IMPACT OF COVID-19 ON GLOBAL INCOME INEQUALITY

The COVID-19 pandemic has raised global income inequality, partly reversing the decline that was achieved over the previous two decades. Weak recoveries in emerging market and developing economies (EMDEs) are expected to return between-country inequality to the levels of the early 2010s. Preliminary evidence suggests that the pandemic has also caused within-country income inequality to rise somewhat in EMDEs because of particularly severe job and income losses among lower-income population groups. Over the medium and long term, rising inflation, especially food price inflation, as well as pandemic-related disruptions to education may further raise within-country inequality. Within-country inequality remains particularly high in EMDE regions that account for about two-thirds of the global extreme poor. To steer the global recovery onto a more equitable development path, a comprehensive package of policies is needed. A rapid global rollout of vaccination and redoubled productivity-enhancing reforms can help lower between-country inequality. Support targeted at vulnerable populations and measures to broaden access to education, health care, digital services and infrastructure, as well as an emphasis on supportive fiscal measures, can help lower within-country inequality. Assistance from the global community is essential to expedite a return to a green, resilient, and inclusive recovery.

Introduction

The recovery from the deep recession triggered by the COVID-19 pandemic has been highly uneven across countries, leaving behind some of the poorest countries. Whereas advanced economies are recovering at a solid pace and the vast majority of them are expected to regain their pre-pandemic real per capita income levels in 2022, only about one-half of emerging market and developing economies (EMDEs) and low-income countries (LICs) are expected to recover their pre-pandemic real per capita income levels over the same period (chapter 1). Lower-income population groups have been hurt disproportionately, and the pandemic has raised extreme poverty rates.

Reducing income inequality is important for many reasons. Income inequality is often accompanied by poverty and inequality of opportunity as low-income households face greater challenges in investing in adequate education, thereby limiting the next generation's job and income prospects (Corak 2013). Countries with wider income gaps may face higher risks to social and political stability, amplifying the risks of crises, and thereby potentially undermining sustained economic growth and development (Berg and Ostry 2017; World Bank 2016).

This chapter examines the impact of the pandemic on income inequality and addresses the following questions:

- What has been the impact of the COVID-19 pandemic on global income inequality?

- Which policy measures were deployed to mitigate the impact of the pandemic on within-country inequality?

- What policies are needed to reduce global income inequality?

Contributions to the literature. The chapter contributes to the rapidly evolving literature on the economic impact of the pandemic in several ways.[1] *First*, the chapter presents the first comprehensive assessment of the possible effects of the pandemic on within- and between-country income inequality, drawing on multiple approaches, including high-frequency phone surveys of households and firms conducted by the World Bank, simulations, and growth forecasts.[2] It is the first study to do so with an EMDE focus. This

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Note: This chapter was prepared by Amat Adarov, Alexandru Cojocaru, Sinem Kilic Celik, and Ambar Narayan, with contributions from Tom Bundervoet, Christoph Lakner, Daniel Gerszon Mahler, and Nishant Yonzan.

[1] For the discussion of income inequality trends, see Alvaredo and Gasparini (2015); Lakner and Milanovic (2016); and World Bank (2016); for studies focusing on developments in inequality around past recessions, crises, and epidemics, as well as related transmission channels, see Bitler and Hoynes (2015); Bodea, Houle, and Kim (2021); Hoynes, Miller, and Schaller (2012); Meyer and Sullivan (2013); and Morelli and Atkinson (2015); for the analysis of the distributional impacts of COVID-19, see Clark, D'Ambrosio, and Lepinteur (2021); O'Donoghue et al. (2020); and Palomino, Rodriguez, and Sebastian (2020); for the analysis of inequality-reducing policies, see Hoynes and Patel (2018) and Lustig (2018).

assessment of the impact of the pandemic is rooted in a summary of different strands of the literature that describe a wide range of potential transmission channels through which the pandemic may affect income inequality.

Second, the chapter reviews developments in global income inequality over the past two decades. It does so along three dimensions: within-country inequality (the dispersion of incomes within a country's population), between-country inequality (the dispersion of average per capita incomes between countries), and global interpersonal income inequality (the distribution of incomes across all individuals in the world).

Third, the chapter is the first study to illustrate how within- and between-country inequality historically evolved around a wide range of major disruptive events. The events considered here include global and national recessions, financial crises, and epidemics.

Fourth, the chapter reviews the policies that have been deployed to reduce income inequality. Whereas a large literature describes and estimates the effects of specific types of policies in isolation or for limited country samples, this chapter distills the patterns from the literature as a whole, and reviews the policies implemented globally during COVID-19. Based on this review, the chapter formulates a comprehensive strategy to address income inequality issues.

Main findings. This chapter offers a number of novel findings.

First, the pandemic is likely to have increased *within-country* income inequality somewhat in EMDEs. For a sample of 34 EMDEs, income inequality as measured by the Gini coefficient is estimated to have increased in 2020 by a modest 0.3 points, equivalent to the annual average decline in within-country income inequality in these EMDEs over the preceding two decades. The increase in within-country inequality has been driven by particularly severe job and income

losses during the pandemic among low-skilled workers, low-income households, informal workers, and women. The increase follows a decline in within-country income inequality in most EMDEs, and most steeply in Latin America and the Caribbean (LAC), over the previous two decades. Nevertheless, countries in Sub-Saharan Africa (SSA) and LAC, which are home to about two-thirds of the global extreme poor, still had some of the highest within-country inequality levels among EMDEs before the pandemic.[3]

Second, the pandemic is likely to have increased *between-country* income inequality as a result of the lagging economic recovery in EMDEs in 2021-2023 compared with advanced economies. Between-country inequality is estimated to have returned to the levels of the early 2010s. Because of increasing between-country and within-country inequality, global interpersonal income inequality is likely to have increased.

Third, the modest increase in within-country inequality caused by the COVID-19 pandemic is in line with the experience of other epidemics over the past three decades, which have been systematically associated with increases in inequality in affected countries. In contrast, past recessions and financial crises have been associated with highly heterogeneous changes in within-country inequality as several transmission channels operated in diverging directions.

Fourth, while the rise in within-country income inequality on account of the COVID-19 pandemic may have been modest in the short term, it may be greater over the longer term. Education has been severely disrupted in many EMDEs, and disproportionately for children in low-income households. Given the tight links between education and income, this may set back income prospects for several generations, increase inequality of opportunity, and reduce inter-generational mobility.

Fifth, a comprehensive strategy is needed to steer the global economy onto a more inclusive

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[2] The simulations of within-country income inequality effects on EMDEs are based on the background papers, Narayan et al. (forthcoming) and Mahler (r) et al. (forthcoming).

[3] By some measures, it is also high in Middle East and North Africa (Chancel et al. 2021).

development path. Such a strategy needs to include measures to reduce both between-country and within-country inequality through national reforms and with support from the global community. A rapid vaccine rollout and redoubled efforts to implement reforms to boost productivity growth in EMDEs can help reduce between-country inequality. Support targeted at groups worst affected by the pandemic combined with efforts to reduce inequality of outcomes and opportunities can reduce within-country income inequality. Fiscal measures to raise government revenues and targeted government support to the most vulnerable groups can help improve equality of outcomes; measures to broaden access to health care and education, infrastructure and technology as well as finance can help reduce inequality of opportunity. The global community can support national efforts by accelerating vaccine provision, debt relief where needed, and maintaining an open and rules-based trade and investment climate.

Recent trends in global income inequality

Over the two decades ending in 2019, income inequality fell markedly in EMDEs, although progress stalled after the global financial crisis of 2007-09. The decline was broad-based across EMDE regions. Nevertheless, inequality remains considerably higher in EMDEs than in advanced economies.

Decline in global within-country income inequality. Between the first and second decades of the 2000s, within-country income inequality declined globally, both on average and in the majority of countries.[4]

- The average within-country Gini coefficient (a measure of income inequality based on the entire income distribution of the country) fell by 1.5 points to 38 points (figure 4.1). The decline occurred from historically high levels of income inequality in the early 2000s, after increases in inequality in both advanced

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[4] For a review of the data details and limitations see annex 4.1.

FIGURE 4.1 Within-country income inequality and poverty, 2000-09 and 2010-19

Between 2000-09 and 2010-19, poverty and within-country income inequality declined, especially in EMDEs. Within-country Gini indices fell by 1.5 points for the global average and by 2 points in EMDEs, on average. However, in about one-half of advanced economies, inequality increased.

A. Average within-country income share of the bottom 40 percent

B. Average within-country extreme poverty rate

C. Average within-country top-to-bottom income quintile ratio

D. Average within-country Gini index

E. Average within-country income share of the top 1 percent

F. Share of countries with declining inequality between 2000-09 and 2010-19

Sources: World Bank; World Inequality Database.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies. Simple averages, except for "World (weighted)," which indicates the global average weighted by country population. Aggregates are calculated using ten-year country averages for 2000-09 and 2010-19 to maximize the sample size and mitigate gaps in the data for some countries. Strongly balanced panel data based on 136 countries, including 31 AEs and 105 EMDEs. Extreme poverty rate is defined as the share of the population living on less than $1.90 a day at 2011 purchasing power parity (PPP).

economies and EMDEs throughout the 1990s (figure A4.1.1).

- The income share of the top quintile of the income distribution relative to that of the bottom quintile (a measure that focuses on the changes at the extreme ends of the income

distribution) declined by more than one-tenth, to a ratio of 7.7, on average.

- The income share of the richest 1 percent of the income distribution (a measure that focuses on the top of the income distribution) declined by 1 percentage point, on average, to 16 percent.

- The income share of the poorest 40 percent of the income distribution (a measure that focuses on the bottom of the income distribution) rose by 0.6 percentage point, on average, to 17.8 percent.

Decline in within-country inequality in EMDEs. Between the first and second decades of the 2000s, income inequality declined in more than two-thirds of EMDEs, but in only one-half of advanced economies as measured by the Gini index or the top-to-bottom income quintile ratio. In the average EMDE, the Gini index declined by 2 points and the income share of the top quintile, relative to that of the bottom quintile of the income distribution declined by one-eighth between the first decade of the 2000s and the 2010s. In more than half of EMDEs, and in less than one-tenth of advanced economies, the Gini index declined by 2 points or more and the top-to-bottom income quintile ratio declined by 0.6 or more.

In EMDEs, the income share of the richest 1 percent declined from 16.8 to 16.2 percent, on average, equivalent to 3.5 standard deviations of average annual changes over the two decades. That said, in the most populous EMDEs and advanced economies, including China, India, and the United States, the income share of the richest 1 percent increased (figure A4.1.2; Alvaredo et al. 2018; Lakner and Milanovic 2016; Milanovic 2016). The income share of the bottom 40 percent of the income distribution rose by 0.8 percentage points in the average EMDE, to 16.9 percent. Nevertheless, the income share of the poorest 40 percent in the average EMDE remained 3.6 percentage points below that in the average advanced economy.

Uneven decline in within-country inequality in EMDEs. The decline in within-country inequality over the past two decades was broad-based across EMDE regions, but was not evident among LICs (figure 4.2).

- The largest regional decline in inequality was achieved in LAC, where the average top-to-bottom income quintile ratio fell by almost one-third. The decline has been attributed to more pro-poor government policies and declining wage premia for skilled workers as access to basic education improved (Lustig, Lopez-Calva, and Ortiz-Juarez 2013).

- The decline in inequality in low-income countries (LICs), including fragile and conflict-affected countries, was feeble, at best, by all measures, especially in more populous economies.

Higher within-country inequality in EMDEs than advanced economies. Despite the decline between the past two decades, income inequality in the average EMDE in 2010-19 remained 1.2-1.6 times (depending on the measure) as high as in the average advanced economy (figure 4.2). Inequality is especially high among energy exporters. In commodity exporters, several of which are LICs, despite declines in inequality, the 20 percent of the population with the highest incomes received nine times more income than the poorest 20 percent. This large gap is consistent with what has been termed the "paradox of plenty," whereby countries rich in natural resources often exhibit worse development outcomes, including more unequal distribution of natural resource rents than countries less richly endowed (Sachs and Warner 2001).

Declining between-country inequality. Over the past two decades, between-country income inequality declined, and at a particularly rapid clip until the global financial crisis. Differentials in median incomes in advanced economies and EMDEs narrowed as the population-weighted average median income in EMDEs increased by 57.5 percent, compared with 8.7 percent in advanced economies. The unweighted between-country Gini index decreased by about one-tenth from the early 2000s to the late 2010s, with particularly rapid per capita income growth in China and India, the two most populous EMDEs.

More rapid median income growth in EMDEs than in advanced economies also points to declining between-country income inequality. The decline in the between-country Gini index was fastest and most broad-based in the early 2000s, but slowed sharply after the global financial crisis (figure 4.3). The slowdown reflected the effects of the global financial crisis on economic growth among the EMDEs, and also the effects of the commodity price plunge during 2014-16, especially on commodity exporters.

Decline in global interpersonal income inequality. Global interpersonal income inequality (a measure of inequality across the world population) decreased over the past two decades, consistent with the observed decline in both within- and between-country income inequality. Interpersonal Gini coefficient declined by one-tenth between the early 2000s and the late 2010s (figure 4.3). Most of the decline, however, occurred in the early 2000s and stalled after the global financial crisis as economic growth in EMDEs slowed sharply, amid a commodity price collapse, trade tensions, and bouts of financial market stress (Kose and Ohnsorge 2020).
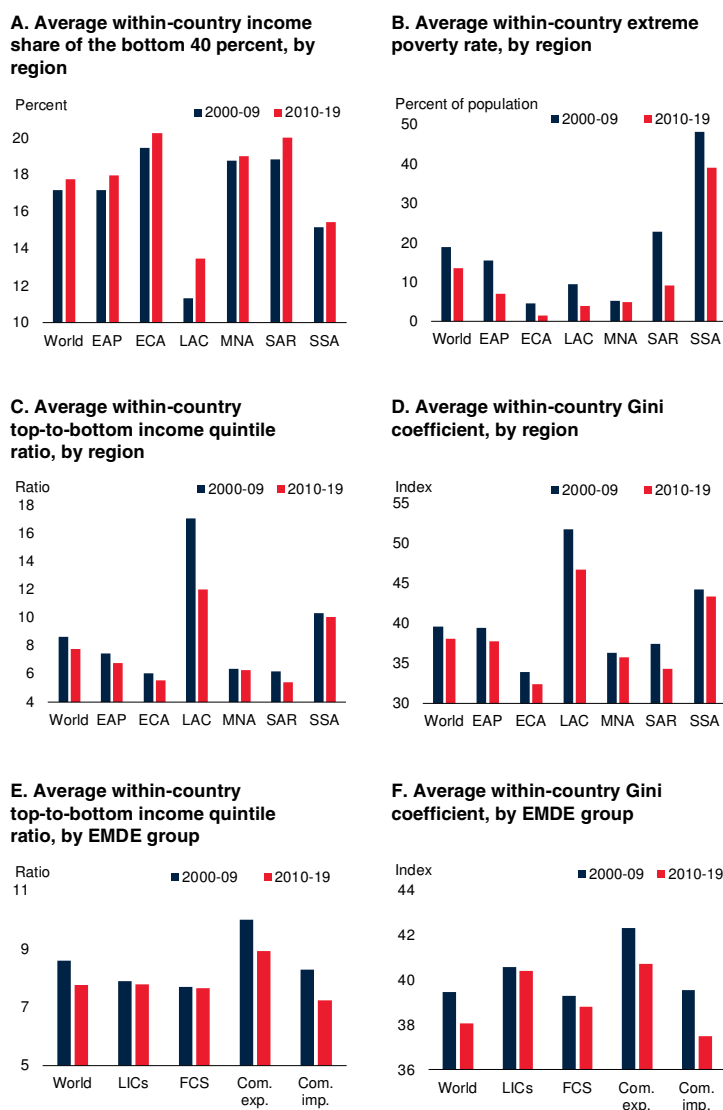
Distributional impacts of disruptive events

The epidemics of past three decades were typically followed by rising within-country income inequality in EMDEs. In contrast, global and national recessions as well as financial crises were associated with a wide range of changes in income inequality. Generally, the magnitudes of changes in within-country inequality around epidemics were small. These results suggest that within-country inequality is driven more by lasting structural factors than by macroeconomic cycles or epidemics.

Historically, pandemics have affected global inequality through different channels. These channels range from the direct effects on health to the effects of the crises on macroeconomic and financial conditions (box 4.1). The relative importance of these channels has varied significantly across countries and specific episodes, as have the net effects on inequality.

FIGURE 4.2 Within-country income inequality and poverty, by region and country group, 2000-09 and 2010-19
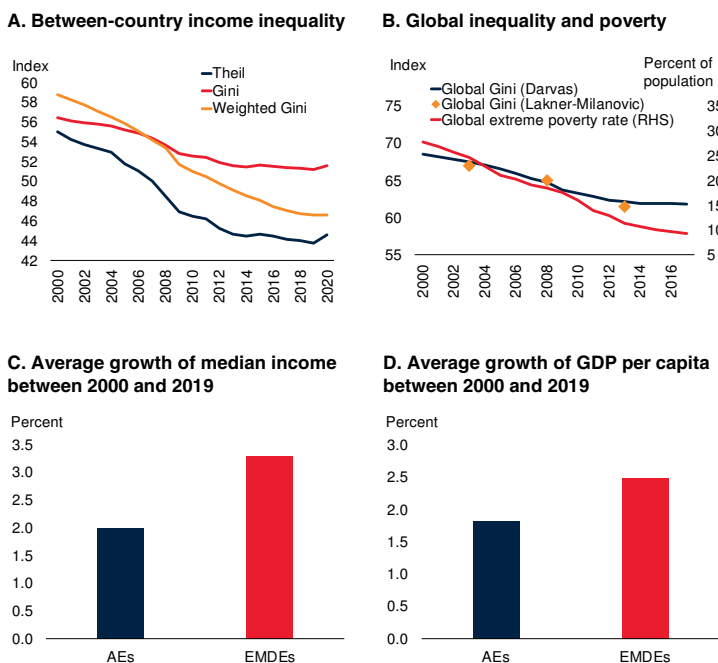
The decline in within-country income inequality between 2000-09 and 2010-19 was broad-based across EMDE regions, but it was small in low-income countries (LICs). Among the regions, the largest decline in inequality occurred in LAC, where the average ratio of the top to the bottom quintiles of the income distribution fell by almost one-third. Despite progress, inequality remained particularly elevated in LAC and in commodity exporters. The decline in inequality in LICs, including fragile and conflict-affected situations (FCS), was limited.

