GROUP OF TWENTY

G-20 Background Note on the Impact of Growth on Inequality and Social Outcomes

2024

Prepared by Staff of the

INTERNATIONAL MONETARY FUND*

*Does not necessarily reflect the views of the IMF Executive Board

July 2024

CONTENTS

EXECUTIVE SUMMARY

In recent years, the global economy has shown signs of resilience. But growth remains slow and medium-term growth prospects have steadily weakened since the Global Financial Crisis, undermining hard-won gains in poverty reduction and social conditions. Moreover, economic growth has become uneven, causing the long-term decline in between-country inequality to stall. At the same time, progress in reducing within-country inequality has been mixed, notably among emerging market and developing countries.

The relationship between economic development and inequality within countries is complex. In the absence of policy intervention, structural transformations—such as technological change and globalization—can entail tradeoffs, particularly in the early stages of economic development. However, domestic policy settings—often reflecting social norms or institutional quality—can also shape growth-inequality dynamics.

This note finds evidence that enhancing redistribution through social spending, transfers, or taxes, is related to lower levels of inequality. Moreover, with strong redistributive policies, a growing G20 economy may experience declines in inequality between 1.5 and 5 times larger than a country with a weaker redistributive capacity. Social spending programs that target the poorest and most vulnerable, public investment in education, and progressive direct taxes are highlighted as some of the most powerful redistributive tools.

Labor market institutions that inhibit the formation of dual labor markets are also associated with a softening of growth inequality trade-offs at early stages of development. Meanwhile, ensuring workers' rights in G20 emerging markets can eliminate the growth-inequality tradeoff by as much as two-decades earlier. Increases in the minimum wage can reduce inequality in advanced economies, but in emerging economies their effectiveness depends on the interaction with other social programs—notably, public investment in education. Financing such targeted expenditures through domestic revenue mobilization, rather than debt, could help deliver more fiscally sustainable reductions in inequality.

Long episodes of growth stagnation tend to be followed by large and persistent increases in income inequality, peaking at about 17 percent after 3 years, whereas recessions are associated with more modest increases. In both cases, the poor tend to be hit the hardest. However, countries either entering stagnation episodes with stronger policy settings or responding to downturns with adequate stabilization policies can mute the resultant increases in inequality. Regulations inhibiting dual labor markets, sufficient fiscal space, strong redistributive capacity, or high public investment shares in education and the social safety net can reduce the inequality cost of stagnations by 10 to 20 percentage points.

While reforms can improve growth and inequality outcomes and mitigate tradeoffs, recommendations should consider each country's context. Furthermore, multilateral cooperation is necessary to ensure that the benefits from globalization and technological change are shared by all.

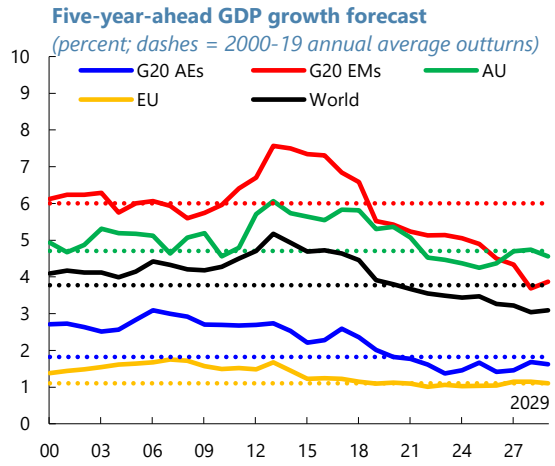
Prepared under the overall guidance of Aqib Aslam and the supervision of Neil Meads by a team led by Carolina Osorio-Buitron comprising Nicolas Fernandez-Arias, Paula Beltran Saavedra, Duncan MacDonald, Rafael Machado-Parente, Mel Zhang, Da Huu Hoang, and Xiaomeng Mei. Ilse Peirtsegaele and Camara Kidd provided administrative support. Prepared based on information available as of July 16, 2024. The report does not necessarily reflect the views of G20 members. Past G20 background notes are available on IMF.org.

