloom 2014, pp. 170–171), it is critical to assess the impact of macroeconomic factors on living standards in order to discuss the potential of the European Pillar of Social Rights Action Plan (EU 2030 target) to reduce the number of people at risk of poverty or social exclusion by at least 15 million.[7]

The focus on living standards requires the analysis of data on material deprivation rather than income poverty. According to Fusco et al. (2010, pp. 16–17):

- income does not measure adequately all available resources and wealth,
- standard of living or deprivation have a stronger link with permanent income, and
- the equivalised household disposable income addresses household size and composition but does not address differences in needs.

The macroeconomic factors that determine material deprivation will cover main indicators such as GDP or national income and unemployment.

The rest of the chapter is organized as follows. Section 6.2 describes the three main theoretical strands on the causes of poverty and indicates why poverty measurement has been linked with expenditures representing living standards. Section 6.3 discusses material deprivation, the EU approach to measuring living standards, and reviews selected empirical studies of macro-level determinants. Section 6.4 presents the empirical strategy. Section 6.5 presents the empirical results. Section 6.6 discusses the results and gives policy recommendations.

6.2 Poverty Causes and Measurement

Brady (2019) classifies the explanations of the causes of poverty into three broad families of theories: behavioral, structural and political. The distinctions between theories are provided by the answers to the following questions:

1. "How much are behaviors beyond individual control and dictated by structure?"
2. "How much can governments moderate the behavior-poverty link?"
3. "How much can governments moderate the effects of demographic and labor market contexts?"

The answer to the first question provides the distinction between structural and behavioral explanations: structure is more important than behavior if, for example, individuals exert limited control on whether they are poor during structural changes such as economic development. The answer to the second question provides the distinction between political and behavioral explanations: behavior is more important than politics if, for example, unemployment triggers poverty regardless

[7] See https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:The_European_Pillar_of_Social_Rights_Action_Plan_(EU_2030_targets)&stable=0&redirect=no (accessed December 1, 2021).

of the social policy and institutional context. The answer to the third question provides the distinction between structural and political explanations: structure is less important than politics if, for example, states can accomplish low poverty regardless of economic development.

Macro-level explanations of poverty indicate the level of poverty, and individual accounts indicate who becomes poor (Calnitsky 2018). Living standards indices for measuring poverty have been related to the utility concept of economic theory (Ngo 2018). Sen (1987) defines the standard of living in terms of functioning (achievements) and capabilities (the ability to achieve): what life people actually lead and the freedom people have in the choice of life. Based on this definition, Kakwani (1993) finds that the standard of living is less responsive to income per capita in richer countries. Furthermore, Boarini et al. (2021) indicate that income is a poor indicator of the social cost of the great recession: living standards of poor households fell by 5.3% annually, while GDP per capita stagnated across OECD countries.

The preference of consumption expenditures over measures of income is twofold. First, consumption expenditures relate needs with commodities. A reference budget standard is a specific basket of commodities which, when priced, can represent a particular standard of living. Large-scale surveys of poverty and deprivation are of particular importance in determining minimum living standards (Deeming 2017). Second, the income received in a given period may not be the source of consumption expenditures over that period. Under the consideration that economic crises magnify the role of assets in cushioning severe income shocks, poverty levels should be estimated by taking into account assets and debt (Kuypers and Marx 2021).

6.3 Empirical Studies of Country-Level Factors Determining Material Deprivation in the EU

The material deprivation rate is an indicator of the lack of (at least) three out of nine necessary and desirable items based on data from the European Union Statistics on Income and Living Conditions (EU-SILC). It measures the percentage of the population that does not have the ability to: (i) meet unexpected expenses; (ii) pay a mortgage, rent, utility bills or other loan payments on time; (iii) afford a one-week annual holiday away from home; (iv) adequately heat their dwelling; (v) afford a meal with meat, fish or a vegetarian equivalent every second day; (vi) purchase a range of durable goods such as a washing machine, (vii) a color television, (viii) a telephone, (ix) or a car. The severe material deprivation rate is an indicator of enforced inability with a threshold set at four lacks.[8]

[8] For definitions see Eurostat (2018, p. 141) and Eurostat statistics explained at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Material_deprivation (accessed December 1, 2021).

The literature of material deprivation in the EU distinguishes between micro- and macro-level determinants. Bárcena-Martín et al. (2014) who investigate the effects of a larger set of macro-level variables find that country-specific factors are much more relevant than individual effects in explaining differences in material deprivation across European countries. Their finding suggests that the socio-demographic characteristics of individuals/households are shaped by institutional and structural country-specific factors, which have to be considered in order to design measures to reduce the difference in material deprivation among countries.