A. Average within-country income share of the bottom 40 percent, by region

B. Average within-country extreme poverty rate, by region

C. Average within-country top-to-bottom income quintile ratio, by region

D. Average within-country Gini coefficient, by region

E. Average within-country top-to-bottom income quintile ratio, by EMDE group

F. Average within-country Gini coefficient, by EMDE group

Source: World Bank.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa; FCS = fragile and conflict-affected situations; LICs = low-income countries; Com. exp. = commodity exporters; Com. imp. = commodity importers. Simple averages. Aggregates are calculated using ten-year country averages for 2000-09 and 2010-19 to maximize the sample size and mitigate gaps in the data for some countries. Based on 136 countries.
A.-D. Sample includes 14 EAP, 19 ECA, 17 LAC, 9 MNA, 7 SAR, and 39 SSA EMDEs.
B. Extreme poverty rate is defined as the share of the population living on less than $1.90 a day at 2011 purchasing power parity (PPP).
E.F. Sample includes 20 LICs, 21 FCS, 73 commodity exporters, and 39 commodity importers.

FIGURE 4.3 Between-country and global income inequality, 2000-20

Between 2000 and 2020, between-country income inequality declined, and at a particularly rapid clip until the global financial crisis. Reflecting reductions in between-country and within-country inequality, global interpersonal income inequality also declined over the two decades ending in 2020. Between-country income inequality increased in 2020 on account of the pandemic.

A. Between-country income inequality

B. Global inequality and poverty

C. Average growth of median income between 2000 and 2019

D. Average growth of GDP per capita between 2000 and 2019

Sources: Darvas (2019); Lakner and Milanovic (2016); World Bank.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies.
A. Theil generalized entropy GE(1) index and Gini index are computed using GDP per capita, purchasing power parity (PPP)-adjusted (constant 2017 international dollars), based on a strongly balanced panel of 176 countries over the period 2000-20. Weighted Gini is a population-weighted between-country Gini index based on the same data.
B. The figure shows the data for 2000-2017. The figure reports the global interpersonal income inequality estimates by Darvas (2019), based on 145 countries, and estimates by Lakner and Milanovic (2016) and World Bank (2016) for selected years. Global extreme poverty rate is defined as the share of the population living on less than $1.90 a day at 2011 PPP; 2017 is the last year with official global poverty estimates.
C. Simple averages of annualized growth rates of median incomes of individual countries. Based on 2011 U.S. dollars, PPP-adjusted. Annualized growth rate of median income for each country is calculated using the earliest available survey during 2000-2005 and the latest available survey during 2014-19 to mitigate gaps in the data for some countries. Strongly balanced panel data of 30 AEs and 83 EMDEs.
D. Simple averages of annualized growth rates of GDP per capita of individual countries. Based on 2017 U.S. dollars, PPP-adjusted. Annualized growth rate of GDP per capita for each country is calculated between 2000 and 2019. Strongly balanced panel data of 35 AEs and 140 EMDEs.

Transmission channels

Recession- or crisis-specific channels. Recessions and financial crises tend to have their largest negative income effects on low-wage and less-educated workers, informal workers, and youth, so that they are typically associated with rising inequality in their aftermath (table A4.3.1). However, if an economic downturn is associated with significant declines in asset prices and

bankruptcies, the effects can fall more heavily on higher income households. Policies may also dampen or exacerbate the effects of macro-economic shocks on income inequality: social spending policies can provide support targeted at low-income households, but corporate bail-outs, accommodative monetary policies that raise asset prices thereby affecting wealth inequality, and fiscal austerity may favor higher-income households. The inequality-increasing effects of recessions tend to be larger in countries with greater pre-existing inequality. Moreover, LICs generally have more limited policy options and capacity to prevent a disproportionate impact of economic downturns on vulnerable population groups.

Epidemic-specific channels. During epidemics, low-skilled workers tend to be disproportionately affected as they are more often employed in activities that require person-to-person interactions and in which the scope for telecommuting is limited. Also, low-income households living in densely populated urban areas are more exposed to epidemic risks. Along with less affordable health care, this may also inhibit their education and employment opportunities, adversely affecting intergenerational mobility and exacerbating long-run income inequality. These effects can be compounded if epidemics trigger recessions (table A4.3.1).

Empirical estimates from the literature

Increase in within-country inequality after epidemics. The literature mostly suggests that epidemics increase within-country income inequality, with disproportionate income losses borne by less educated or female workers (box 4.1). Income inequality declined only in large-scale pre-industrial pandemics, such as the Black Death in the 14th century and cholera outbreaks in the 19th century, because heavy fatalities among the low-income population eventually resulted in rising labor incomes. These pre-industrial disease outbreaks, however, may be of limited relevance for modern-day epidemics, given current medical technologies, state capacity, and standards of living.

Idiosyncratic effects of recessions and financial crises on within-country inequality. The literature

on the impact of recessions or financial crises on within-country inequality is largely inconclusive. Only one-third of the 25 studies examined for this chapter find that economic recessions or financial crises increased within-country income inequality. Empirical studies that examine multi-country samples report either highly heterogeneous effects across countries or, on aggregate, an insignificant impact of recessions on within-country income inequality.

Event study

Impact on within-country inequality: Some increase after epidemics. An event study of changes in inequality around past epidemics, national or global recessions, and financial crises since 1970 supports these findings of the literature in a broader sample (box 4.1). Within-country income inequality rose in EMDEs after epidemics, but the effects of (global or national) recessions and financial crises were less consistent. In all cases, however, income inequality changes around adverse events were small compared with the those during noncrisis periods (within one standard deviation of the average change in inequality for the post-2000 period). This suggests that, to a large extent, changes in income inequality are driven by more lasting structural factors than macroeconomic cycles or epidemics.

Effects of COVID-19 on income inequality

Preliminary evidence suggests that global income inequality has risen as a result of the COVID-19 pandemic. It is estimated that the impact on within-country inequality is likely to have been modest for the average EMDE. More significantly, the pandemic has likely rolled back between-country income inequality to the levels of the early 2010s.

COVID-19 pandemic: Aggravating factors

Combination of shocks. The COVID-19 pandemic caused a steep global recession, and its effects on income inequality occur through economic as well as health channels. In addition, there are several unique aspects of the COVID-19 pandemic that are likely to have magnified

increases in inequality in those countries that were unable to put in place effective mitigating policies. Conversely, large-scale policy support could mitigate any COVID-19-induced rise in income inequality, as could the presence of a large agricultural sector that is insulated from pandemic-related disruptions but employs many of the poorest.

Global scale. Unlike other epidemics in the past three decades, policy makers around the world have met the COVID-19 pandemic with widespread, repeated, and persistent lockdowns and social distancing measures. These have amplified income inequality by disproportionately affecting services sector activities where person-to-person interactions are necessary, including tourism (Ohnsorge and Yu 2021).[5] In comparison with manufacturing, parts of the services sector also employ a larger share of informal workers, who tend to be lower-income and lower-skilled workers with less savings to fall back on, and feature a larger share of informal firms, which have fewer resources to buffer losses. In contrast, high-tech sectors such as pharmaceuticals, ecommerce, cloud computing, and electronics, which employ more highly skilled and highly paid workers, have flourished on the back of increased demand for their products.

Digitalization. Widespread digitalization has allowed firms and households to shift toward online transactions and telecommuting. Digital platforms have allowed small businesses to lower operating costs and reach a larger customer base; mobile platforms have enabled government assistance such as cash transfers to reach a wider population, which is especially important in places with high informality. Aside from the benefits, however, this may contribute to rising income inequality and form a long-term setback for intergenerational mobility and human capital accumulation among low-income households (Azevedo et al. 2020).

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[5] See also Adams-Prassl et al. (2020); Baker et al. (2020a, 2020b); Bartik et al. (2020a, 2020b); Crossley, Fisher, and Low (2021); Dalton et al. (2021); Dingel and Neiman (2020); Hatayama, Viollaz, and Winkler (2020); Mongey, Pilossoph, and Weinberg (2021); and Shibata (2021).

BOX 4.1 Within-country inequality around recessions, financial crises, and epidemics

Over the past three decades, epidemics have typically been followed by an increase in within-country income inequality in affected countries. In contrast, global and national recessions as well as financial crises have been associated with highly idiosyncratic movements in within-country inequality. Only prolonged recessions have been systematically associated with rising within-country income inequality in emerging market and developing economies (EMDEs).

Introduction

The COVID-19 pandemic has triggered the deepest global economic recession since the Second World War. The impact of the pandemic on income inequality combines and compounds the effects of recessions and epidemics. Assessments of the impact of the pandemic on within-country inequality need to be anchored in an understanding of the transmission channels and a review of the evidence on the distributional impacts of past adverse events, including global and national recessions, financial crises, and recent epidemics over the past three decades.

This box offers a comprehensive literature review and an event study of the evolution of within-country income inequality around past economic shocks and epidemics to address the following questions:

- Through which transmission channels do recessions, financial crises, and epidemics affect income inequality?

- What does the empirical literature suggest about the effects of past recessions, financial crises, and epidemics on income inequality?

- How did income inequality evolve around past global recessions, national recessions, and epidemics?

Impact on inequality: Transmission channels

Recession- or crisis-specific channels. The literature on past economic recessions and financial crises identifies multiple transmission channels to income inequality that are also relevant to the recession brought about by COVID-19. Among the factors that may increase income inequality are asymmetric labor market effects, with greater job and wage losses among low-income and less-educated workers, informal workers, and youth, which are further aggravated by weaker recovery of low-

income jobs leading to job polarization and thereby contributing to long-run increases in inequality. [a]

These channels also imply that the distributional impacts of recessions will be larger in economies with greater pre-existing inequality (Lybbert et al. 2004; Thirumurthy, Zivin, and Goldstein 2008; Hill and Porter 2017). On the other hand, inequality may decline in a recession if falling asset prices and bankruptcies disproportionately affect those at the top of the income distribution (Morelli and Atkinson 2015; Baldacci, de Mello, and Inchauste 2002; Bodea, Houle, and Kim 2021) or if policy support and labor market regulations disproportionately benefit vulnerable population groups (Bargain and Callan 2010; Lustig 2018; Doorley, Callan, and Savage 2021).

At the same time, some studies also note that certain anti-crisis policy measures may indirectly increase income inequality—for instance, bail-outs of large systemically important corporations, accommodative monetary policies leading to asset price increases, and fiscal austerity measures (Ball et al. 2013; Bodea, Houle, and Kim 2021; Woo et al. 2013). Low-income countries (LICs) generally have limited policy options as well as less financial and technical capacity to effectively mitigate the adverse impacts of recessions on vulnerable population groups, and thus are more exposed to inequality risks than advanced economies.

Epidemic-specific channels. The transmission channels associated with epidemics range widely, but mostly act to raise income inequality. Severe epidemics and pandemics can trigger economic recessions and thus impact inequality partly via the recession-related channels discussed above. The distributional effects in this case, however, are likely to be more intense in comparison with the pandemic-only or the recession-

a. For studies on the effects on low-income, less-educated, and informal workers, see Bitler and Hoynes (2015); Bodea, Houle, and Kim (2021); Domeij and Floden (2010); Hoynes, Miller, and Schaller (2012); Mocan (1999); and Shibata (2021). For studies on job polarization, see Acemoglu and Autor (2011); Autor (2010); Brynjolfsson and McAfee (2011); and Jaimovich and Siu (2020).

BOX 4.1 Within-country inequality around recessions, financial crises, and epidemics (*continued*)

FIGURE B4.1.1 Literature review: Studies indicating an increase or decrease in inequality after an event

The literature finds that changes in within-country inequality after past global or national recessions and financial crises were highly idiosyncratic and mostly small. With the exception of the analysis of large-scale pre-industrial pandemics (Black Death in the 14th century and cholera in the 19th century), the literature points to an increase in income inequality after epidemics.

A. Epidemics

B. Recessions and financial crises

C. Recessions, by sample composition
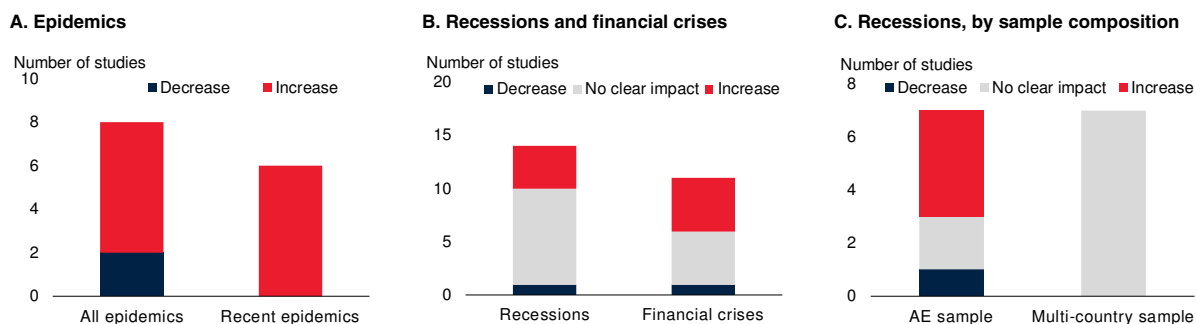
Source: World Bank; based on 32 studies.
Note: Number of studies indicating an increase, decrease, or no clear impact (insignificant or varying across countries) of recessions, financial crises, and epidemics on income inequality. Recent epidemics include the epidemics that occurred in the 20th century. AE sample = studies that analyze only advanced economies. The following studies are included in the analysis: Agnello and Sousa (2012); Alfani (forthcoming); Amate-Fortes, Guarnido-Rueda, and Molina-Morales (2017); Baldacci, de Mello, and Inchauste (2002); Baiardi and Morana (2017); Bargain et al. (2017); Bazillier and Najman (2017); Bodea, Houle, and Kim (2021); Brzezinski (2018); Brzezinski (2021); Camacho amd Palmieri (2019); Das, Bisai, and Ghosh (forthcoming); de Haan and Sturm (2017); Denk and Cournède (2015); Domeij and Floden (2010); Esseau-Thomas, Galarraga, and Khalifa (2020); Furceri and Loungani (2018); Furceri et al. (2021a); Galletta and Giommoni (forthcoming); Gokmen and Morin (2019); Heathcote, Perri, and Violante (2010); Jenkins et al. (2013); Li and Yu (2014); Meyer and Sullivan (2013); Milanovic (2016); Morelli (2018); Morelli and Atkinson (2015); Neyapti (2018); O'Donoghue, Loughrey, and Sologon (2018); Pfeffer, Danziger, and Schoeni (2013); Piketty and Saez (2013); Sedik and Xu (2020); Vašková (2013).

only episodes (Furceri et al. 2021a). During epidemics, low-skilled workers tend to be disproportionately affected as they are often employed in activities that require person-to-person interactions. This puts them at greater risk of infection as well as risk of job and wage losses if containment measures are put in place or consumers become wary of interactions (see table A4.3.1).

Low-income households that live in densely populated urban areas and use more crowded, shared modes of transport are also especially exposed to the health risks of epidemics. Combined with less access to affordable health care, this may inhibit their education and employment opportunities, adversely affecting intergenerational mobility and exacerbating income inequality in the long term (Brzezinski 2021; Esseau-Thomas, Galarraga, and Khalifa 2020). Especially harsh historical epidemics—such as the Black Death in the 14th century or cholera epidemics in the 19th century—reduced income inequality because of large-scale fatalities among the poor and related labor shortages that drove up wages (Alfani, forthcoming; Alfani and Tullio 2019; Sayed and Peng 2021). These

pre-industrial pandemics, however, are less relevant to present-day epidemics, essentially because of advances in medical science, state capacity, and standards of living.

Impact on inequality: Empirical estimates

Effects of past recessions and financial crises on income inequality. The literature on the net effect of recessions and financial crises on income inequality within countries is largely inconclusive (figure B4.1.1). In rare cases, studies document declining income inequality after crises (Agnello and Sousa 2012; O'Donoghue, Loughrey, and Sologon 2018). Only one-third of the 25 studies examined for this chapter find that economic recessions or financial crises increased income inequality.[b] That said, studies published in outlets with higher publication impact factors tend to document increases in inequality; however, these studies are

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b. Bazillier and Najman (2017); Bodea, Houle, and Kim (2021); Danziger, and Schoeni (2013); de Haan and Sturm (2017); Domeij and Floden (2010); Furceri and Loungani (2018); Li and Yu (2014); Meyer and Sullivan (2013).

BOX 4.1 Within-country inequality around recessions, financial crises, and epidemics (*continued*)

typically based on advanced-economy samples. [c] Empirical studies that examined multi-country samples reported either highly heterogeneous effects across countries or, on aggregate, an insignificant impact of recessions on income inequality.

Effects of past epidemics on income inequality. Only large-scale pre-industrial pandemics (Black Death in the 14th century and cholera in the 19th century) have been found to have reduced income inequality, because of particularly heavy fatalities among the low-income population, aggravated by the absence of effective prevention and treatment methods (Alfani forthcoming; Milanovic 2016). Apart from these episodes, the evidence from other early pandemics (the Spanish Flu of 1918-19) and more recent epidemics and pandemics (SARS 2003; H1N1 2009; MERS 2012; Ebola 2014; Zika 2016) points to a generally inequality-increasing effect of outbreaks, with disproportionate losses borne by more vulnerable population groups such as less educated or female workers. [d]

Impact on inequality: Event study

Data and methodology. The event study is based on 1,016 survey-based observations of income inequality measures for 32 advanced economies and 87 EMDEs spanning the period 1970-2019. The global recession dates are obtained from Kose, Sugawara, and Terrones (2020); the national recession dates are from World Bank (2021a), and include 78 national recession events. Financial crisis dates are from the Systemic Banking Crises Database II, documented in Laeven and Valencia (2020). The epidemics included in the analysis are SARS in 2003 (27 affected countries); MERS in 2012 (22 affected countries); Ebola in 2014 (6 affected countries); and Zika in 2016 (21 affected countries).

The H1N1 outbreak that occurred in 2009 is not included in the sample as it coincided with the global financial crisis and recession. The data on the countries affected by these epidemics are from Furceri et al. (2021a).