GLOBAL GROWTH PROSPECTS AND INEQUALITY TRENDS[1]

The global economy has weathered successive shocks in recent years, but global growth has been uneven and medium-term prospects are subdued. Meanwhile, income inequality within countries has increased for G20 advanced economies in recent decades, while developments in G20 emerging market economies and African Union members are more mixed, and their level of income inequality remains considerably higher than for G20 advanced economies. The weak and uneven outlook has implications for continued global poverty reduction and progress against global income inequality.

1. Despite recent resilience, global growth has been uneven in recent years. Global activity has grown steadily, defying warnings of stagflation and global recession. However, growth outcomes have varied across the G20: some G20 advanced economies (*Italy*, *United States*) and some large G20 emerging market economies (*Brazil*, *India*, *Mexico*, *Russia*, and *Türkiye*) grew faster than expected during the global disinflation of 2022–23, while others such as *Japan*, *Korea*, *Argentina*, *Saudi Arabia*, and *South Africa* and the rest of the African Union underperformed.

Figure 1. Growth Prospects



Sources: IMF, *World Economic Outlook*; and IMF staff calculations.
Notes: G20 AEs=G20 advanced economies; AU=African Union excluding South Africa; G20 EMs=G20 emerging market economies; EU=European Union excluding France, Germany, and Italy.

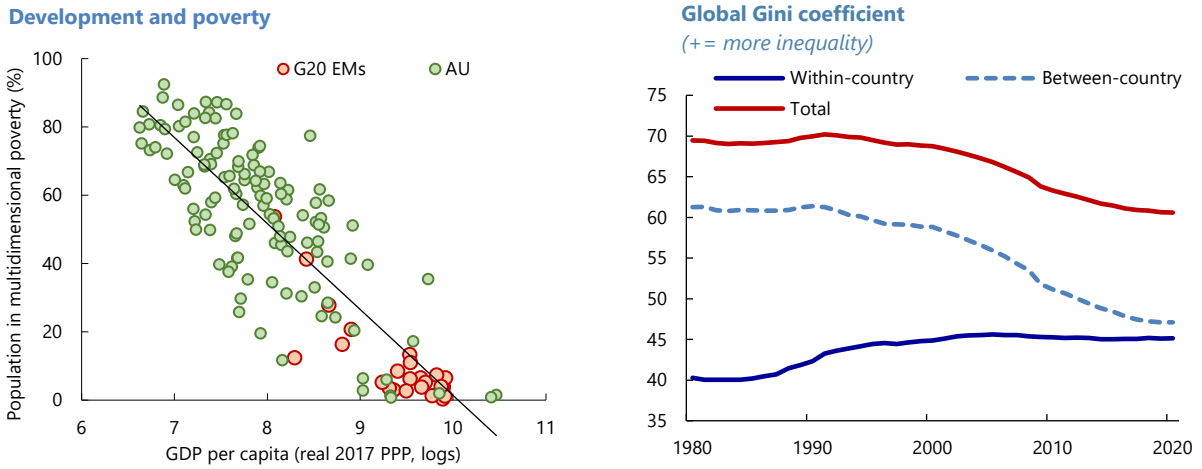
2. Medium-term prospects have been consistently revised down since the global financial crisis due to several secular forces. April 2024 WEO projections for global growth in 2024 and 2025 remain muted at just 3.2 percent. Meanwhile, projections for global growth five-years ahead stand at just 3.1 percent, well below historical average outturns of 3.8 percent for 2000–19. Declining medium-term growth prospects have been broad based across G20 economies and the African Union (Figure 1), including in per-capita terms (IMF 2024a, 2024c). But as with actual outcomes, revisions have been more pronounced for some G20 economies than other: five-year ahead growth projections for *China*, *Germany, Italy, Japan,*