Nelson (2012) makes use of the EU-SILC data from 26 European countries for the year 2008 to assess the extent to which social assistance accounts for differences in the prevalence of material deprivation. The macro-level explanatory variables are the: level of social assistance benefits, GDP per capita, non-means-tested benefit expenditure, public service expenditure, activity rate, unemployment rate, long-term unemployment rate, educational expenditure and active labor market policy expenditure. The findings indicate that the material deprivation rate has a negative relationship with social assistance benefits, GDP per capita, and the activity rate, and a positive relationship with the unemployment rate and the long-term unemployment rate.

Bárcena-Martín et al. (2014) examine whether country differences with respect to material deprivation levels can be explained by differences in the micro- or the macro-level perspective, and make use of the EU-SILC data from 28 European countries for the year 2007. The macro-level explanatory variables are the: GDP ratio of total expenditure on social protection, long-term unemployment rate, income quintile share ratio s80s20, and GDP per capita. The findings indicate that severe material deprivation has a positive relationship with social policy expenditures and GDP per capita, and a negative relationship with long-term unemployment.

Duiella and Turrini (2014) investigate the determinants of severe material deprivation in EU-28 for the period of 2005–2012. The explanatory variables are the: lagged level of severe material deprivation, the lagged growth rate of GDP per capita, lagged change in unemployment rate, the lagged change in long-term unemployment rate, lagged change in at risk-of-poverty rate, lagged change in Gini coefficient, and a dummy for the post-2007 crisis period. The findings indicate that severe material deprivation has a tendency to converge to a stable value over time,[9] and can be seen as capturing the gradual depletion of households' resources over long-term unemployment. Duiella and Turrini (2014) also investigate the impact of social expenditure variables and find that expenditures on housing benefits, social assistance and unemployment benefits and social protection are associated with a decrease in severe material deprivation.

Ribeiro et al. (2014) assess deprivation in 24 EU Member States, from 2005 to 2012. They extend the methodology of the "index of multiple deprivation" for the United Kingdom (UK) to develop the "index of multiple deprivation for developed

[9] Lagged severe material deprivation rate has a significantly negative coefficient.

countries" and the explanatory variables are the: general government gross fixed capital formation (percent of GDP), GDP per capita, interaction of GDP per capita with Gini coefficient,[10] unemployment rate, general government total expenditures on social protection net of total taxes (percent of GDP), interaction of general government total expenditures on social protection net of total taxes (percent of GDP) with a dummy capturing the phase of the economic cycle,[11] average rate of change in the harmonized index of consumer prices, and Worldwide Governance Indicators[12] (WGI). The findings indicate that multiple deprivation is reduced as GDP per capita increases, is negatively associated with higher-quality institutional environments, and increases along with the unemployment rate.

Visser et al. (2014) investigate the effect of macroeconomic circumstances and social protection expenditure on economic deprivation. They make use of the European Social Survey data from 25 European countries for the years 2010–2011 and construct the dependent variable of economic deprivation in the 3 years before 2010–2011. The macro-level explanatory variables are the: unemployment rate, GDP per capita (expressed in PPS), relative changes in unemployment rate, relative changes in GDP per capita, social protection expenditure (percent of GDP), interaction of social protection expenditure with unemployment rate and interaction of social protection expenditure with GDP per capita. The findings indicate that economic deprivation is negatively associated with GDP per capita and social protection expenditure. The interaction effects reveal that economic conditions temper the influence of social protection expenditure on economic deprivation.

Crettaz (2015) investigates the extent to which macro-level factors affect the income and living standards of workers. Crettaz (2015) makes use of the EU-SILC data from 7 different countries for the years 2008, 2011 and 2012, and constructs the indicator of working material deprivation. The significant correlation coefficients of the association tests between changes in various macro-level factors (real GDP growth rate, GDP per capita in PPS, unemployment rate, income quintile share ratio S80/S20, Gini coefficient, decile ratio of gross earnings D5/D1, low pay incidence, and average rates of social assistance) and changes in working material deprivation indicate a negative relationship between working material deprivation and economic growth, and the share of low-wage workers, and a positive relationship between unemployment and working material deprivation.

Kis et al. (2015) examine the determinants of severe material deprivation rates and make use of the EU-SILC data from 27 EU Member States over the period 2005–2012 to construct country-level variables. The explanatory variables are the: average equivalised disposable income, difference between the median equivalised

[10] The purpose is to assess the marginal effects of growth on poverty at different levels of disposable income inequality.