Income inequality measures are from the World Bank's World Development Indicators (WDI) database, derived from the World Bank's PovcalNet data. Income inequality in the baseline analysis is measured as the top-to-bottom income quintile ratio of the income distribution. For each event (recessions, financial crises, epidemics) and country in the sample, the study compares the inequality levels between the last available survey before an event and the first survey after the event (provided they are within a five-year window before or after the event, respectively). The computed change in inequality is annualized for comparability and de-meaned by the country-specific average annual change in income inequality over the entire period to remove the long-term trend. Small changes (those in the bottom quartile of the full-sample distribution) are deemed to be insignificant. The exercise does not identify causal effects, but rather shows the dynamics of inequality around adverse systemic events.

Epidemics: Rising inequality in EMDEs. Most recent epidemics (55 percent of all outbreaks) were associated with increases in income inequality in most affected EMDEs. This is consistent with the literature, which also finds increases in inequality following the epidemics of the last two decades.

Global and national recessions, financial crises: No clear pattern. No clear pattern emerges in the evolution of income inequality during and after recessions and financial crises. Longer recessions, however, have been associated with increases in income inequality in most EMDEs.

- *Global and national recessions.* The evolution of within-country inequality during and after global or national recessions was highly heterogeneous. Similar shares of countries (about one-third) exhibited an increase and a decrease in inequality. For EMDEs, about one-half of national recession events were accompanied by a decline in inequality, but this may reflect an incomplete removal of

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c. Amate-Fortes, Guarnido-Rueda, and Molina-Morales (2017); Baiardi and Morana (2017); Baldacci, de Mello, and Inchauste (2002); Bargain et al. (2017); Brzezinski (2018); Camacho and Palmieri (2019); Denk and Cournède (2015); Gokmen and Morin (2019); Jenkins et al. (2013); Morelli (2018); Morelli and Atkinson (2015); Neyapti (2018); Piketty and Saez (2013); Vašková (2013).

d. For evidence on the impact of the Spanish Flu, see Galletta and Giommoni (forthcoming). For evidence on SARS, H1N1, MERS, Ebola, and Zika, see Bazillier and Najman (2017); Brzezinski (2021); Das, Bisai, and Ghosh (forthcoming); Esseau-Thomas, Galarraga, and Khalifa (2020); Furceri et al. (2021a); Ma, Rogers, and Zhou (2020); and Sedik and Xu (2020).

BOX 4.1 Within-country inequality around recessions, financial crises, and epidemics (*continued*)

FIGURE B4.1.2 Event study: Inequality around recessions, crises, and epidemics, 1970-2019

Between 1970 and 2019, within-country income inequality changed in a variety of ways around global or national recessions and financial crises: income inequality rose in a roughly equal number of events as those in which it declined. Recent epidemics have been associated with increases in income inequality in most EMDEs. Protracted recessions have been associated with increases in income inequality in EMDEs. The magnitude of changes in inequality around adverse events has mostly been small in comparison with the post-2000 mean annual change.
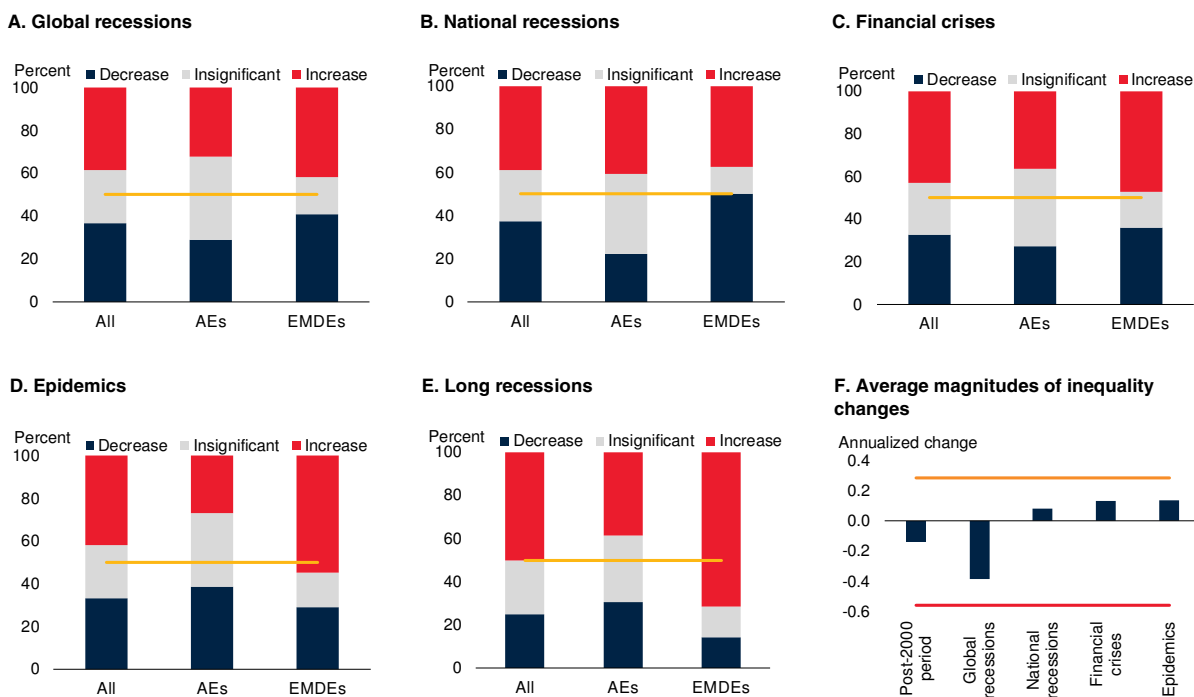
Source: World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies. The chart shows the share of countries in each group with an increase or a decrease in the top-to-bottom income quintile ratio between the last household survey before an event and the first household survey after the event, de-meaned at the country level. Changes with the absolute value in the lowest quartile are assumed to be insignificant. Sample includes 32 AEs and 87 EMDEs for 1970-2019.

A.-E. Horizontal orange line indicates 50 percent.

A. Global recessions as defined in Kose, Sugawara, and Terrones (2020), and include 1975, 1982, 1991, and 2009 recessions.

B. National recessions as defined in World Bank (2021a).

C. The data on financial crises are from the Systemic Banking Crises Database II, developed by Laeven and Valencia (2020). Financial crises include systemic banking crises, currency crises, debt crises, and debt restructuring.

D. The data include the following epidemics: SARS (2003), MERS (2012), Ebola (2014), and Zika (2016). The list of countries affected by the outbreaks is from Furceri et al. (2021a): The SARS outbreak includes 27 affected countries, MERS 22 countries, Ebola 6 countries, and Zika 21 countries.

E. National recessions as defined in World Bank (2021a). Long recessions are defined as recessions lasting two years or longer.

F. Average magnitude of the annualized change in the top-to-bottom income quintile ratio for the post-2000 period and around adverse events. The orange and the red lines indicate one standard deviation above and below the post-2000 mean change in the top-to-bottom income quintile ratio.

the persistent trend decline in inequality (figure B4.1.2).

- *Financial crises.* More financial crises (43 percent) were associated with an increase in inequality than a decrease (33 percent). Inequality increased more frequently in both advanced economies and EMDEs. That said, in all cases the share was less than half of all crisis events included in the sample.

- *Prolonged recessions.* In the few instances of recessions that lasted two years or more, inequality increased after the recession in over 70 percent of affected EMDEs.

- *Recessions in high-inequality countries.* Despite a potentially larger share of vulnerable populations in countries with high inequality, recessions were associated with no more increases in inequality in

BOX 4.1 Within-country inequality around recessions, financial crises, and epidemics (*continued*)

countries with high pre-existing inequality than elsewhere. In fact, in 51 percent of countries with above-average initial income inequality, within-country inequality declined after recessions.

Magnitude of inequality changes: Limited. The magnitude of changes in within-country inequality after global and national recessions, financial crises, and epidemics was generally small in comparison with the average changes in inequality during noncrisis periods. The average change in inequality after these adverse events was within one standard deviation of the average change in inequality in the post-2000 period. This suggests that, to a large extent, income inequality is driven by deeper structural factors than transitory macroeconomic events.

Robustness. Additional event studies were conducted for robustness and further insights, including calculations using alternative measures of inequality (the Gini index, the income share of the poorest 40 percent, the income share of the richest 1 percent), alternative threshold levels, and time periods. The results using the bottom 40 percent and the top 1 percent of the income distribution also suggest that epidemics were associated with rising inequality in EMDEs. Recessions and financial crises were associated with the decline in the income share of the richest 1 percent for both advanced economies and EMDEs. The event study using the pace of changes in inequality before and after an event points to a slowdown in the rate of decline in inequality following recessions and financial crises for EMDEs (table A4.3.2).

- *Feasibility of telecommuting.* Low-income workers, usually employed in sectors where telecommuting is not feasible, have tended to face greater labor market risks, such as unemployment and reductions of hours worked and wages, during COVID-19, in part because the sectors in which they work have also been hit relatively hard by the pandemic (Chetty et al. 2020). The share of jobs that can be performed from home is larger for workers with higher levels of education (Bick, Blandin, and Mertens 2020; von Gaudecker et al. 2020; Chiou and Tucker 2020), and the possibility to telecommute increases with the wage level of workers (Sostero et al. 2020; Adams-Prassl et al. 2020).[6] Employment for high-wage workers, usually working in more technologically adaptable sectors, is also expected to rebound more quickly than for low-wage workers, employed in sectors where recoveries tend to

- be slower and often incomplete (Chetty et al. 2020).

- *Sectoral structure.* Advanced economies generally have a greater share of jobs in sectors that can be performed from home than low-income countries—a factor tending to lead, in a pandemic, to greater cross-country income inequality (Gottlieb, Grobovšek, and Poschke 2020; Hatayama, Viollaz, and Winkler 2020). At the same time, even in advanced economies only a minority of jobs can be performed from home: for instance, in the United States only 37 percent of jobs can be done remotely (Dingel and Neiman 2020).

- *Productivity losses while telecommuting.* Even in the cases when telecommuting is possible for low-income workers, they tend to be less productive while working from home (Etheridge, Wang, and Tang 2020).

- *Access to telecommuting technologies.* The "digital divide" is exacerbated by less accessible high-speed internet and tele-commuting technologies for low-income households (Chiou and Tucker 2020).

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[6] In Europe, for example, 75 percent of employees in the top wage quintile are able to telecommute as opposed to only 3 percent in the bottom quintile (Sostero et al. 2020). Because of their ability to telecommute, high-income workers also face much lower health and labor market risks than low-income workers (Aromi et al. 2021; Ashraf 2020; Carvalho et al. 2020; Papageorge et al. 2020).

- *Digitalization and automation.* The pandemic may accelerate a pre-existing global trend toward digitalization, automation and robotization, as firms increasingly seek to replace low-skilled workers with automated processes (Chernoff and Warman 2020; Lund et al. 2021; UNCTAD 2021).

Education. Low-income households face greater challenges ensuring quality distance learning during lockdowns, with greater learning losses for the disadvantaged students. This can have long-lasting effects on their future earnings and reduce social mobility across generations.[7]

Gender gap. Unlike in typical recessions, the pandemic-triggered recession hit women disproportionately. In a more typical recession, manufacturing sectors that predominantly employ men are more likely to contract relative to services, whereas, in the recession triggered by COVID-19, the services sector was hardest hit. Globally, 59 percent of working women are employed in the services sectors, compared with 15 percent in manufacturing. Between 2019 and 2020, employment of women declined by 4 percent, compared with a 3 percent decline for men (ILO 2021). Because of disruptions to schooling, women also spent more time caring for children at home during lockdowns.[8]

Policies deployed during the COVID-19 pandemic

Large-scale mitigating policies. In many countries, unprecedented fiscal and monetary policy support in response to the pandemic has helped to mitigate the economic impact on the poorest households. In advanced countries, large-scale policy interventions focused on support for the worst-affected groups significantly helped to reduce the adverse impact of the pandemic (Baker et al. 2020b; Chetty et al. 2020). In EMDEs, however, fiscal policy support packages, amounting, on average, to 6 percent of GDP, were

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[7]Aucejo et al. (2020); Fuchs-Schündeln et al. (2020); Hanushek and Woessmann (2020); Hill and Narayan (2020); OECD (2020).

[8]Alon et al. (2020); Cucagna and Romero (2021); Del Boca et al. (2020); De Paz et al. (2020); Doepke and Tertilt (2016); Sevilla and Smith (2020); WEF (2021).

less than one-quarter of the size of those in advanced economies, which averaged 28 percent of GDP. Thus, in some EMDEs many households were left without support (IMF 2021a). Looking ahead, EMDEs also have limited room to finance vaccine rollouts and medical treatment, address food insecurity, and avoid debt distress (World Bank 2021a). These constraints may dampen growth for these countries and further widen between-country income inequality.

Wide range of policy measures deployed. The social protection measures deployed by countries to mitigate the adverse economic and social effects of COVID-19 can be grouped into three categories: (i) social assistance measures: conditional and unconditional transfers, in cash or in kind (for instance, food voucher schemes), measures allowing households to defer or waive utility bills and other financial obligations, and public works programs; (ii) social insurance measures: job loss support (paid sick leave, unemployment benefits), health insurance support, pensions, social security waivers and subsidies; (iii) labor market policies: wage subsidies, job training measures, labor regulations, and reduced work time.

Most commonly implemented measures: Social assistance. The most widely used policy measures included conditional and unconditional cash transfers, as well as measures that allowed households to defer or waive utility bills and other financial obligations (figure 4.4). These tools were implemented in over 80 percent of both advanced economies and EMDEs surveyed—considerably more than the number of countries using social insurance and active labor market policies. Social assistance measures are estimated to have reached over 1.5 billion beneficiaries, or one-fifth of the world's population (Gentilini et al. 2021).

Narrower range of support measures in EMDEs than advanced economies. While all country groups deployed a large number of measures, there were some systematic differences in their choice of measures that reflected country circumstances.

- *EMDEs and LICs.* Most EMDEs relied largely on social assistance measures, especially cash and in-kind transfers along with support for

FIGURE 4.4 Shares of countries implementing social protection measures in response to COVID-19, 2020-21

Social assistance measures—including cash transfers and support with utility bills and other financial obligations—were widely used to mitigate adverse economic and social effects of COVID-19 during 2020-21. Social insurance policies and labor market interventions were also used, though not extensively in LICs.
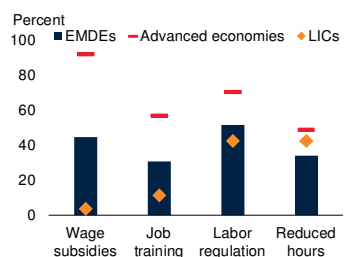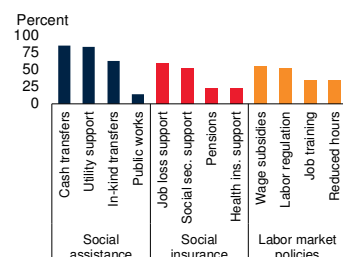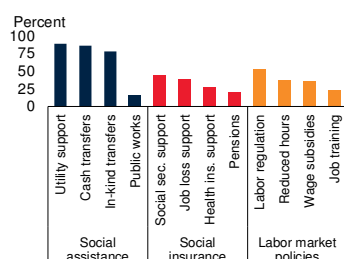

A. Social assistance policies
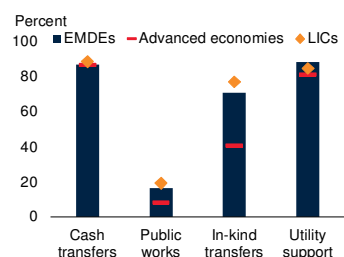
B. Social insurance policies
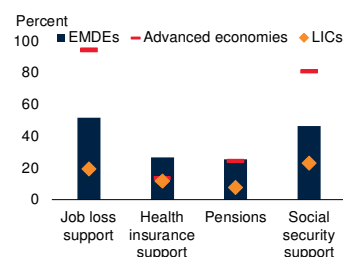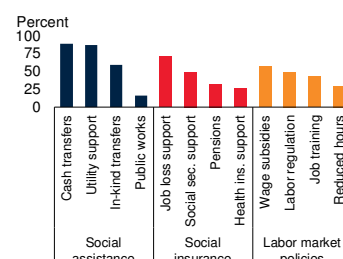
C. Labor market policies

D. All countries

E. EMDE commodity exporters

F. EMDE commodity importers

Sources: Gentilini et al. (2021); World Bank.

Note: EMDEs = emerging market and developing economies; LICs = low-income countries. The data on social protection measures are obtained from Gentilini et al. (2021) and include the following measures, grouped by categories: social assistance policies (cash-based transfer, public works, in-kind transfers, utility and financial support); social insurance policies (job loss support, health insurance support, pensions, social security waiver or subsidy); labor market policies (wage subsidies, job training, labor regulations, reduced hours). The data reflect the period March 20, 2020 - May 14, 2021. Social sec. support = social security support; Health ins. support = health insurance support.

A.-C. Sample includes 37 advanced economies and 153 EMDEs, of which 26 are LICs.

D. Sample includes 214 economies.

E. Sample includes 92 EMDEs.

F. Sample includes 61 EMDEs.

utility payments and other financial obligations; social insurance policies and active labor market policies were implemented in one-half or less of EMDEs surveyed (figure 4.4). This may have reflected a lack of fiscal resources or institutional infrastructure to fund and operate social insurance and active labor market policies as well as widespread informality that may narrow their reach. The use of social insurance policies and labor market interventions was particularly low in LICs, where informal employment accounts for three quarters of employment, on average (Ohnsorge and Yu 2021).

- *Advanced economies.* Most advanced economies, in contrast, complemented social assistance measures with a wide range of social insurance and active labor market policies, especially job loss support (95 percent of the countries surveyed), wage subsidies (92 percent of countries), and social security support (81 percent of countries).

- *EMDE commodity exporters and importers.* A greater share of commodity exporters used in-kind transfers than commodity importers (78 percent and 59 percent, respectively); at the same time, commodity importers more often made use of job loss support and wage subsidies than commodity exporters.