[1] In this note, "G20 economies" is used to refer to the 19 individual member countries (*Argentina*, *Australia*, *Brazil*, *Canada*, *China*, *France*, *Germany*, *India*, *Indonesia*, *Italy*, *Japan*, *Korea*, *Mexico*, *Russia*, *Saudi Arabia*, *South Africa*, *Türkiye*, *United Kingdom*, and *United States*). G20 advanced economies comprise *Australia*, *Canada*, *France*, *Germany*, *Italy*, *Japan*, *Korea*, *United Kingdom*, and *United States*, and the G20 emerging market economies are *Argentina*, *Brazil*, *China*, *India*, *Indonesia*, *Mexico*, *Russia*, *Saudi Arabia*, *South Africa*, and *Türkiye*. While the European Union and African Union are members of the G20, they are referenced explicitly when included in figures and aggregates. The information used in this note is as of July 16, 2024, and IMF, *World Economic Outlook* figures correspond to the July 2024 release.

Korea, Mexico, *Russia*, and *South Africa* have more than halved since 2000. The downturn is even more pronounced in growth per working age person for G20 emerging market economies (IMF 2024c).

3. The weak outlook can stall poverty reduction and undermine improvement in broader social conditions. The Sustainable Development Goals call for the eradication of extreme poverty—income below 2.15 US dollars per day in constant 2017 international dollars at purchasing power parity—and seek to halve the population living below individual countries' poverty lines by 2030. Since 1980 close to 800 million people have been lifted out of extreme poverty, driven largely by reforms in China. But progress has stalled in recent years and even reversed during the COVID-19 pandemic, with around 700 million people—the majority living in the Sub-Saharan Africa region of the African Union—now falling below the international poverty line, slightly above pre-pandemic levels. Given that poverty generally declines when economies grow, either because incomes at the bottom of the distribution increase or because more people meet basic needs (Figure 2, LHS), the subdued growth outlook risks undermining efforts to reduce global poverty. Consequently, policies that support economic growth would also help poverty reduction (Annex IV).

Figure 2. Poverty and Global Inequality



Sources: Oxford Poverty and Human Development Initiative (2023); World Income Inequality Database; IMF, *World Economic Outlook*, and IMF staff calculations.
Notes: The multidimensional poverty index (MPi) measures the percentage of households in a country deprived of a third or more of ten indicators of basic needs, which are grouped along three broad categories—health, education, and living standards.

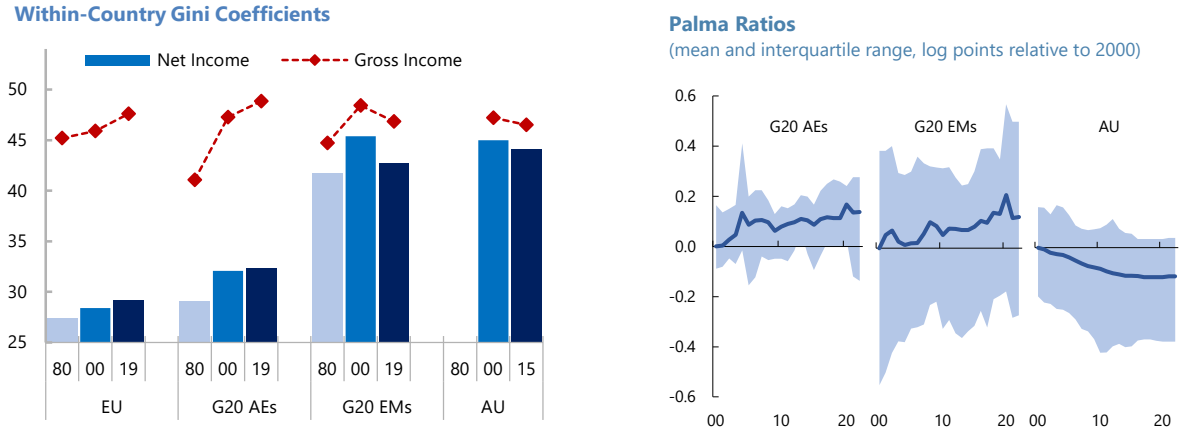
4. Moreover, uneven growth between countries may disrupt decades of progress against global income inequality. [2] Global inequality can be decomposed into a *between-country* component—which captures the variation in average incomes across countries—and a *within-country* component—which measures income dispersion between individuals and households within a country. Since the mid-1990s global inequality as measured by the Gini coefficient has continuously declined, on the back of improvements in between-country inequality, primarily reflecting rising