[11] The purpose is to control for the impacts of redistributive policies on poverty in the different phases of the business cycle.

[12] Simple average (of six indicators): voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption.

disposable income of people below the at-risk-of-poverty threshold and the at-risk-of-poverty threshold (expressed as a percentage of the at-risk-of-poverty threshold), interaction of disposable income with poverty gap, average social transfers, general government expenditure on education (percent of GDP), general government expenditure on healthcare (percent of GDP), general government expenditure on old-age pensions (percent of GDP), unemployment benefit (percent of GDP), family or child allowance (percent of GDP), employment rate (15–64 years), and household savings (percent of GDP). The findings indicate a positive relationship between severe material deprivation and disposable income, and the degree of income inequality (poverty gap), and a negative relationship between severe material deprivation and the savings rate.

Dudek (2019) investigates which country-level factors affect the severe material deprivation rate in 27 EU Member States, with data for the period of 2008 to 2015. The explanatory variables are the: GDP per capita (expressed in PPS), long-term unemployment rate, ratio of total expenditure on social protection in relation to GDP, median equivalised disposable household income (expressed in PPS), relative median at-risk-of-poverty gap indicator, Gini coefficient, and income quintile share ratio S80/S20. The findings indicate that severe material deprivation rates are negatively affected by GDP per capita, social protection, and disposable household income.

6.4 Data and Model Specification

The investigation of selected macro-level determinants of material deprivation is based on the findings of empirical studies discussed in the previous section. Considering that only one empirical study (Dudek 2019) explores data after 2012, recent developments are explored in this chapter for the cases of Greece, Italy, Portugal and Spain over the period 2005–2019.

Table 6.1 presents the dependent and the explanatory variables. The dependent variable is severe material deprivation and the panel data is analyzed with the following model:

$$Dep_{it} = X_{it}\beta + u_{it} \tag{6.1}$$

Where X is regressor vector of explanatory variables for each of the *i* member state at time *t*.

This is the general form of the fixed effects model whose selection is based on the results of the Hausman test for the panel data sample presented in Table 6.1. The explanatory variables are analyzed with the following model:

$$Dep_{it} = Inc_{it} + Exp_{it} + Ineq_{it} + Inst_{it} + Unem_{it} + u_{it} \tag{6.2}$$

Table 6.1 Variables and data sources

Variable	Source
Severe material deprivation, no. of persons	Eurostat
GDP per capita in PPS	Eurostat
Social protection benefits, euro per inhabitant	Eurostat
Gini coefficient	Eurostat
Unemployment, no. of persons	Eurostat
Long-term unemployment, no. of persons	Eurostat
Very long-term unemployment, no. of persons)	Eurostat
WGI[a]	World Bank

Sources: Eurostat database available at https://ec.europa.eu/eurostat/data/database (accessed June 28, 2021). World Bank databank available at https://databank.worldbank.org/source/worldwide-governance-indicators (accessed June 28, 2021)
[a]Simple average of six indicators as in Ribeiro, Silva and Guimarães (2014)

The dependent variables include income (GDP per capita), government expenditure on social protection (social protection benefits), inequality (Gini coefficient), institutional quality (WGI) and unemployment (general, for 12 months or more, and for 24 months or more). As mentioned above, the selection of all explanatory variables is based on the findings of studies discussed in the previous section. u_{it} denotes the error term.

6.5 Empirical Results

A brief discussion of the steps in the analysis of the panel data sample presented in Table 6.1 is in the Appendix. Table 6.2 presents the estimates of model (2) via the Weighted Least Squares (WLS) for heteroscedasticity correction of the fixed effects. The results agree with findings from previous studies (referred in brackets) discussed in Sect. 6.3. Social protection benefits (Nelson 2012; Duiella and Turrini 2014; Visser et al. 2014; Dudek 2019) have the greatest effect on severe material deprivation. Institutional quality (Ribeiro et al. 2014) and unemployment (Nelson 2012; Bárcena-Martín et al. 2014; Duiella and Turrini 2014; Ribeiro et al. 2014; Crettaz 2015) have a moderate effect (absolute value of coefficients <1) and changes in income distribution measured by the Gini coefficient have a lesser effect. Some of the previous studies discussed in Sect. 6.3, find that the degree of income inequality has an effect on deprivation: poverty gap for instance, in the case of Kis et al. (2015). However, there are no statistically significant findings reported for the Gini coefficient.