- *EMDE regions.* In each EMDE region, all types of measures were implemented (figure 4.5). Governments in Europe and Central Asia (ECA), LAC, and South Asia (SAR) relied somewhat more on labor market interventions than those in East Asia and the Pacific (EAP), the Middle East and North Africa (MNA), and SSA. ECA made greater use than other regions of labor market policies in the form of wage subsidies (83 percent of ECA economies). Among EMDEs for which there are available data, EAP and ECA reported much higher spending per capita on social protection policies from March 2020 to May 2021 than other regions (474 U.S. dollars and 521 U.S. dollars, respectively), while SAR lagged behind with 47 U.S. dollars (figure 4.6).
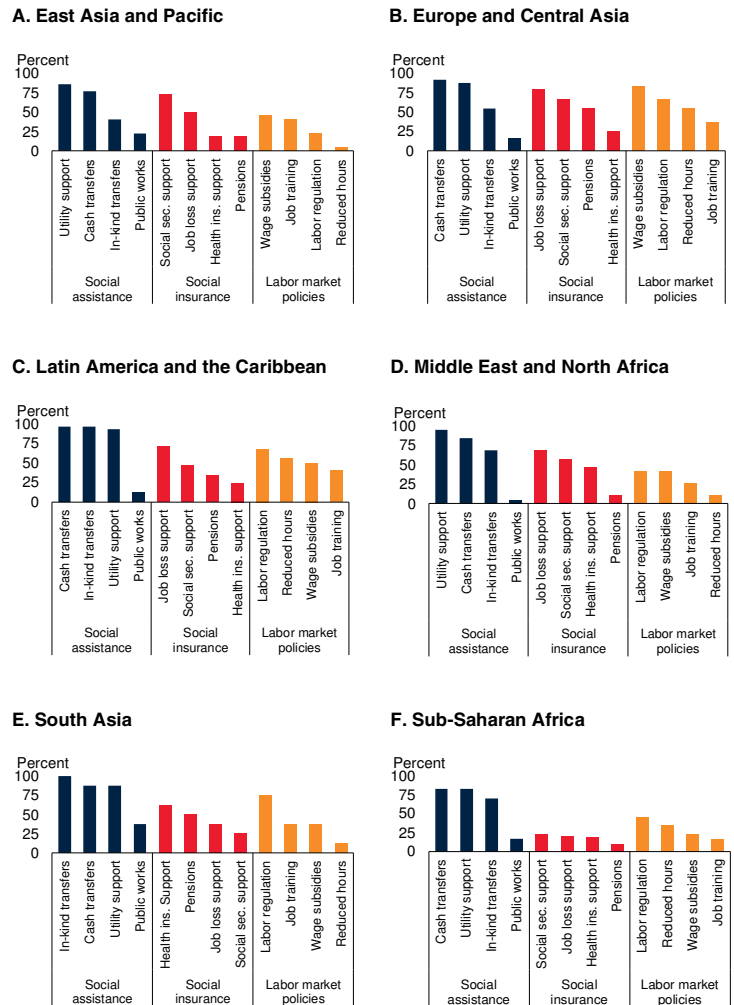
Highly uneven magnitudes of support policies. Notwithstanding comparable ranges of policy measures implemented, the magnitude of mitigating policy support differed widely across countries. Between March and September 2020, governments in advanced economies spent 7.4 percent of GDP, on average, on fiscal support for households and firms in response to the pandemic (Bundervoet, Davalos, and Garcia 2021). This was almost double the amount spent by EMDEs (3.8 percent of GDP) over the same period and more than triple the amount spent by LICs (2.4 percent of GDP; Narayan et al., forthcoming). As of October 2021, the cumulative amounts of fiscal support packages (relative to GDP) in advanced economies were more than three times larger than in EMDEs, and more than four times larger than in LICs, on average (figure 4.6). From March 2020 to May 2021, average per capita spending on social protection measures in advanced economies was five times larger than that in EMDEs.

Access to government support: Limited among households. The findings from high-frequency phone surveys of households in 51 EMDEs in 2020 suggest that only 22 percent of households had received government support since the start of the pandemic in the average EMDE, and only 12 percent of households in LICs (figure 4.7). In SSA and SAR, the two lowest-income EMDE regions, only 11 percent and 20 percent of households, respectively, had received government support. This is in stark contrast to the EAP region, where 51 percent of households had received government support, reflecting the strong and early policy priority that was attached to these programs and the innovative use of digital tools and mobile platforms. Government support to private sector enterprises was also greater in EAP than in other regions (World Bank 2021b).

Access to government support: Even more limited among firms. In surveys of firms in 50 EMDEs conducted in 2020, only one-quarter of firms reported receiving, or expecting to receive, public assistance—and only 7 percent of firms in LICs. Wage subsidies were the most common form of government support for firms; they had been granted to 15 percent of firms, on average. Other forms of support, including payments

FIGURE 4.5 Shares of countries implementing social protection measures in response to COVID-19, by EMDE region, 2020-21

Social assistance measures, especially cash and in-kind transfers, support with utility payments and financial obligations, were used most widely in emerging market and developing economies (EMDEs) in response to COVID-19. Labor market interventions were used more by governments in ECA, LAC, and SAR than those in EAP, MNA, and SSA. Countries in ECA were the most proactive in using labor market policies, especially wage subsidies, reported in 83 percent of ECA countries.
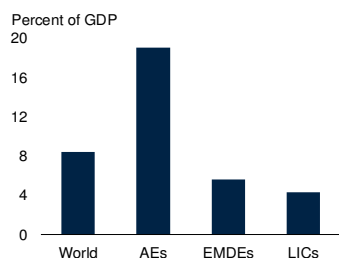

A. East Asia and Pacific

B. Europe and Central Asia

C. Latin America and the Caribbean

D. Middle East and North Africa

E. South Asia

F. Sub-Saharan Africa

Sources: Gentilini et al. (2021); World Bank.
Note: EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa. The data on social protection measures are obtained from Gentilini et al. (2021) and include the following measures, grouped by categories: social assistance policies (cash-based transfer, public works, in-kind transfers, utility and financial support); social insurance policies (job loss support, health insurance support, pensions, social security waiver or subsidy); labor market policies (wage subsidies, job training, labor regulations, reduced hours). Social sec. support = social security support; Health ins. support = health insurance support. Sample includes 22 EAP, 24 ECA, 32 LAC, 19 MNA, 8 SAR, and 48 SSA EMDEs. The data reflect the period March 20, 2020 - May 14, 2021.

FIGURE 4.6 Government support spending on COVID-19

The magnitude of government support spending in response to COVID-19 has differed widely among countries. As of October 2021, the cumulative amounts of fiscal support packages (relative to GDP) in advanced economies were more than three times larger than those in EMDEs, and more than four times larger than in LICs, on average. Among EMDEs for which data are available, those in EAP and ECA reported much higher per capita spending on social protection from March 2020 to May 2021 than other regions (474 U.S. dollars and 521 U.S. dollars, respectively), while those in SAR lagged behind with 47 U.S. dollars.
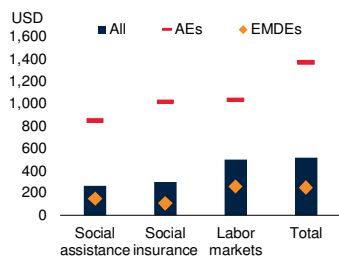
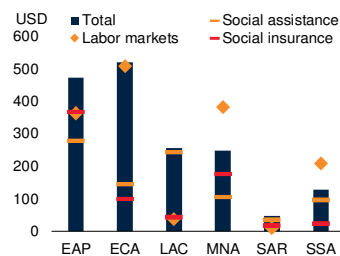**A. Fiscal spending on COVID-19 support, percent of GDP, simple average**

B. Fiscal spending on COVID-19 support, percent of GDP, weighted average
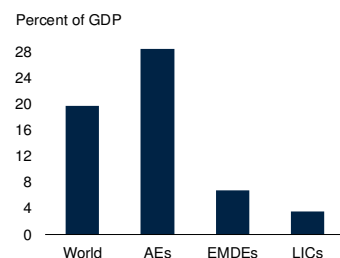
C. Spending on social protection by support measure, USD per capita

D. Spending on social protection by EMDE region, USD per capita

Sources: Gentilini et al. (2021); World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; LICs = low-income countries; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa.

A.B. World Bank staff's calculations based on IMF's Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic. Sample includes 35 AEs and 136 EMDEs, of which 21 are LICs. The figure shows fiscal spending in 2020-21 (as of October 2021).

B. GDP-weighted average.

C. Simple averages of spending per capita over the period March 20, 2020 - May 14, 2021, measured at 2020 purchasing power parity (PPP)-adjusted U.S. dollars. Sample includes 21 AEs and 105 EMDEs.

D. Simple averages of spending per capita over the period March 20, 2020 - May 14, 2021, measured at 2020 PPP-adjusted U.S. dollars. Sample includes 14 EAP, 16 ECA, 28 LAC, 11 MNA, 5 SAR, and 32 SSA EMDEs.

deferrals, tax reduction (exemptions), and access to credit and cash transfers had been received by 7 percent or fewer firms surveyed (figure 4.8). The largest share of firms that had received government support—mostly in the forms of wage subsidies, tax reductions and cash transfers—was in ECA (up to 25 percent of surveyed firms); the smallest were in SAR and SSA (at most 3 percent

of firms). Among small and medium-sized firms in surveyed EMDEs, only 27 percent of firms received public support, as opposed to 35 percent of large firms.

High-frequency phone surveys to assess the distributional impact of the pandemic

Distributional impact of the pandemic: Preliminary evidence. In the absence of available household expenditure or income surveys, high-frequency phone surveys of households were conducted by the World Bank in EMDEs during the pandemic, and they offer a glimpse of the uneven effects of the pandemic on household incomes. These phone surveys point to rising within-country and between-country inequality because they suggest the largest job and income losses among low-income households, low-skilled and informal workers, women, with more adverse effects in lower-income countries.[9]

Data and methodology. The World Bank conducted phone surveys of more than 216,000 households in 52 EMDEs during April-December 2020. Key indicators of harmonized surveys are available via the COVID-19 Household Monitoring Dashboard. The sample consists of households with phone access and may therefore underrepresent the very poorest, who tend to have limited or no phone access (Bundervoet, Davalos, and Garcia 2021; Kugler et al. 2021). Phone surveys and web-based surveys were also conducted with more than 100,000 firms in 50 EMDEs from April to September 2020. The harmonized indicators are reported in COVID-19 Business Pulse Surveys Dashboard. Two methodologies were used to estimate the impact of the pandemic on households and firms. First, the household and firm survey data were analyzed to detect broad cross-country patterns in socioeconomic outcomes during the pandemic. Second, logit regressions of the household-level data were used to estimate the probability that a household with particular characteristics suffers job or income losses, controlling for country charac-

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[9] The limitations of the high-frequency phone surveys data used in the analysis are discussed in annex 4.1.

teristics. The regressions were estimated for 46 countries in the analysis of work stoppages and 30 countries in the analysis of income losses.[10]

Income losses and employment disruption: Cross-country patterns. Most survey respondents in EMDEs reported income losses, job losses, or work stoppages since the start of the pandemic.
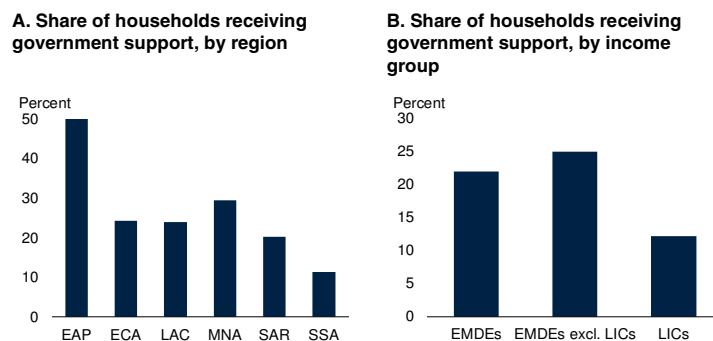
- *Income losses.* In EMDEs covered by household phone surveys, over 60 percent of households reported income losses since the start of the COVID-19 pandemic. In LICs and in SSA, the shares of households reporting income losses were above 70 percent (figure 4.9).

- *Job losses and work stoppages.* Almost a third of the surveyed households reported job losses or work stoppages since the beginning of the pandemic. A greater share (36 percent) of respondents reported work stoppages in LICs (figure 4.10). The highest regional rate of work stoppages was reported in LAC—48 percent of households, on average.

Income losses and employment disruption: Household characteristics. Women, low-skilled workers, and informal workers were the most likely to report work stoppages or income losses (figures 4.9 and 4.10). On average, women were 8 percentage points more likely than men to stop working during the first months of the pandemic (April-June 2020). Workers without tertiary education were 10 percentage points more likely to stop working and 5 percentage points more likely to lose income than workers with tertiary education. Informal workers were 19 percentage points more likely to incur income losses than workers in the formal sector, in part reflecting the particularly severe impact of lockdowns in heavily services-based informal sectors. Workers employed in the agricultural sector were 19 percentage points less likely to report job losses or work stoppages and 13 percentage points less likely to

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[10] The country samples differ as not all variables are available for every country. Further details are reported in the background paper (Narayan et al., forthcoming). An earlier version of the analysis using a smaller sample of 34 countries is reported in Bundervoet, Davalos, and Garcia (2021).

FIGURE 4.7 Households in EMDEs receiving government assistance during the COVID-19 pandemic, 2020

According to surveys, only 22 percent of households in the average EMDE in 2020 received government support, and fewer than this in SSA and SAR. In contrast, about one-half of surveyed households received government assistance in EAP. In low-income countries (LICs) the share of households that received government support was 13 percentage points lower than in other EMDEs.

A. Share of households receiving government support, by region

B. Share of households receiving government support, by income group

Source: World Bank.
Note: EMDEs = emerging market and developing economies; LICs = low-income countries; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa. Based on wave 1 of harmonized high-frequency phone surveys conducted in 2020.
A. Simple averages. Sample includes 5 EAP, 6 ECA, 12 LAC, 3 MNA, 7 SAR, and 18 SSA EMDEs.
B. Simple averages. Sample includes 51 EMDEs, of which 12 are LICs.

report income losses than those employed in the manufacturing and mining sectors. Especially in countries with large agricultural sectors, this has potentially insulated some of the very poorest populations (which tend to be rural) from the economic impact of the pandemic.

Disruption to firm operations: Firm characteristics. Smaller firms had higher risks of falling into arrears and struggled to cover their costs with cash at hand for an extended period (Apedo-Amah et al. 2020). Firm closures were also more common among small enterprises (Karalashvili and Viganola, 2021). According to the World Bank's Business Pulse Survey data, about one-third of the surveyed firms reported reducing working hours, and about a quarter reported reducing wages during the pandemic (figure 4.11). A greater share of small- and medium-sized firms reported reducing wages during the pandemic than large firms. Businesses in the manufacturing and services sectors suffered more than agricultural firms. For instance, the share of firms that reduced wages during the pandemic was 9 percentage points lower in agriculture than in manufacturing.

FIGURE 4.8 Firms in EMDEs receiving government support during the COVID-19 pandemic, 2020

According to surveys, only one-quarter of firms in EMDEs in 2020 received, or expected to receive, public assistance, and only 7 percent of firms in LICs. Wage subsidies were the most common form of government support for firms. The greatest share of firms that received government support was in ECA, while the smallest shares were in SAR and SSA.
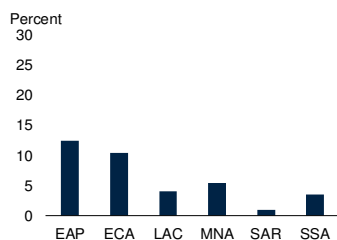
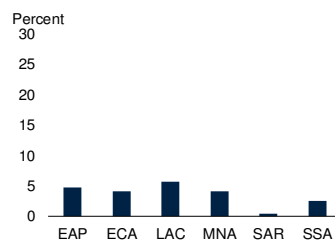**A. Share of firms receiving government support, by type of support**
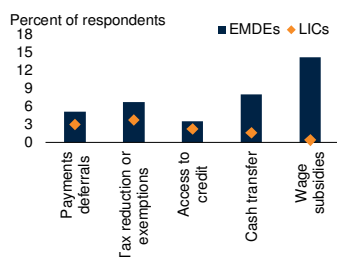
B. Share of firms receiving government support in the form of payment deferrals
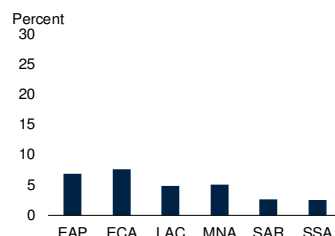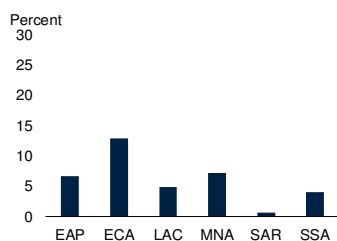
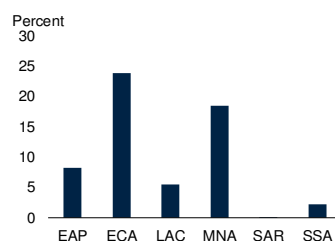**C. Share of firms receiving government support in the form of tax reductions or exemptions**

D. Share of firms receiving government support in the form of access to credit

E. Share of firms receiving government support in the form of cash transfers

F. Share of firms receiving government support in the form of wage subsidies

Source: World Bank.
Note: EMDEs = emerging market and developing economies; LICs = low-income countries; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia; SSA = Sub-Saharan Africa. Simple averages. Based on business pulse surveys conducted in 80 EMDEs in 2020.
A. Sample includes up to 48 EMDEs, of which 9 are LICs. Sample varies by variable.
B. Sample includes 4 EAP, 15 ECA, 4 LAC, 4 MNA, 4 SAR, and 13 SSA EMDEs.
C. Sample includes 3 EAP, 18 ECA, 4 LAC, 4 MNA, 3 SAR, and 16 SSA EMDEs.
D. Sample includes 3 EAP, 18 ECA, 5 LAC, 3 MNA, 3 SAR, and 15 SSA EMDEs.
E. Sample includes 4 EAP, 17 ECA, 4 LAC, 2 MNA, 2 SAR, and 13 SSA EMDEs.
F. Sample includes 4 EAP, 17 ECA, 5 LAC, 3 MNA, 1 SAR, and 8 SSA EMDEs.