[2] Inequality can be measured in many ways. For example, in relation to outcomes (such as incomes and wealth), and access to opportunities (i.e., health, education, access to basic services). In this note we will focus on income inequality, using Gini coefficients and ratios of income shares, which are among the most widely cited measure.

average incomes in emerging market and developing economies, (Figure 2, RHS).[3] Relatively weaker growth prospects for emerging market and developing economies imply a slower pace of convergence toward higher income levels in advanced economies, thus inhibiting further reductions in global inequality.[4] Meanwhile, average within-country inequality increased over the same period and stabilized after the global financial crisis.

5. But within-country inequality trends have varied across countries. Over the last four decades, gross income inequality—based on Gini coefficients—within the average G20 advanced economy has increased steadily, while for the average economy in G20 emerging markets and the African Union it declined slightly in the two decades since 2000[5] (Figure 3, LHS). These broad trends remain evident even after taxes and benefits, but the absolute level of inequality in advanced economies is considerably lower, indicating overall greater redistribution than in emerging market and developing economies. An alternative measure of inequality, the Palma ratio, which has better coverage, including in the post-pandemic period, shows similar trends but it also highlights the heterogeneity within G20 emerging markets and the African Union country groups (Figure 3, RHS).[6]

Figure 3. Within-Country Income Inequality Developments



Sources: Solt (2022); Standardized World Income Inequality Database (SWIIID); World Inequality Database (WID); and IMF staff calculations. Notes: G20 AEs=G20 advanced economies, AU=African Union excluding South Africa, G20 EMs=G20 emerging market economies, EU = European Union excluding France, Germany, and Italy. LHS: G20 AEs excludes Japan due to data availability. AU contains a constant sample of 31 countries in the African Union excluding South Africa, with 2015 as the terminal year due to data limitations. G20 EMs excludes Russia, South Africa, Türkiye, and Saudi Arabia due to data availability.
RHS: Constant sample of all 9 G20 AEs, 10 G20 EMs, and 47 countries in the AU excluding South Africa. The Palma ratio measures the ratio of the income of the top 10 percent of the income distribution to the income of the bottom 40 percent. Hence, a higher value indicates increased inequality. The shaded area corresponds to the interquartile range for each country group and year.

[3] The Gini coefficient is an index for inequality where a value of 100 indicates that all national income is earned by one individual and a value of 0 indicates that all individuals earn the same income. Other measures of global income inequality—adjusting for top incomes—have been more stable, and there is some evidence (Lakner and Milanovic (2013)) that income gains have not been evenly shared across the global income distribution.

[4]The pace of convergence is slowing and potentially reversing over the medium-term—in contrast to pre-pandemic historical trends, IMF 2024a.

[5] The latest data point for ensuring a balanced country sample for Africa Union members is 2015.

[6] Subsequent analysis in the note uses the Palma ratio as the key measure for inequality. Beyond coverage limitations, the Gini coefficient has been criticized for the underreporting of top incomes (Atkinson, 2007, Leigh, 2007) as well as its low sensitivity to changes at the top and bottom of the income distribution (Alvaredo, 2011).