Finally, GDP per capita is positively associated but in contrast to the findings of previous research (Nelson 2012; Duiella and Turrini 2014; Ribeiro et al. 2014; Visser et al. 2014; Crettaz 2015; Dudek 2019), it is not statistically significant. Following the distinctions of Brady (2019) between theoretical explanations of the

Table 6.2 WLS for heteroscedasticity correction of the fixed effects (Greece, Italy, Portugal and Spain)

Explanatory variables & test statistics	1		2		3	
Constant	−5.10 ∗ ∗∗	(1.84)	−4.86 ∗ ∗	(1.85)	−3.99 ∗ ∗	(1.91)
Log GDPpc	0.76	(0.55)	1.04	(0.54)	0.86	(0.55)
Log socprotben	−1.51 ∗ ∗∗	(0.33)	−1.22 ∗ ∗∗	(0.33)	−1.31 ∗ ∗∗	(0.33)
Gini	0.04 ∗ ∗∗	(0.01)	0.03∗	(0.01)	0.02	(0.01)
WGI	−0.42 ∗ ∗∗	(0.07)	−0.35 ∗ ∗∗	(0.07)	−0.32 ∗ ∗∗	(0.07)
Log unemp	0.22 ∗ ∗∗	(0.05)				
Log lt unemp			0.26 ∗ ∗∗	(0.05)		
Log vlt unemp					0.24 ∗ ∗∗	(0.05)
R^2	0.90		0.89		0.89	

Notes: Robust standard error in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6.3 WLS for heteroscedasticity correction of the fixed effects (Greece and Portugal)

Explanatory variables & test statistics	1		2		3	
Constant	4.85∗	(2.40)	5.71 ∗ ∗	(2.10)	7.25 ∗ ∗∗	(2.00)
Log GDPpc	0.47	(0.40)	0.24	(0.33)	−0.02	(0.31)
Log socprotben	−0.75 ∗ ∗∗	(0.16)	−0.57 ∗ ∗∗	(0.19)	−0.56 ∗ ∗	(0.21)
Gini	0.02 ∗ ∗∗	(0.01)	0.02 ∗ ∗	(0.01)	0.02 ∗ ∗	(0,01)
WGI	−0.44 ∗ ∗∗	(0.04)	−0.43 ∗ ∗∗	(0.04)	−0.45 ∗ ∗∗	(0,04)
Log unemp	0.26 ∗ ∗∗	(0.09)				
Log lt unemp			0.17 ∗ ∗∗	(0.06)		
Log vlt unemp					0.11 ∗ ∗	(0,05)
R^2	0.97		0.97		0.96	

Notes: Robust standard error in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

causes of poverty, the findings indicate that politics are more important (with regard to social protection benefits and institutional context) than behavior (in terms of unemployment) and structure (regarding the Gini coefficient and GDP per capita).

Table 6.3 presents estimates for Greece and Portugal and Table 6.4 for Italy and Spain. These are more homogeneous groups considering their size in terms of demand and output. Table 6.3 indicates similar findings to those of Table 6.2 with two notable differences. First, the coefficient of social protection benefits is almost half the size of the respective in Table 6.2. Second, the effect of unemployment weakens through time. Following the distinctions of Brady (2019), the results indicate that politics remain the most important factor explaining severe material deprivation. However, the weaking effect of unemployment through time requires for further investigation. A possible explanation could be that the very long-term unemployed receive income through undeclared work and reduce their level of deprivation.

Table 6.4 WLS for heteroscedasticity correction of the fixed effects (Italy and Spain)

Explanatory variables & test statistics	1		2		3	
Constant	11.73 ∗ ∗	(4.35)	10.84 ∗ ∗	(4.18)	12.02 ∗ ∗∗	(3.75)
Log GDPpc	−1.68 ∗ ∗	(0.81)	−0.98	(0.85)	−1.21∗	(0.65)
Log socprotben	−0.62	(0.71)	−0.09	(0.75)	−0.21	(0.59)
Gini	0.04	(0.03)	−0.02	(0.04)	−0.05	(0.04)
WGI	−1.15 ∗ ∗∗	(0.35)	−1.17 ∗ ∗∗	(0.34)	−0.98 ∗ ∗∗	(0.30)
Log unemp	−0.08	(0.19)				
Log lt unemp			0.20	(0.171)		
Log vlt unemp					0.27 ∗ ∗	(0.11)
R^2	0.91		0.92		0.93	