Uneven job recovery. A comparison of the household surveys conducted in May-June 2020 and August-September 2020, provides a glimpse of the distributional effects of the incipient recovery in surveyed EMDEs. In the 17 countries with available data, 17 percent of households reported work stoppages in August-September 2020, down from 29 percent in the preceding May-June (Narayan et al., forthcoming). Job losses were particularly prolonged among low-income, low-skilled and informal workers, and women. By August-September 2020, on average, one-half of the initial work stoppages and job losses of the male workers had ended or been recovered, compared with only one-third for female workers (figure 4.12). The job recovery rate was also much lower for urban workers (33 percent of job losses reversed) than for rural workers (58 percent of job losses reversed). This is consistent with the preliminary evidence from the literature, suggesting that small, female-owned, and newer firms appear to be recovering more slowly (World Bank 2021c).

Adverse impact on education: Deeper in LICs. The findings from the household surveys conducted in EMDEs during the pandemic suggest that the pandemic has had a severe impact on learning and education outcomes in EMDEs. Along with income losses, delayed job recovery, and adverse coping strategies, this increases the risks of long-run adverse effects of the pandemic on income inequality via intergenerational mobility. In LICs, among the households with school-age children who attended school before the pandemic, only 39 percent reported engagement in any learning or education activities since school closures, as opposed to 79 percent in other EMDEs (figure 4.13).

Estimations suggest that children in rural areas and from households with lower education levels of survey respondents were much less likely to continue learning during school closures. The probability of continued learning among children was 4 percentage points lower for respondents who stopped working during the pandemic. The gap between EMDEs and advanced economies in the ability to maintain education provision during school closures will also exacerbate between-country income inequality.

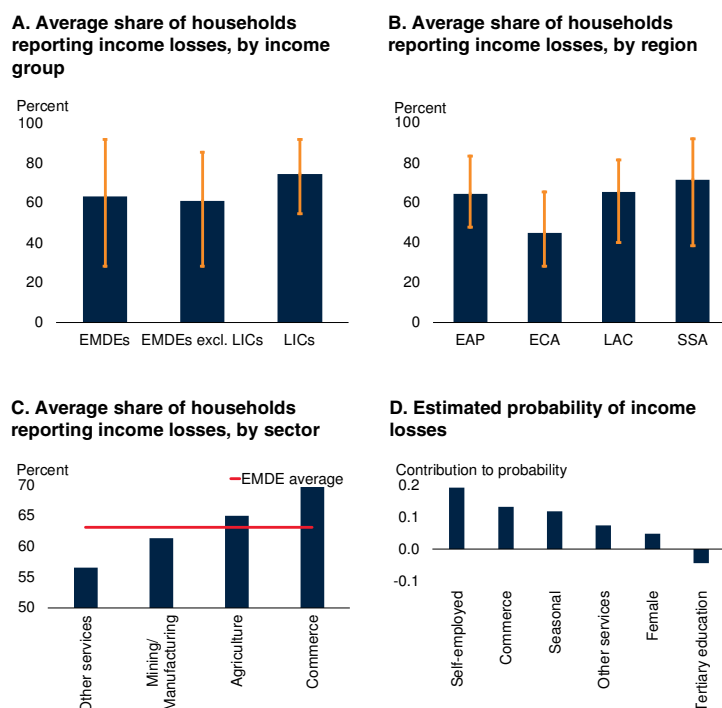## Impact of COVID-19 on within-country income inequality: Simulations

Data and methodology. The potential effects of COVID-19 on within-country inequality in 2020 are estimated using simulations based on country-specific sectoral growth projections and high-frequency phone surveys data undertaken in 2020. The exercise is conducted for 34 EMDEs. The methodology involves estimating the household income distribution in 2019 for each country using the last available household survey data, extrapolated to 2019 using GDP growth data from national accounts. The data on household characteristics from phone surveys are then used to predict the probability of household income losses during the pandemic. Finally, the estimated probabilities and sectoral output growth data for industry, agriculture, and services sectors are used to simulate income distribution changes in rural and urban households under the pandemic and the no-pandemic scenario, which assumes the last pre-pandemic sectoral output growth forecast for 2020 (see annex 4.2 and Mahler (r) et al., forthcoming for details).

Household income losses. The simulations suggest that, in this sample of 34 countries, income losses in 2020 were more likely for the poorest 40 percent of households than for the other 60 percent of the income distribution in 26 out of 33 countries in the sample. The probability of income losses was higher for urban populations than for rural populations (Mahler (r) et al., forthcoming). Among EMDE regions, income losses were most common in SSA (71 percent of surveyed households, on average) and least common in ECA (45 percent of surveyed households, on average), where government support was most substantial.

Impact of the pandemic on within-country inequality in 2020: Modest increase. These findings for income losses suggest that income inequality and poverty increased because of the pandemic (figure 4.14). However, the magnitude of the increase appears to have been small: the Gini coefficient is estimated to have increased, on average, by 0.3 points in 2020, compared with the no-COVID counterfactual scenario in which there

FIGURE 4.9 Households reporting income losses in EMDEs since the beginning of the pandemic, 2020

Over 60 percent of households in EMDEs for which 2020 survey data are available reported income losses since the start of the COVID-19 pandemic. Households in LICs and SSA countries were hardest hit, with more than 70 percent of surveyed households reporting income losses. Informal workers, women, low-skilled workers (those without college education), and workers in non-agricultural sectors had relatively higher probabilities of suffering income losses.

A. Average share of households reporting income losses, by income group

B. Average share of households reporting income losses, by region

C. Average share of households reporting income losses, by sector

D. Estimated probability of income losses

Sources: Narayan et al. (forthcoming); World Bank.
Note: EMDEs = emerging market and developing economies; LICs = low-income countries; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, SSA = Sub-Saharan Africa. Data for other regions are not available.
A.-C. Calculations based on the Harmonized High-Frequency Phone Surveys (HFPS) data from the COVID-19 Household Monitoring Dashboard for wave 1.
A. Simple averages. Sample consists of 36 EMDEs, including 6 LICs. Orange whiskers indicate the maximum and the minimum values.
B. Simple averages. Sample includes 4 EAP, 7 ECA, 14 LAC, and 11 SSA EMDEs. Orange whiskers indicate the maximum and the minimum values.
C. Simple averages. Sample includes 37 EMDEs.
D. The figure shows the estimates based on the logit regression of the incidence of households reporting income losses on variables measuring household characteristics and country dummy variables (Narayan et al., forthcoming). Each bar shows the contribution to the conditional probability of losing income in 2020. Agriculture is the baseline sector; wage-employed, male workers, and workers without secondary and tertiary education are the baseline demographic categories in the regression. Detailed estimates are reported in annex table A4.3.3.

is virtually no change in inequality. This increase is comparable in magnitude to the annual average decline in within-country income inequality in these EMDEs over the preceding two decades. In the average LIC, the increase in the Gini coefficient was 0.1 point more than in the average EMDE, reflecting particularly deep per capita income contractions.

FIGURE 4.10 Households reporting work stoppages in EMDEs since the beginning of the pandemic, 2020

Almost one-third of all responding households in EMDEs in 2020 reported work stoppages since the start of the pandemic. Among EMDE regions, a higher share of households reported work stoppages in LAC. Women were 8 percentage points more likely to have stopped working during the first months of the outbreak than men. Low-skilled workers were 10 percentage points more likely to have stopped working than college-educated workers.

A. Share of respondents reporting work stoppage, by demographic group
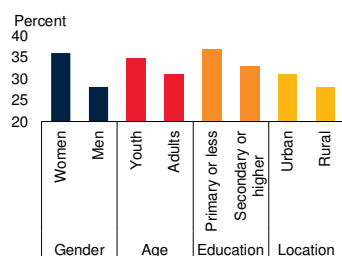
B. Estimated probability of work stoppage
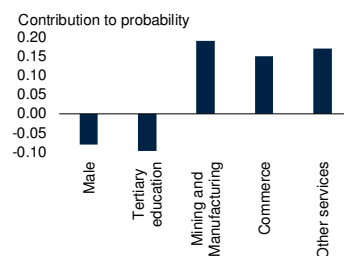
C. Share of respondents reporting work stoppage, by region
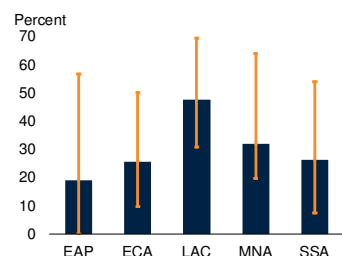
D. Share of respondents reporting work stoppage, by EMDE income group
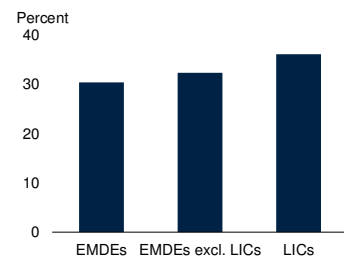
Sources: Kugler et al. (2021); Narayan et al. (forthcoming); World Bank.
Note: EMDEs = emerging market and developing economies; LICs = low-income countries; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SSA = Sub-Saharan Africa.
A.C.D. Calculations based on the Harmonized High-Frequency Phone Surveys (HFPS) data from the COVID-19 Household Monitoring Dashboard for wave 1.
A. Simple averages. Youth is defined as 18-24 years and adults as older than 25.
B. Estimates based on a logit regression of the incidence of households reporting work stoppages on variables measuring household characteristics and country dummy variables (Narayan et al., forthcoming). Agriculture is the baseline sector; female workers; female workers, workers without secondary and tertiary education are the baseline demographic categories in the estimations.
C. Simple averages. Sample includes 9 EAP, 7 ECA, 13 LAC, 5 MNA, and 25 SSA EMDEs. Orange whiskers indicate the maximum and the minimum values.
D. Simple averages. Sample includes 59 EMDEs, among which 15 are LICs.

In some countries—where aggregate output growth was high but a larger share of poorer (rural) households than richer (urban) households reported income losses—the increase in within-country income inequality reached up to 1.0 Gini point. However, in one-tenth of the EMDEs in the sample, output growth was resilient and a smaller share of poorer (rural) households than

richer (urban) households reported income losses, so that income inequality declined. Even in countries where income inequality may not have risen, because agricultural populations were largely insulated, urban inequality may have risen since the hard-hit services sector tends to employ more informal, lower-skilled, and lower-income workers. Like the Gini coefficient (which captures the full income distribution), the estimated top-to-bottom quintile ratio (which captures the extremes of the income distribution) also rose in more than four-fifths of the EMDEs in the sample.

Impact of the pandemic on poverty in 2020: Increase. The pandemic led to increases in extreme poverty rates in 33 of the 34 countries analyzed. The extreme poverty rate in the countries included in the sample is estimated to have increased, on average, by 0.63 percentage points—about 0.92 percentage points more than in the no-pandemic counterfactual scenario, in which poverty rates would have declined. The income share of the poorest 40 percent of the population declined, on average, by 0.1 percentage points and, in some countries, by as much as 0.6 percentage points—more than the average annual change in their income share over the previous two decades.

Impact of the pandemic on medium-term within-country inequality: Increase likely. Owing to data constraints, the simulations assess within-country income inequality in 2020. Since then, however, a global recovery has taken hold. As part of the recovery, global inflation has continued to increase. Rising inflation may further increase inequality over the medium term, since poorer households tend to be less able than richer households to protect the real value of their incomes and assets from inflation (Ha, Kose, and Ohnsorge 2019). Food price inflation, in particular, may hurt poorer households disproportionately since food tends to account for a larger share of their consumption baskets than for richer households (World Bank 2021e). Strategies by low-income households to cope with real income losses since the pandemic, such as consumption cuts, drawdowns of savings, and distress sales of assets, further increase the risks

that rising income inequality will persist in the longer run (Hill and Narayan 2020). Surging public debt levels (special focus) may also inhibit the implementation of policies to address income inequality in the longer run (Chancel et al. 2021; Furceri et al. 2021b; Sandbu 2021).

Implications for between-country and global inequality

Impact of the pandemic on between-country income inequality: Increase. Current real GDP growth projections in chapter 1 point to an increase in between-country income inequality since 2019. Between-country Gini and Theil indices increased between 2019 and 2020, and are estimated to have risen further in 2021 (figure 4.15).[11] As a result, between-country income inequality is estimated to have returned to the levels of the early 2010s. In this respect, the pandemic-triggered global recession of 2020 differs from the global recession of 2009, when between-country inequality declined as EMDE growth remained resilient and median incomes rose more rapidly in EMDEs than in advanced economies.

Impact of the pandemic on global interpersonal income inequality: Increase. Because of rising within- and between-country inequality, global interpersonal inequality is also likely to have increased in the wake of the pandemic. This inference is supported by simulation results suggesting that the global bottom quintile of the income distribution suffered greater income losses in 2020 than the top income quintile, and did not recover as fast in 2021. Income declines over 2019-21 are estimated at 3.3 percent for the bottom quintile of the global income distribution and 0.5 percent for the top quintile. The same inference is also supported by data for LICs, which account for over 40 percent of the global extreme poor. As a result of output contractions and a lagging recovery, they experienced deeper and more persistent income losses between 2019 and 2021. This alone will have raised global

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[11] Population-weighted between-country income inequality has also increased, which is consistent with Deaton (2021).

FIGURE 4.11 Firms reporting cuts in working hours or wages in EMDEs since the beginning of the COVID-19 pandemic, 2020
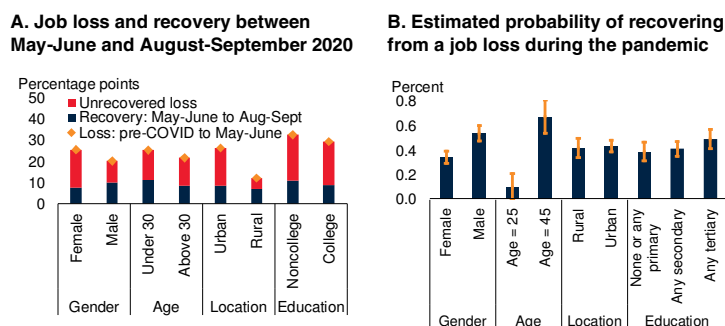
About one-third of firms surveyed in 2020 reported that they had reduced working hours, and about a quarter of firms surveyed reported reducing wages during the pandemic. An above-average share of small- and medium-sized firms reported reducing wages during the pandemic. Agriculture suffered less than manufacturing and services.

A. Share of firms that reduced working hours

B. Share of firms that reduced wages
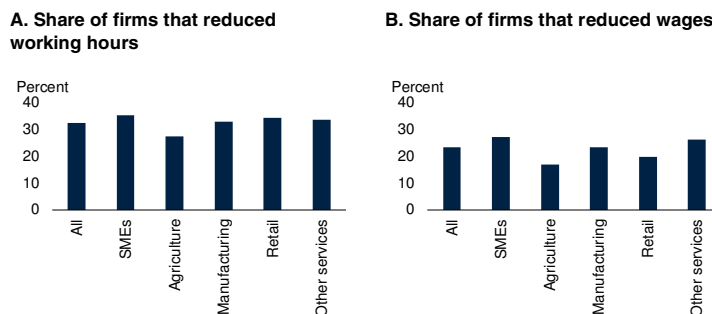
Source: World Bank.
Note: SMEs = average for small and medium-sized firms. Simple averages. Calculations are based on the data from the Business Pulse Surveys, wave 1 responses of firms in 2020. The sample includes 32 emerging market and developing economies (EMDEs).

FIGURE 4.12 Job recovery in EMDEs, 2020

Job losses proved particularly long-lasting among women and low-skilled workers. By September 2020, on average, one-half of the initial work stoppages and job losses experienced by male workers had been recovered, whereas the corresponding proportion for female workers was one-third.

A. Job loss and recovery between May-June and August-September 2020

B. Estimated probability of recovering from a job loss during the pandemic

Sources: Mahler (r) et al. (forthcoming); Narayan et al. (forthcoming); World Bank.
Note: A. The figure shows the decline in the average share of employed among surveyed households in percentage points (pp) terms from pre-pandemic to May-June 2020, split into recovery in employment between May-June and August-September 2020, when policy stringency declined, and "unrecovered loss." The results are based on 14-17 emerging market and developing economies (EMDEs) with at least one survey wave for this period.
B. Based on six countries. The estimates are based on logit regressions with the dependent variable measuring whether the individual is working again in August-September 2020 (for those who had a job pre-pandemic but lost it in May-June 2020) regressed on household characteristics, based on high-frequency phone survey data. Orange whiskers indicate the 95-percent confidence intervals.

FIGURE 4.13 Impact of COVID-19 on education in EMDEs, 2020

The pandemic has disrupted the learning and education outcomes in EMDEs. Learning disruptions have been particularly high in LICs. Children of more educated parents have been more likely to continue learning activities, and children of parents who lost their jobs have been less likely to continue learning activities through the pandemic.

A. Children engaged in education during school closures
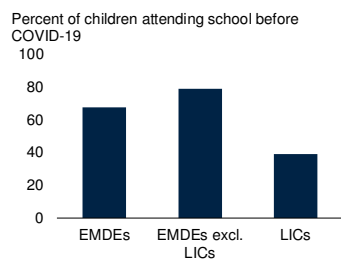
B. Children engaged in education during school closures, by EMDE region

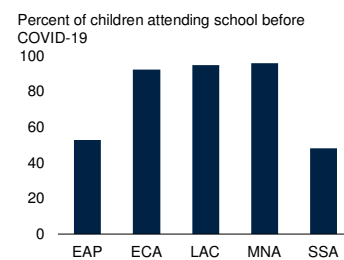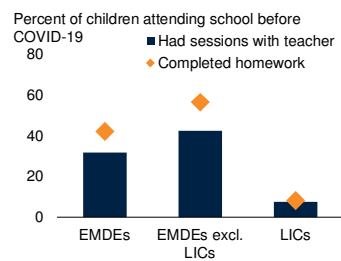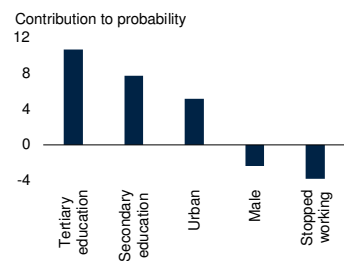**C. Children doing homework and engaging with teachers during school closures**

D. Likelihood of continued learning among children during school closures

Sources: Narayan et al. (forthcoming); World Bank.
Note: EMDEs = emerging market and developing economies; LICs = low-income countries, EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, SSA = Sub-Saharan Africa. Based on High-Frequency Household Surveys data from the COVID-19 Household Monitoring Dashboard for wave 1 in 2020.
A. Response to survey question about children engaged in any education activities since school closures (percent of households with school age children who attended school before the pandemic), by income group (simple average). Sample consists of 49 EMDEs, including 14 LICs.
B. Response to survey question about children engaged in any education activities since school closures (percent of households with school age children who attended school before the pandemic), by region (simple averages). Sample includes 5 EAP, 5 ECA, 14 LAC, 1 MNA, and 24 SSA EMDEs.
C. Simple averages. Response to question about children that attended sessions with teachers or completed homework during school closures (percent of households with school age children who attended school before the pandemic). Sample consists of 39 EMDEs (including 12 LICs) for "had sessions with teacher" and 37 EMDEs (including 11 LICs) for "completed homework."
D. Based on the logit regression of the incidence of households reporting continued learning among children on several covariates reflecting characteristics of respondents and households, and country fixed effects. The sample is limited to households with children going to school before the pandemic.

income inequality even if within-country income distributions had remained materially unaffected by the pandemic.

Empirical evidence from the literature

Expected impact on within-country inequality: Increase. The simulation results assessing the

impact of COVID-19 on within-country income inequality are in line with the early empirical estimates reported in the literature, mostly focusing on the distributional impacts of the pandemic in advanced economies. A large-scale survey found that over 87 percent of economists working on inequality-related topics expected within-country income inequality to increase because of the COVID-19 pandemic (Oxfam International 2021).

Mitigating factor: Policy support. For advanced economies and a few EMDEs, however, simulations suggest that a strong policy response targeted at vulnerable groups may have reduced income inequality.[12] Cash transfers made to households during 2020 increased spending among low-income households and helped limit the adverse effects of the pandemic (Baker et al. 2020b; Chetty et al. 2020).

Expected long-term increase in within-country inequality. The increases in income inequality from the recent pandemic are expected to be lasting, in part because of widespread disruptions to education for low-income families. Globally, COVID-19 could result in a loss of 0.6 years of quality-adjusted schooling with larger losses in low-income countries (Azevedo et al. 2020).[13] Human capital deterioration on account of job losses as well as school closures is expected to disproportionately hurt poor households, resulting in lower intergenerational mobility and greater inequality in the long run (Hill and Narayan 2020).

For example, in LAC, children of parents with secondary or higher education lost 9 days of

[12] For advanced economies, see Almeida et al. (2021); Brewer and Tasseva (2021); Bruckmeier et al. (2021); O'Donoghue et al. (2020); and Palomino, Rodriguez, and Sebastian (2020). Similar results were found for some Latin American countries (Lustig et al. 2020; Oliva et al. 2021) and Sub-Saharan African countries (Lastunen et al. 2021; Younger et al. 2020).

[13] For the educational implications of the pandemic, see also Aucejo et al. (2020); Fuchs-Schündeln et al. (2020); Hanushek and Woessmann (2020); and OECD (2020). For the long-term effects of disproportional economic disruptions for lower-income households, see Ashraf (2020); Baker et al. (2020a); Blundell et al. (2020); Bundervoet, Davalos, and Garcia (2021); Carvalho et al. (2020); Lakner et al. (forthcoming); Major and Machin (2020); Ohnsorge and Yu (2021); Papageorge et al. (2020); and Stantcheva (2021).

schooling whereas children from less-educated households lost 71 days of schooling in 2020 (Neidhöfer, Lustig, and Tommasi 2021). In LAC, on average, more than half of the children of low-skilled parents are likely to be low-skilled, compared with less than one-seventh of children of high-skilled parents (Neidhöfer, Serrano and Gasparini 2018).
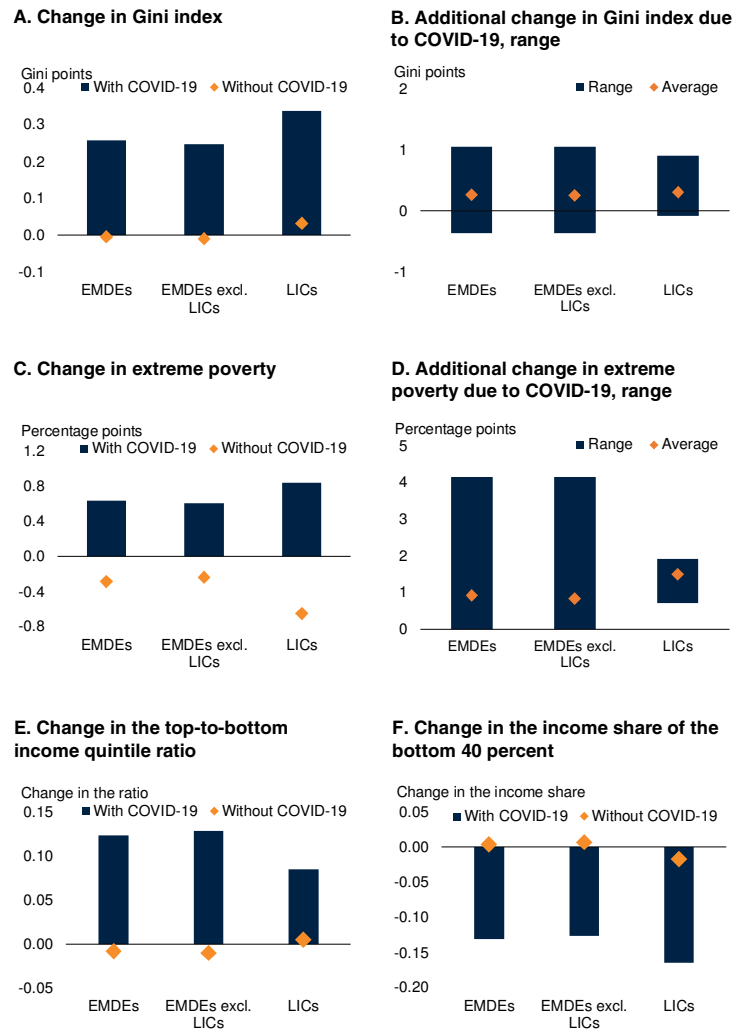
Policy implications

Persistently high within-country income inequality and increased between-country inequality warrant a comprehensive, three-pronged policy effort to lower both, supported by the global community.

Need for a comprehensive strategy. The analysis above indicates that COVID-19 pandemic has raised global income inequality by increasing between-country inequality considerably and within-country inequality somewhat in EMDEs, with larger increases in urban areas than in rural areas. It also shows that, notwithstanding a decline over the two decades preceding the pandemic and the modest impact of the pandemic, within-country income inequality remains high in several EMDE regions, especially LAC and SSA, which together host about two-thirds of the world's extreme poor. This points to the need for a three-pronged strategy: reducing between-country inequality, reducing within-country inequality, and ensuring support by the global community. In some countries, severely constrained fiscal space after the pandemic will present a challenge to implementing this strategy.

- *Reducing between-country inequality:* The main source of the pandemic-related increase in global income inequality has been a pronounced rise in between-country inequality as a result of the lagging recovery in EMDEs and, especially, LICs. For these countries to return to growth paths with robust convergence toward advanced-economy per capita incomes, the rollout of vaccination programs in EMDEs and, especially, LICs needs to be accelerated. Beyond the short term, policy efforts to sustain robust growth in EMDEs need to be redoubled. This requires, in particular,

A. Change in Gini index

B. Additional change in Gini index due to COVID-19, range

C. Change in extreme poverty

D. Additional change in extreme poverty due to COVID-19, range

E. Change in the top-to-bottom income quintile ratio

F. Change in the income share of the bottom 40 percent

Sources: Narayan et al. (forthcoming); World Bank.
Note: EMDEs = emerging market and developing economies; LICs = low-income countries. The simulations estimate the changes in the income distribution of households in 2020 against a counterfactual 2020 income distribution that assumes the last pre-pandemic sectoral output growth forecast for 2020. The sample includes 34 countries. The simulations are based on country-specific sectoral growth projections and Harmonized High-Frequency Phone Surveys data as of July 2021.
A. Difference between the average change in the Gini index in the COVID-19 scenario and the no-pandemic counterfactual scenario.
B. Average change in the Gini index; bars indicate the range with minimum and maximum values for the group.
C. Difference between the average change in extreme poverty rate in the COVID-19 scenario and the no-pandemic counterfactual scenario.
D. Average change in extreme poverty rate; bars indicate the range with minimum and maximum values for the group.
E. Difference between the average change in the top-to-bottom income quintile ratio in the COVID-19 scenario and the no-pandemic counterfactual scenario.
F. Difference between the average change in the income share of the bottom 40 percent of the income distribution in the COVID-19 scenario and the no-pandemic counterfactual scenario.

FIGURE 4.15 Estimated changes in between-country income inequality

Between-country income inequality has increased since the outbreak of the COVID-19 pandemic, in contrast with the decline following the global recession of 2009. As a result, between-country income inequality is estimated to have returned to the levels of the early 2010s.

A. Change in between-country income inequality, 2019-21

B. Change in between-country income inequality, 1990-92

C. Change in between-country income inequality, 2008-10

D. Average growth of median income around 2009 recession

E. Per capita income growth relative to advanced economies

F. Share of EMDEs with income per capita growth slower than that in advanced economies
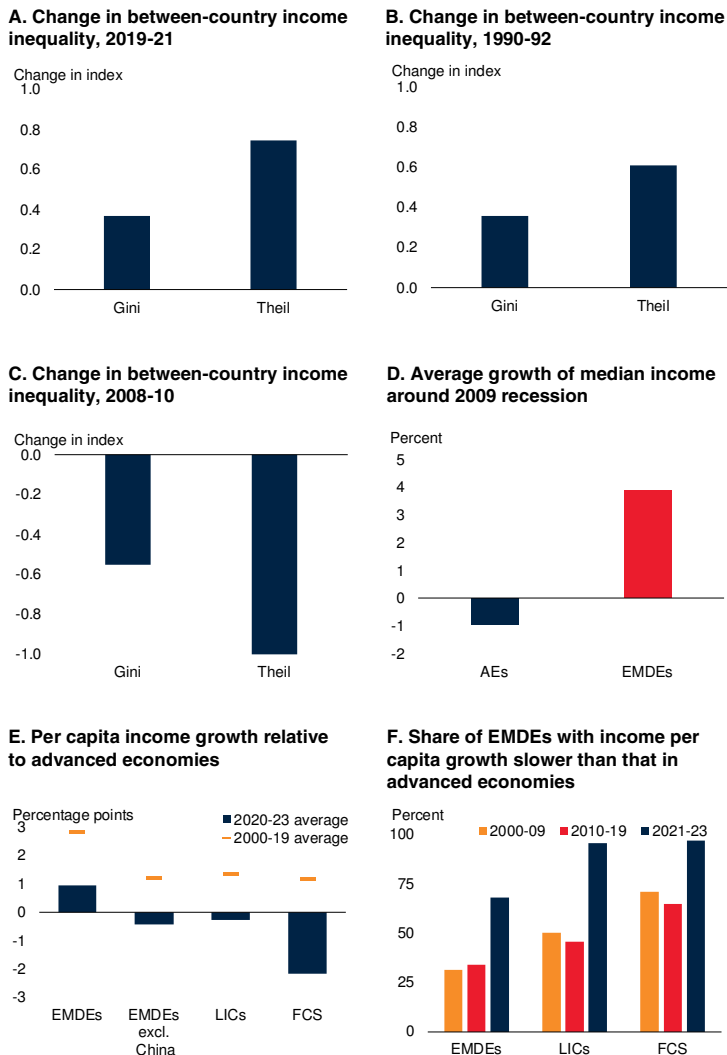
Source: World Bank.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies; FCS = fragile and conflict-affected situations; LICs = low-income countries.
A.C. Based on the World Bank's World Development Indicators (WDI) and growth estimates. The figures show annualized changes in the indices between the two years indicated. The calculations are based on a strongly balanced panel of 176 countries over the period 2000-21. The Gini index is on 0-100 scale. The Theil generalized entropy GE(1) index and the Gini index are computed using GDP per capita, purchasing power parity (PPP)-adjusted (constant 2017 international dollars). The Gini and Theil indices reported in the figure are consistent with the Gini and Theil indices reported in figure 4.3. For reference: The between-country Gini index level in 2019 for this sample of countries is 51; the Theil index level in 2019 is 44.
B. Based on World Bank's World Development Indicators (WDI). The figure shows annualized changes in the indices between 1990-92. The calculations are based on a strongly balanced panel of 153 countries over the period 1990-2021.
D. Simple averages of annualized growth rates of median incomes of individual countries. Based on 2011 U.S. dollars, PPP-adjusted. Annualized growth rate of median income for each country around 2009 is calculated using the closest available year before and after 2009 in a five-year window. Strongly balanced panel data of 33 AEs and 94 EMDEs.
E.F. Relative per capita income growth is computed as difference of the period average annual per capita GDP growth between EMDEs or EMDE groups and advanced economies. Data for 2022-23 are forecasts. Sample includes 144 EMDEs, of which 22 are LICs and 31 are FCS.

reforms to boost productivity growth such as improvements in human and physical capital as well as in business climate for more efficient allocation of factors of production (Dieppe 2021; World Bank 2020b).

- *Reducing within-country inequality:* Persistently high within-country income inequality warrants more proactive measures to reduce inequality of outcomes in the short term and inequality of opportunities to improve equality of outcomes over the long term (box 4.2). In the short term, support needs to continue to be channeled to groups that have been hit hard by the pandemic—women, low-skilled workers, urban informal sector workers, and small enterprises—to avoid their recent setbacks being perpetuated into the future. This can include social transfers, which have been shown to be effective in EMDEs, financed by a broadening of government revenues (Bracco et al. 2021). This is especially important because education or income losses can persist across generations. Beyond the short term, past experience suggests that certain policies can be particularly effective for lowering within-country income inequality (box 4.2). These include government support targeted at early childhood development, universal access to quality education and health coverage, infrastructure improvements especially in rural areas, broader access to technology and finance, social transfers targeted at vulnerable groups, and effective labor market policies. Improved government revenue collection can help alleviate tax burdens for the most vulnerable groups and can help expand the financing envelopes for more redistributive spending initiatives.

- *Global cooperation to ensure inclusive and sustainable recovery:* The global community can support efforts to lower both between-country and within-country inequality by accelerating the global rollout of vaccination, especially in LICs. For EMDEs with excessive debt burdens, where debt service payments threaten to crowd out poverty-reducing and growth-enhancing government spending, the

BOX 4.2 Evidence on the distributional effects of past policy initiatives

The literature has identified several policies that have been effective in reducing within-country income inequality. The highest-impact strategies have included reforms in health and education, especially focusing on children, tax and transfer policies, investments in rural infrastructure, active labor market reforms, and policies aimed at equal access to technology and financial services.

Introduction

Global income inequality has declined over the past two decades although at a slower pace since the global financial crisis. The pandemic likely reversed this decline in global inequality. A proactive policy response is required to set countries on to more inclusive development paths.

The policy response can draw on the rich literature assessing past policy initiatives to lower within-country inequality. This box offers a comprehensive literature review to address the following questions:

- What is the role of fiscal policy in reducing inequality?

- Which reforms can help boost human and physical capital?

- What are the highest-impact strategies to lower inequality?

Fiscal policy

Taxes and transfers. Taxes and transfers reallocate household incomes via direct taxes (most commonly, personal income and corporate income taxes, but also wealth, physical property, and inheritance taxes); indirect taxes (value-added tax, sales tax, excise tax); social security system and social transfers directed at vulnerable population groups (unemployment insurance, family benefits, disability assistance, housing subsidies and other measures). Empirical evidence suggests that taxes and transfers are generally effective in lowering income inequality in both advanced economies and emerging market and developing economies (EMDEs) but that they have been used more aggressively in advanced economies, as also captured by estimates of pre- and post-tax Gini coefficients (figure B4.2.1). [a]

Human and physical capital investment

Access to capital. Reforms that foster the development of universal services, as well as ensuring equal and uninterrupted access to education (human capital formation) and physical infrastructure can help reduce inequality. Among the most effective reforms the literature reports are policies related to improvements in infrastructure, reforms in educational systems, especially those focusing on basic education and higher enrollment rates, early childhood development programs; and healthcare-related policies, including programs promoting universal health coverage. [b]

High-impact inequality-reducing strategies

The most effective strategies. Among the broad range of policies that either explicitly focus on income inequality or impact economic inequality indirectly, the following interventions have been identified as the most potent in reducing inequality (World Bank 2016).

- *Early childhood development and nutrition interventions.* The childhood period is critically important for human capital development, and deprivation can lead to long-run detrimental effects for labor market outcomes, as well as personal development, of low-income households. It is thus important for vulnerable households to receive adequate developmental support to tackle inequality in children's developmental and learning opportunities.

EMDEs, see Clifton, Díaz-Fuentes, and Revuelta (2020); Goñi, Humberto López, and Servén (2011); Immervoll et al. (2006); Lustig (2018); and Martinez-Aguilar et al. (2017). For the discussion of the redistribution and predistribution policies, as well as interactions between them, see also Chancel et al. (2021) and Sandbu (2021).

b. For empirical evidence on the distributional impacts of infrastructure, see Calderon and Serven (2004); Charlery, Qaim, and Smith-Hall (2016); Chatterjee and Turnovsky (2012); and Raychaudhuri and De (2016); reforms to education, especially basic education and higher enrollment rates: Checchi and van de Werfhorst (2017) and De Gregorio and Lee (2002); early childhood development programs: Deutsch (1998) and Magnuson and Duncan (2016); health care policies and programs promoting universal health coverage: Buettgens, Blavin, and Pan (2021); Kaestner and Lubotsky (2016); Pierce (2001); and Wagstaff (2016).

Note: This box was prepared by Amat Adarov and Sinem Kilic Celik.
a. For evidence on advanced economies, see Berg and Hebous (2021); Wang, Caminada, and Goudswaard (2012). For evidence on

BOX 4.2 Evidence on the distributional effects of past policy initiatives *(continued)*

FIGURE B4.2.1 Pre- and post-tax Gini indices, 1990-2018

Taxes and transfers have generally been effective in lowering income inequality in both advanced economies and EMDEs but more effective in advanced economies.