Notes: Robust standard error in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6.4 presents a very different picture than Table 6.2. GDP per capita is negatively associated and has the greatest effect on severe material deprivation. The effect of institutional quality is much stronger (absolute value of coefficients ≥ 1). Only very long-term unemployment has a statistically significant effect on severe material deprivation. Following Duiella and Turrini (2014), this estimate can be seen as capturing the gradual depletion of households' resources over very long-term unemployment. Following the distinctions of Brady (2019), the results indicate that structure (in terms of GDP per capita) is more important than politics (in terms of institutional context), since these two states cannot accomplish low deprivation rates regardless of economic development. The differences in the results indicate that an one-size-fits-all strategy to reduce poverty is not efficient. Although the institutional context remains a statistically significant critical determining factor for both groups, differences in the productive capacity differentiate their results.

6.6 Conclusion and Policy Recommendations

Under the consideration that macro-level explanations of poverty indicate the level of poverty (Calnitsky 2018), this chapter revisits the macro-level determinants of living standards in the EU over a period of economic crisis and uncertainty. Consistent with Eurostat methodologies, living standards are investigated in terms of material deprivation.

The empirical results of the model of macro-level determinants of severe material deprivation support some of the findings of previous research. Although the size of the sample in terms of the number of economies examined is smaller than in previous research, the time-series consider developments not previously examined in four euro area member states who bore the brunt of the great recession. The results for the total sample indicate that in the bigger picture, the role of government expenditure in terms of social protection benefits and unemployment benefits, is

critical to the size of severe material deprivation. This finding is in favor of the debate on redesigning EU fiscal rules (Blanchard et al. 2021). Their reinstatement due to the pandemic's end will require from governments to cut spending even if the evidence suggests that doing so would have negative consequences for living standards. In addition, severe material deprivation is negatively associated with higher-quality institutional environments. This finding indicates the requirement for states such as Greece to improve their level of institutional quality (Vlachos and Bitzenis 2022).

When the sample is broken-down into two groups, one consisting of the two relatively bigger and more industrial economies and one of the two smaller economies with less industrial production, the results indicate that an one-size-fits-all strategy to reduce poverty would not be efficient. The results for the group of Italy and Spain indicate that economic growth will contribute to the reduction of severe material deprivation by increasing labor demand, raising wages and reducing the rate of long-term unemployment. The results for Greece and Portugal indicate that GDP growth does not have the same effect on severe material deprivation. In contrast to the case of Italy and Spain, the effects of unequal income distribution (Gini coefficient) and social protection benefits are important. This may be due to the lesser effect of GDP growth on job creation.

The results also imply that the decrease of severe material deprivation rates will be less time consuming in economies with smaller income gaps. Shifts in income inequality are therefore necessary for the materialization of the European Pillar of Social Rights Action Plan 2030 target of poverty reduction in the EU. Otherwise, changes in poverty rates and income distribution specific to the intrinsic characteristics of member states will probably occur.

In conclusion, as the economies recover from the consequences of COVID-19 pandemic on economic activity, severe material deprivation rates will decrease. All efforts made at the member states level to reduce income inequality should be accompanied by a revised European macro-economic framework for fiscal discipline. The over a decade-long period of uncertainty caused by the pendulum between periods of economic downturn and anemic growth stresses the need for an immediate and effective response to secure a V-shaped post-pandemic recovery. This response should entail productive investment expenditures in human development (health and education) and infrastructure improvements that must be exempted from the existing EU fiscal rules framework.

Appendix

Log transformation is applied to all variables but the Gini coefficient and the WGI. The Im–Pesaran–Shin test statistic is not significant and the hypothesis that all cross-sections have unit root is rejected.

The model is estimated via 4 different regressions:

1. Pooled ordinary least squares (OLS) for testing whether the data should be analyzed with fixed or random effects. The variance inflation factors of all explanatory variables have values lower than 10. The results of the Hausman specification test indicate the selection of fixed effects.
2. Pooled WLS for heteroscedasticity correction of pooled OLS, following the White test results for heteroscedasticity.
3. Fixed (within) effects estimation. The Wooldridge test result does not reject the null hypothesis of no serial correlation.
4. WLS for heteroscedasticity correction of the fixed effects. The results of the Wald test of the fixed effects estimation indicate the presence of heteroscedasticity and for that reason a WLS is performed.

Across all 4 regressions, the Durbin-Watson test statistic indicates that the residuals are not autocorrelated and the normality test results indicate that the residuals are normally distributed.

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