A. World

B. Advanced economies

C. EMDEs
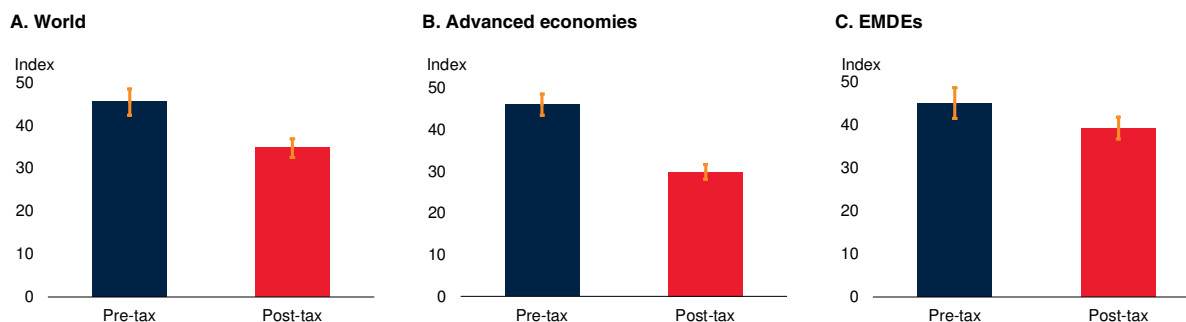
Sources: Solt (2020); World Bank.
Note: Bars represent average within-country Gini indices for market income (pre-tax) and disposable income (post-tax). Whiskers indicate the 95 percent confidence interval (owing to the estimation uncertainty in Gini estimates) over the period 1990-2018 for 67 countries: 32 advanced economies and 35 emerging market and developing economies (EMDEs).

- *Universal health coverage.* Universal health care access helps reduce poverty and foster shared prosperity. Poor households often cannot afford out-of-pocket health care expenditures, leading to long-run damage to human capital, productivity and incomes, or choose to pay for these expenditures by sacrificing other essential expenditures and being pushed below the extreme poverty line (WHO and World Bank 2017). The COVID-19 pandemic has revealed the significant differences in access to basic health services both across and within countries. [c] Unequal access to vaccines is exacerbating both within-country and between-country inequality, contributing to the unequal recovery and impairing global progress in containing the pandemic (IMF 2021a; World Bank 2021a). Robust policy effort is needed at the global level to ensure effective vaccine deployment, especially in low-income countries (LICs).

- *Universal access to quality education.* The pandemic has worsened pre-existing structural inequality as lower-income households struggled to retain access to quality remote education. Robust policies can help ensure equal access to education for all population groups. New learning technologies can be leveraged to improve teaching effectiveness and learning outcomes (World Bank 2018).

- *Cash or in-kind transfers to poor families.* Cash or in-kind transfers constitute a straightforward policy tool to alleviate income disparities, and are widely used to improve health and education outcomes in poor communities. They have been successfully implemented in Brazil, Mexico, and many other countries globally (Millán et al. 2019; Fiszbein et al. 2009; Bastagli et al. 2016). Transfers may be provided either unconditionally or with conditions that typically include regular health check-ups of children or school enrollment. Such conditional transfers can both directly support the incomes of the vulnerable households and help to reduce inequality in the long term by encouraging investment in human capital of household members, particularly, children.

- *Investing in rural infrastructure.* Improvements in rural infrastructure—such as road, electricity, and internet investments—are particularly important for tackling poverty and inequality as a large number of the extreme poor live in rural areas. Empirical studies report a positive role of improved

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c. For a comprehensive analysis of implementation of universal health care programs in 24 developing countries, see Cotlear et al. (2015).

BOX 4.2 Evidence on the distributional effects of past policy initiatives *(continued)*

infrastructure that allows vulnerable households in low-income countries to access markets (Rozenberg and Fay 2019). [d]

• *Tax and transfer policies.* Taxes and transfers have been among the most powerful tools to reshape the inequality of outcomes (Lustig 2018; Inchauste and Lustig 2017). Appropriate tax policies vary with country characteristics. At the same time, increasing the progressivity of personal income taxation, greater reliance on wealth, property and or inheritance taxes, as well as consumption taxes with high redistributive potential (such as value-added taxes, excise taxes, and carbon taxes) can be effective policy tools in both advanced economies and EMDEs (IMF 2021a). Equally important is the strengthening of tax administration to enable effective redistribution through revenues and spending. At the global level, the international tax agreement recently reached, under the auspices of the OECD, by 136 countries aiming to reform international taxation rules for corporations and setting a minimal tax rate for multinational enterprises, should help both to limit tax avoidance by companies and to ensure a more equitable distribution of corporate profits and taxes across countries (OECD 2021).

• *Active labor market policies and reforms.* Effective labor market policies can be powerful tools to facilitate a more equitable income distribution and foster greater equality of opportunities. Measures include public employment services that aid job search and matching, job training programs, wage subsidies that help employment of the disadvantaged workers, particularly, youth, and policies promoting gender equality. Such policies have been shown empirically to have had positive long-run effects (Card, Kluve, and Weber 2018).

• *Policies to foster equal access to technology and financial inclusion.* The COVID-19 pandemic has exacerbated the digital divide between the haves and the have-nots as telecommuting opportunities and remote education have not been equally accessible by low-income households, hurting their long-run income prospects, including intergenerational mobility. The pandemic will likely further fuel the digitalization and automation that had been underway before the pandemic and may disproportionately affect low-skilled workers. Policies fostering financial inclusion are also critical for reducing the inequality of opportunities. Policies that focus on greater accessibility of financial services to low-income households have been shown to be important for sustainable and inclusive economic growth and development (Demirgüç-Kunt, Klapper, and Singer 2017).

Global cooperation

Many of these inequality-reducing measures require fiscal resources. These are severely constrained in many EMDEs, especially in LICs. The global community has an important role to play in supporting these countries in strengthening growth and engaging in effective inequality-reducing policies.

This is particularly important in facing a new challenge that risks increasing global inequality: climate change. The costs of climate change have become increasingly visible as the frequency and severity of weather-related natural disasters has intensified. Climate change often affects disproportionately vulnerable populations, especially small island developing states, countries with fragile and conflict-affected situations (FCS) and LICs (World Bank 2021d). Besides the migration to other countries, there could be more than 216 million internal climate migrants globally by 2050 unless the necessary actions are taken to tackle the underlying factors, such as water scarcity, declining crop productivity, and sea-level rise (Clement et al. 2021). Global cooperation is needed to increase the pace of the progress in meeting the goals of the Paris Agreement on Climate Change (UKCOP 2021). The international community can help transition to a lower-carbon and more resilient development pathway, and to do so while supporting natural capital, economic growth, and job creation (World Bank 2021e).

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d. For instance, in Bangladesh, a road-paving project implemented in 1997-2001 increased household expenditure by an average of 9 percent (Khandker and Koolwal 2011). In Ethiopia, access to an all-season road reduced poverty by 7 percent and increases household consumption by 16 percent (Dercon et al. 2009).

global community can support debt relief. By fostering an inclusive global trade and investment environment, encouraging deeper reforms for EMDEs, and open and predictable policies in advanced economies, the global community can promote broad-based productivity and inclusive job growth, and help reduce global inequality (World Bank 2020b, 2021e).

Conclusion

The COVID-19 pandemic has raised global income inequality by increasing between-country inequality considerably and within-country inequality somewhat. The increase in between-country inequality is the result of the uneven recovery from the pandemic that contrasts with the decline in between-country inequality around the global recession of 2009. The increase, albeit less significant, in within-country income inequality reflects the particularly severe income losses and employment disruptions suffered by lower-income households, low-skilled and informal workers, and women. Among EMDE regions, within-country income inequality remains particularly high in LAC and SSA, which together host about two-thirds of the world's extreme poor.

In the medium and long run, the increase in income inequality caused by the pandemic may become entrenched as pandemic-induced disruptions to education and the disproportionate losses imposed on low-income households may worsen intergenerational mobility. High inflation and surging public debt levels may hamper countries' ability to support vulnerable groups and facilitate recovery and sustainable growth, thereby aggravating risks of rising within- and between-country income inequality.

A comprehensive policy package is needed to steer the global economy toward a more inclusive development path. Such a package would combine policies to reduce both between-country and within-country inequality. It would require proactive national policies and support from the global community.

ANNEX 4.1 Data challenges

The analysis in the chapter relies on multiple data sources and certain limitations and caveats in the data warrant further discussion. In general, the data on income inequality are limited, as surveys that are used to construct the data on income distribution within countries are not conducted every year for all countries.

Phone surveys data. During the pandemic in-person data collection, including official surveys conducted by national statistical offices, were suspended in most countries. Therefore, the phone surveys of households and firms became an important source of the data to gauge the impacts of the pandemic. The survey questions, however, may differ to fit individual country contexts. To mitigate this caveat, the survey data undergo harmonization, and the surveys that are included in the publicly available harmonized dashboard are designed to be representative of the underlying population. At the same time, these data have a range of limitations. Phone surveys rely on self-reported data on income, job losses, and other socio-economic dimensions surveyed, and the accuracy of the responses by households are not guaranteed.

The harmonized high-frequency phone surveys underlying the COVID-19 Household Monitoring Dashboard are designed to be nationally representative, using reweighting methods to adjust for differential response rates among subgroups of the population. Similarly, the phone and web-based surveys underlying the COVID-19 Business Pulse Surveys Dashboard are designed to obtain a representative sample where possible, using sampling weights where available. Nevertheless, these data are subject to caveats related to the collection and harmonization of the survey data. For instance, the population groups with limited network coverage or no access to phones, who are more likely to be poor, may be underrepresented in the sample. The phone surveys are also known for attrition and a high level of nonresponse rates. The sample of the countries surveyed is also limited and does not include all EMDEs. For instance, China and India are not covered by the surveys. Moreover, the timelines of the pandemic and lockdowns differ
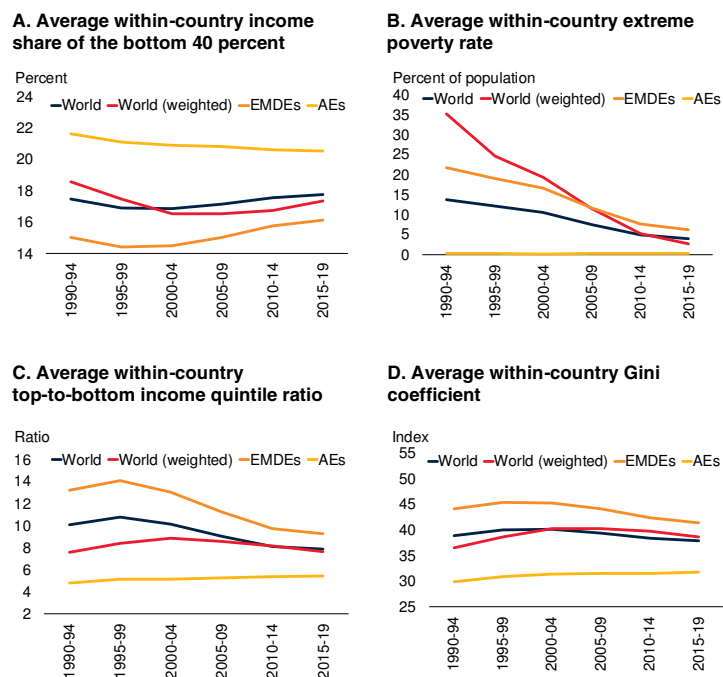
across countries, and it may be hard to capture an overall picture of the impact of the pandemic on inequality by relying on the high-frequency phone surveys. Therefore, the results reported based on the phone survey data and the simulations may not be representative of the trends in all EMDE countries and should be interpreted with caution.

Within-country income inequality data: World Development Indicators and PovcalNet. Most of the data that are used in the chapter rely on the World Bank's PovcalNet data, also reported in the World Development Indicators (WDI) database. Among the datasets with the global coverage, they are the only data that develop inequality estimates directly from the survey micro-data, more specifically, from country-level household income and expenditure surveys. PovcalNet has income or consumption distributional data from more than 1,500 household surveys spanning 1967-2018 and 166 economies. The coverage, however, is limited both across countries and over time, as surveys are not conducted every year for most countries. In some cases, the coverage is especially lacking. For instance, for India the most recent available survey is in 2011.

To maintain strongly balanced panel data, which is important for comparability over time and more general inference of the global trends, the chapter relies on 10-year averages of the countries to make comparisons between the decade of the 2000s and the decade of the 2010s. As a robustness check, these computations are complemented by examining the inequality trends using 5-year averages for a smaller sample of countries for which the survey data at such frequency are available (figure A4.1.1). The use of multi-year averages for assessing longer-run trends in income inequality is justified as inequality changes are gradual.

Another limitation is associated with the methodological differences in administering surveys across countries. The surveys that form the basis of the PovcalNet data are carried out by national statistical offices, central banks, or other national agencies, and thus may not be comparable. Furthermore, the PovcalNet data mix surveys of household expenditures and household incomes, which are conceptually very different

FIGURE A4.1.1 Within-country income inequality and poverty (5-year averages), 1990-2019

A. Average within-country income share of the bottom 40 percent

B. Average within-country extreme poverty rate

C. Average within-country top-to-bottom income quintile ratio

D. Average within-country Gini coefficient

Source: World Bank.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies. Aggregates are calculated using five-year averages of within-country income inequality and extreme poverty measures. "World (weighted)" indicates global average weighted by country population. Strongly balanced panel data based on 46 countries, including 17 AEs and 29 EMDEs. Extreme poverty rate is defined as the share of the population living on less than $1.90 a day at 2011 purchasing power parity (PPP).

measures. For instance, the household income surveys are used for LAC and ECA regions, while for other regions consumption surveys are used, which makes the cross-country comparisons more complicated (see also World Bank 2016). In addition to the cross-country comparability caveats, issues may arise on account of changes in the methodology of surveys.

Within-country income inequality data: Databases relying on data imputation. Secondary databases rely on imputations and interpolations to fill the gaps in the original survey-based datasets and achieve a better coverage. The most widely acknowledged databases among these are the Standardized World Income Inequality Database (SWIID), the United Nations University-World Institute for Development Economics Research World Income Inequality Database (WIID), World Inequality Database (WID), Luxembourg Income Study (LIS). At the same time, the

FIGURE A4.1.2 Within-country income inequality and poverty (population-weighted averages), 2000-19

A. Average within-country income share of the bottom 40 percent

B. Average within-country extreme poverty rate

C. Average within-country top-to-bottom income quintile ratio

D. Average within-country Gini coefficient

E. Average within-country income share of the top 1 percent

F. Average within-country income share of the top 10 percent

Sources: World Bank; World Inequality Database.
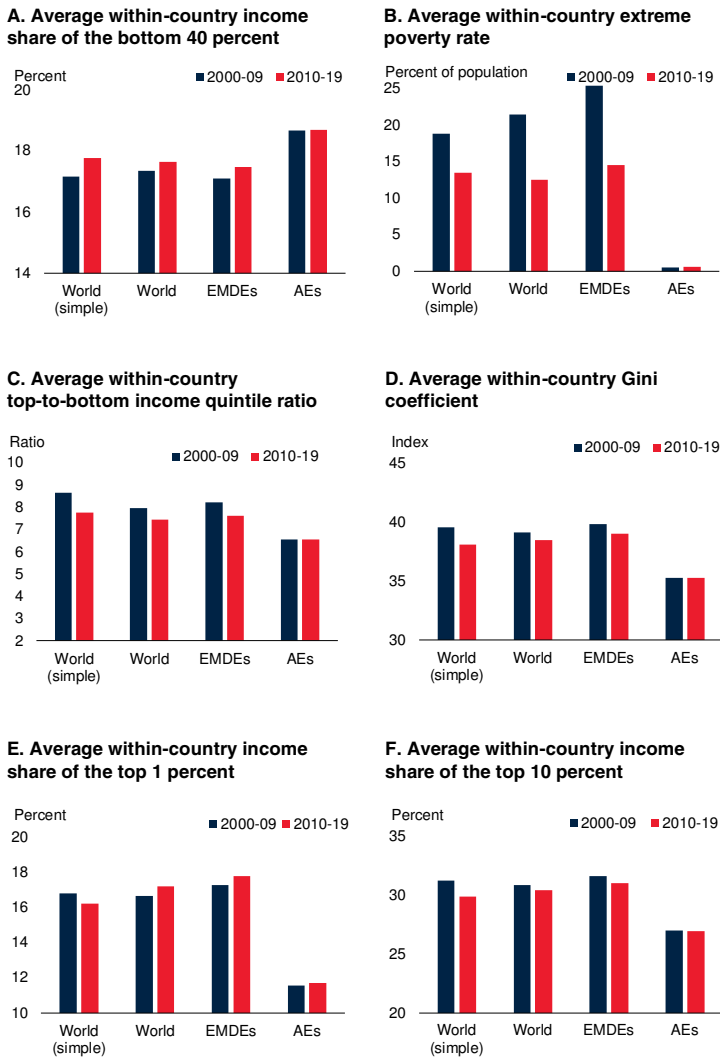*Note*: AEs = advanced economies; EMDEs = emerging market and developing economies.
Aggregates are calculated using ten-year averages of within-country income inequality and extreme poverty measures. "World (simple)" indicates simple average across countries. Extreme poverty rate is defined as the share of the population living on less than $1.90 a day at 2011 purchasing power parity (PPP).
A.-D.F. Strongly balanced panel data based on 136 countries, including 31 AEs and 105 EMDEs.
E. Strongly balanced sample, including 32 AEs and 127 EMDEs.

estimation of the inequality measures in these sources relies on imputation with strong assumption (Jenkins 2015). For some exercises, the chapter uses WID to report the income shares of the top 1 percent of the income distribution given the lack of such data in World Development Indicators. WID estimates the income distribution by combining data from national accounts, survey data, fiscal data, and wealth rankings.

Between-country income inequality and global income inequality data. Between-country inequality measures, in line with the literature and given a lack of frequent household survey data, are based on national accounts data, more specifically, the purchasing power parity (PPP)-adjusted real per capita GDP series reported in WDI. The up-to-date WDI data report 2017 PPPs, and thus the measures based on earlier PPP estimates may differ (for a discussion of the implications of PPP adjustments for inequality and poverty measures see also Deaton 2010). Given the lack of global household survey data, the computation of global interpersonal income inequality is generally not feasible. The chapter therefore reports the estimates available for the post-2000 period from two sources: Darvas (2019) and Lakner and Milanovic (2016), updated in World Bank (2016). As Lakner and Milanovic (2016) use household survey data, the estimates of global interpersonal income inequality are available only for selected years given the gaps in the underlying survey data. Estimates by Darvas (2019), while offering yearly coverage, use the data from SWIID, and thus the resulting global interpersonal income inequality estimates are subject to the shortcomings associated with the inherent imprecision of the estimates when interpolation or imputation are used.

Between-country differences are captured by GDP per capita in Darvas (2019), while Lakner and Milanovic (2016) and World Bank (2016) rely directly on household surveys. Despite these methodological differences, both series, however, point at a declining trend in global interpersonal income inequality. An arithmetic decomposition of global interpersonal inequality into between-country and within-country inequality is not possible with the Gini index.

Measures of income inequality. There are multiple measures of income inequality that are used for making inferences in the literature. These measures may emphasize certain parts of the income distribution and may convey only a partial view of inequality trends. Along with the caveats associated with the data discussed above, this may lead to diverging conclusions on inequality trends in the literature. For instance, only examining the top 1 percent of the income distribution may

suggest a different dynamics in inequality in comparison with the Gini index that uses the entire distribution, or the income share of the poorest 40 percent. To mitigate this caveat, the chapter reports various measures of income inequality, including income quintile ratios, Gini indices, income shares of the bottom 40 percent and the top 1 percent of the income distribution, Theil indices. In addition to inequality and poverty measures based on simple averages, population-weighted averages are reported for robustness (figure A4.1.2).

ANNEX 4.2 Technical details on the simulation exercises

For the purposes of the simulation exercises three data sources were triangulated: the latest household survey for each country, the World Bank's High-Frequency Phone Surveys (HFPS), and national accounts data. For the countries that do not have a household survey in 2019 (surveys are not conducted annually in all countries), the last household survey available was used and income for the year 2019 was computed assuming that households' welfare have grown in line with the growth observed in national accounts.

Then, the HFPS data were used to gauge the change in the income in 2020. As the HFPS data collect only discrete responses to questions (income loss, income gain, no change), model-based probability of a change in income was used taking into account the key relevant characteristics, including education, demographic characteristics, location (urban or rural). The estimated probabilities were then matched with the household surveys for 2019. Suppose, for example, that the survey of a given country indicates that 75 percent of its urban households where the head has less than primary education experienced a decrease in income in 2020, 20 percent experienced no change, and 5 percent experienced an increase in income. In this case from all urban households where the head has less than primary in the latest household survey, 75 percent of them are randomly selected to experience a decrease in incomes, 20 percent to have their incomes kept constant, and 5 percent to have an increase in incomes.

National growth in per capita GDP, g^{nat}, can be attributed to rural and urban areas using the following identity:

$$g_t^{nat} = g_t^{rur} y_{t-1}^{rur} + g_t^{urb} y_{t-1}^{urb}, \qquad (1A)$$

where g_t represents growth in rural and urban areas, y_{t-1} is the share of national income; thus the contribution to national growth from rural areas is $g_t^{c,rur} = g_t^{rur} y_{t-1}^{rur}$ and that from the urban areas is $g_t^{c,urb} = g_t^{urb} y_{t-1}^{urb}$. The resulting growth rates are checked for consistency to match the aggregate GDP per capita growth from national accounts. The growth of rural households that have experienced an increase, decrease, and zero change in income (g_t^{rur+}, g_t^{rur-}, and g_t^{rur0}), and the share of income pertaining to rural households that have experienced an increase, decrease or no change in income as s_{t-1}^{rur+}, s_{t-1}^{rur-}, s_{t-1}^{rur0} and (and similarly for urban), should aggregate such that:

$$g_t^{rur} = g_t^{rur+} s_{t-1}^{rur+} + g_t^{rur-} s_{t-1}^{rur-} + g_t^{rur0} s_{t-1}^{rur0}$$

and

$$g_t^{urb} = g_t^{urb+} s_{t-1}^{urb+} + g_t^{urb-} s_{t-1}^{urb-} + g_t^{urb0} s_{t-1}^{urb0}$$

Equation (1A) can be rewritten as:

$$g_t^{nat} = (g_t^{rur+} s_{t-1}^{rur+} + g_t^{rur-} s_{t-1}^{rur-} + g_t^{rur0} s_{t-1}^{rur0})$$
$$\times y_{t-1}^{rur} + (g_t^{urb+} s_{t-1}^{urb+} + g_t^{urb-} s_{t-1}^{urb-} + g_t^{urb0} s_{t-1}^{urb0}) \quad (1B)$$
$$\times y_{t-1}^{urb}$$

By construction, $g^{rur0} = g^{urb0} = 0$. The sectoral growth rates from national accounts are allocated to rural and urban areas: denoting the contribution to growth from agriculture, industry, and services as $g_t^{c,agr}$, $g_t^{c,ind}$, and $g_t^{c,ser}$, the total growth is given by $g_t^{nat} = g_t^{c,agr} + g_t^{c,ind} + g_t^{c,ser}$. It is assumed that the growth in agricultural incomes pertains to rural households, the growth in industry incomes applies to urban households, and the growth in the services sector is distributed to urban and rural households based on their population shares, that is, the rural contribution to national growth,

$$g_t^{c,rur} = g_t^{c,agr} + \frac{pop_{t-1}^{rur}}{pop_{t-1}^{nat}} g_t^{c,ser} \quad ,$$

and the urban contribution to national growth,

$$g_t^{c,urb} = g_t^{c,ind} + \frac{pop_{t-1}^{urb}}{pop_{t-1}^{nat}} g_t^{c,ser}.$$

Equation (1B) can be split as follows:

$$g_t^{c,rur} = g_t^{c,agr} + \frac{pop_{t-1}^{rur}}{pop_{t-1}^{nat}} g^{c,ser} = \\ (g_t^{rur+} s_{t-1}^{rur+} + g_t^{rur-} s_{t-1}^{rur-}) \times y_{t-1}^{rur} \tag{2R}$$

and

$$g_t^{c,urb} = g_t^{c,ind} + \frac{pop_{t-1}^{urb}}{pop_{t-1}^{nat}} g_t^{c,ser} = \\ (g_t^{urb+} s_{t-1}^{urb+} + g_t^{urb-} s_{t-1}^{urb-}) \times y_{t-1}^{urb} \tag{2U}$$

To identify the growth rate of rural (urban) households experiencing an income decline or increase, the size of the income increases is set to match the growth projections prior to COVID-19 (denoted by "preCOVID" as a subscript). This implies the following:

$$g_t^{rur+} = g_{t,preCOVID}^{c,agr} + \frac{pop_{t-1}^{rur}}{pop_{t-1}^{nat}} g_{t,preCOVID}^{c,ser}$$

and

$$g_t^{urb+} = g_{t,preCOVID}^{c,ind} + \frac{pop_{t-1}^{urb}}{pop_{t-1}^{nat}} g_{t,preCOVID}^{c,ser}$$

From (2R) and (2U) then the terms g_t^{rur-} and g_t^{urb-} can be identified:

$$g_t^{rur-} = [(g_t^{c,agr} + \frac{pop_{t-1}^{rur}}{pop_{t-1}^{nat}} g_t^{c,ser}) / y_{t-1}^{rur} \\ -(g_{t,preCOVID}^{c,agr} + \frac{pop_{t-1}^{rur}}{pop_{t-1}^{nat}} g_{t,preCOVID}^{c,ser}) s_{t-1}^{rur+}] / s_{t-1}^{rur-} \tag{3R}$$

$$g_t^{urb-} = [(g_t^{c,ind} + \frac{pop_{t-1}^{urb}}{pop_{t-1}^{nat}} g_t^{c,ser}) / y_{t-1}^{urb} \\ -(g_{t,preCOVID}^{c,ind} + \frac{pop_{t-1}^{urb}}{pop_{t-1}^{nat}} g_{t,preCOVID}^{c,ser}) s_{t-1}^{urb+}] / s_{t-1}^{urb-} \tag{3U}$$

Using this approach, the distribution of households' income in both 2019 and 2020 can be computed for all countries in the sample. Then, to assess the impact of COVID-19, a counter-factual 2020 estimate is computed using the last pre-pandemic sectoral GDP forecast for 2020, assuming that without COVID-19 all rural households' income would have grown by the growth in agricultural income from these forecasts plus their share of the service sector growth,

$$g_{t,preCOVID}^{c,agr} + \frac{pop_{t-1}^{rur}}{pop_{t-1}^{nat}} g_{t,preCOVID}^{c,ser} \quad \text{(similarly, for}$$

urban households with industrial income). The simulations are based on a sample of 34 EMDEs (table A4.2.1).

TABLE A4.2.1 Sample of countries used in simulations

Income group	ISO3	Country	Region
LMC	LAO	Lao PDR	East Asia and Pacific
LMC	MNG	Mongolia	East Asia and Pacific
LMC	PHL	Philippines	East Asia and Pacific
UMC	ARM	Armenia	Europe and Central Asia
UMC	BGR	Bulgaria	Europe and Central Asia
UMC	GEO	Georgia	Europe and Central Asia
HIC	POL	Poland	Europe and Central Asia
UMC	ROU	Romania	Europe and Central Asia
LMC	TJK	Tajikistan	Europe and Central Asia
UMC	ARG	Argentina	Latin America and the Caribbean
LMC	BOL	Bolivia	Latin America and the Caribbean
HIC	CHL	Chile	Latin America and the Caribbean
UMC	COL	Colombia	Latin America and the Caribbean
UMC	CRI	Costa Rica	Latin America and the Caribbean
UMC	DOM	Dominican Republic	Latin America and the Caribbean
UMC	ECU	Ecuador	Latin America and the Caribbean
UMC	GTM	Guatemala	Latin America and the Caribbean
LMC	HND	Honduras	Latin America and the Caribbean
UMC	MEX	Mexico	Latin America and the Caribbean
UMC	PER	Peru	Latin America and the Caribbean
UMC	PRY	Paraguay	Latin America and the Caribbean
LMC	SLV	El Salvador	Latin America and the Caribbean
LMC	PSE	West Bank and Gaza	Middle East and North Africa
LMC	TUN	Tunisia	Middle East and North Africa
UMC	GAB	Gabon	Sub-Saharan Africa
LMC	GHA	Ghana	Sub-Saharan Africa
LIC	GIN	Guinea	Sub-Saharan Africa
LIC	GMB	Gambia, The	Sub-Saharan Africa
LIC	MOZ	Mozambique	Sub-Saharan Africa
UMC	MUS	Mauritius	Sub-Saharan Africa
LIC	MWI	Malawi	Sub-Saharan Africa
LMC	NGA	Nigeria	Sub-Saharan Africa
LMC	SEN	Senegal	Sub-Saharan Africa
LMC	ZMB	Zambia	Sub-Saharan Africa

ANNEX 4.3 Additional results

TABLE A4.3.1 Impact of COVID-19 on income inequality: Main transmission channels

Change in inequality	Transmission channels associated with recessions and financial crises	Transmission channels associated with epidemics and pandemics
Increase	• **Greater job losses among low-income and less-educated workers, informal workers, youth** (Bitler and Hoynes 2015; Bodea, Houle, and Kim 2021; Domeij and Floden 2010; Hoynes, Miller, and Schaller 2012; Mocan 1999; Shibata 2021); • **Lower bargaining power of low-income workers** (Furceri and Loungani 2018); • **Weaker recovery for low-income jobs** (Acemoglu and Autor 2011; Autor 2010; Brynjolfsson and McAfee 2011; Jaimovich and Siu 2020); • **Certain policy responses to crises, for instance, bailouts, fiscal consolidation** (Ball et al. 2013; Woo et al. 2013).	• **Epidemics can cause recessions** (see transmission channels for recessions); • **Greater job losses among low-skilled workers with person-to-person interactions** (Brussevich, Dabla-Norris, and Khalid 2020; Darvas 2021; Esseau-Thomas, Galarraga, and Khalifa 2020; Furceri et al. 2021a; Jonas 2013; Ma, Rogers, and Zhou 2020); • **Greater long-term damage to health and education of the poor who are at a higher risk of infection, cannot afford health care, resort to detrimental coping strategies** (Aromi et al. 2021; Ashraf 2020; Brzezinski 2021; Carvalho et al. 2020; Esseau-Thomas, Galarraga, and Khalifa 2020; Papageorge et al. 2020).
Decrease	• **Falling asset prices and bankruptcies for the top of the income distribution** (Baldacci, de Mello, and Inchauste 2002; Bodea, Houle, and Kim 2021; Morelli and Atkinson 2015); • **Macroeconomic stimulus and labor market regulations** (Bargain and Callan. 2010; Lustig 2018; Doorley, Callan, and Savage 2021).	• **In large-scale deadly (pre-industrial) epidemics, greater fatalities among the poor leading to real wage increases** (Alfani, forthcoming; Alfani and Tullio 2019; Sayed and Peng 2021).

Change in inequality	Additional COVID-19 specifics and aggravating factors
Increase	• **Strict COVID-19 containment measures have a greater negative impact on low-income workers, whereas telecommuting is more feasible for high-income workers** (Adams-Prassl et al. 2020; Alstadsaeter et al. 2020; Baker et al. 2020a,b; Bartik et al. 2020a,b; Bick, Blandin, and Mertens 2020; Blundell et al. 2020; Crossley, Fisher, and Low 2021; Dalton et al. 2021; Dingel and Neiman 2020; Hatayama, Viollaz, and Winkler 2020; Mongey, Pilossoph, and Weinberg 2021; Shibata 2021; Sostero et al. 2020; von Gaudecker et al. 2020); • **Widening digital divide between high- and low-income households with greater long-run risks of human capital depreciation and intergenerational mobility for low-income households** (Aromi et al. 2021; Ashraf 2020; Carvalho et al. 2020; Papageorge et al. 2020); • **Greater impact on the gender gap relative to past crises** (Adams-Prassl et al. 2020; Alon et al. 2020; Del Boca et al. 2020; Doepke and Tertilt 2016; Sevilla and Smith 2020; WEF 2021; World Bank 2020a).
Decrease	• **Policy response supporting the vulnerable population groups** (Almeida et al. 2021; Baker et al. 2020b; Brewer and Tasseva 2021; Bruckmeier et al. 2021; Chetty et al. 2020; Clark, D'Ambrosio, and Lepinteur 2021; O'Donoghue et al. 2020; Palomino, Rodriguez, and Sebastian 2020; Stantcheva 2021).

Source: World Bank; based on 74 studies.

TABLE A4.3.2 Additional results from the event study

	Global recessions			National recessions			Financial crises			Epidemics		
	All	AEs	EMDEs	All	AEs	EMDEs	All	AEs	EMDEs	All	AEs	EMDEs
Top/bottom income quintile ratio, change from the pre-event to the post-event level, de-meaned												
Decrease	36.8	28.8	40.9	37.3	22.2	50.0	32.8	27.3	36.1	33.3	38.5	29.0
Insignificant	24.7	39.0	17.4	23.7	37.0	12.5	24.1	36.4	16.7	24.6	34.6	16.1
Increase	38.5	32.2	41.7	39.0	40.7	37.5	43.1	36.4	47.2	42.1	26.9	54.8
Gini coefficient, change from the pre-event to the post-event level, de-meaned												
Decrease	37.9	33.9	40.0	39.0	37.0	40.6	34.5	36.4	33.3	41.5	39.7	42.6
Insignificant	24.7	30.5	21.7	23.7	22.2	25.0	24.1	27.3	22.2	24.5	31.0	20.8
Increase	37.4	35.6	38.3	37.3	40.7	34.4	41.4	36.4	44.4	34.0	29.3	36.6
Income share of the bottom 40 percent, change from the pre-event to the post-event level, de-meaned												
Decrease	37.4	37.3	37.4	35.6	44.4	28.1	43.1	36.4	47.2	38.6	26.9	48.4
Insignificant	24.7	28.8	22.6	23.7	18.5	28.1	24.1	31.8	19.4	24.6	30.8	19.4
Increase	37.9	33.9	40.0	40.7	37.0	43.8	32.8	31.8	33.3	36.8	42.3	32.3
Top/bottom income quintile ratio, change from the pre-event to the post-event level, not de-meaned												
Decrease	43.7	27.1	52.2	40.7	25.9	53.1	36.2	18.2	47.2	40.4	26.9	51.6
Insignificant	24.7	39.0	17.4	23.7	33.3	15.6	24.1	36.4	16.7	24.6	34.6	16.1
Increase	31.6	33.9	30.4	35.6	40.7	31.3	39.7	45.5	36.1	35.1	38.5	32.3

Source: World Bank.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies. The table reports additional event studies with alternative measures of income inequality in addition to the top-to-bottom income quintile ratio (the Gini coefficient, the income share of the poorest 40 percent), results without de-meaning. The table indicates the share of countries in each group (All, AEs, EMDEs) with an increase or a decrease in the given inequality measure after the event relative to the pre-event period (the last available household survey before an event and the first household survey after the event). Changes with the absolute value in the lowest quartile are assumed to be insignificant. Includes data for 32 advanced economies and 87 EMDEs for 1970-2019. Global recessions as defined in Kose, Sugawara, and Terrones (2020) and include 1975, 1982, 1991, 2009. National recessions as defined in World Bank (2021a). The data on financial crises are from the Systemic Banking Crises Database II, Laeven and Valencia (2020). The data include the following epidemics: SARS (2003), MERS (2012), Ebola (2014), Zika (2016). The list of countries affected by outbreaks is from Furceri et al. (2021a). Income inequality measures are from the World Bank's World Development Indicators (WDI) and World Inequality Database.

TABLE A4.3.3 Estimated probability of income losses

Categories	Contribution to probability
Female	0.048***
Has school child	0.043***
Urbanization	0.009
Secondary education	0.013
Tertiary education	-0.042**
Mining and manufacturing	0.135***
Commerce	0.132***
Other services	0.075***
Informal workers	0.193***
Seasonal and temporary workers	0.119***
Other workers	0.112***

Source: Narayan et al. (forthcoming).
Note: Estimates based on the logit regression of the incidence of households reporting income losses on variables measuring household characteristics and country dummy variables. Agriculture is the baseline sector; wage-employed, male workers, and workers without secondary and tertiary education are the baseline demographic categories in the regression. Informal workers are defined as self-employed workers, in line with Ohnsorge and Yu (2021). ** indicates statistical significance at the 1 percent level, ** indicates significance at the 5 percent level, * indicates significance at the 10 percent level.

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