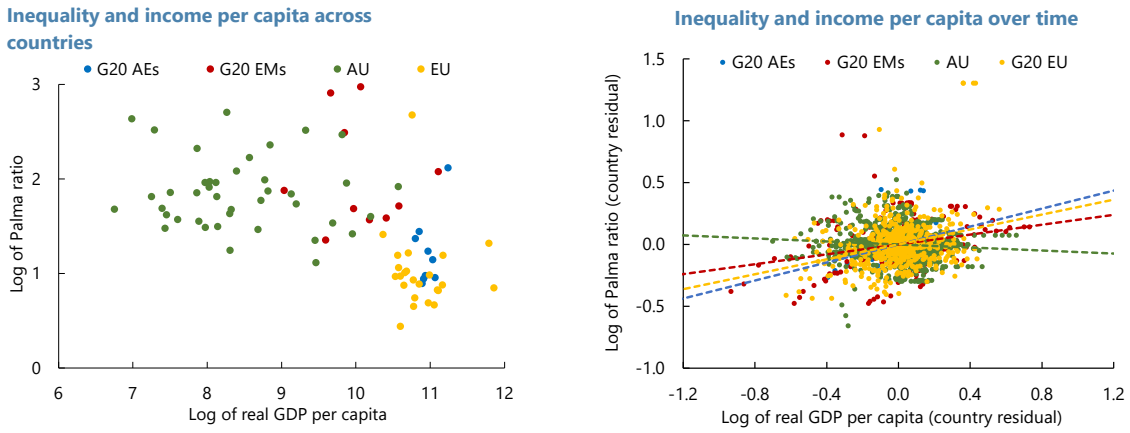
THE NEXUS BETWEEN GROWTH AND INEQUALITY WITHIN COUNTRIES

The relationship between development and inequality is complex and difficult to disentangle. While economic development can drive inequality and vice-versa, certain policies and trends—including globalization and technological change—have impacted both. This section builds on the "Kuznets framework" under which economic development is associated with periods of increasing and decreasing inequality given a set of policies. However, changes in policies and institutional arrangements can alter the tradeoff between growth and inequality.

A. Understanding the Relationship Between Growth and Inequality

6. The empirical relationship between economic development and inequality is not clear cut. Although advanced economies, on average, have a lower level of inequality than emerging market and developing economies (Figure 4, LHS), any relationship between development—captured by output per capita—and inequality measured by the Palma ratio— the income share of the richest 10 percent of the population relative to the income share of the poorest 40 percent—is less clear over time, when the data is corrected for differences in average incomes between countries (Figure 4, RHS). For African Union members, a 10 percent increase in output per capita is associated with a 0.8 percent lower Palma ratio. For G20 advanced and emerging market economies, the relationship is instead positive—for example, for advanced economies, a 10 percent increase in output per capita is associated with a Palma Ratio that is about 3.5 percent higher. These findings are broadly consistent with a larger literature documenting a lack of any systematic correlation between growth and inequality changes (see Bruno and others 1998; Ravallion 2007; Ferreira and Ravallion 2009, Ferreira 2016). In turn, this lack of a clear empirical relationship reflects the fact that growth and inequality can be driven by several distinct factors and, moreover, affect each other directly.

Figure 4. Incomes and Inequality



Sources: World Inequality Database; IMF, *World Economic Outlook*; and IMF staff calculations.
Notes: A higher value for the Palma ratio indicates higher inequality. Left panel considers 2022. Right panel considers years 2000-2022 with each observation equal to the country residual after subtracting the country-specific mean.

7. There are several channels through which output and inequality could directly affect one another. Theory and empirics suggest that higher growth and lower inequality tend to reinforce each other.

- *From output and growth to inequality*. If economic growth increases wages in the formal sector, it can boost the formal labor supply and reduce inequality, notably in countries with large informal sectors. Positive output shocks—even if the gains are not equally distributed—can also alleviate individual constraints to finance education and reduce inequality in the future. Growth in output per capita could affect redistribution—for example, through broadening the tax base, increasing the progressivity of taxation, and improving revenue administration—and increase the provision of public goods such as education, healthcare, and social protection (Galor 2011; Halter and others 2014; Quadrini and others 2015; Chu and others 2023). Finally, higher growth can reduce wealth inequality by tipping the scales away from owners of capital (Piketty, 2014).
- *From inequality to output and growth.* Differential returns can provide incentives to invest in skills or capital that can promote growth. But, at the same time, inequality of wealth and income, particularly in the face of credit constraints and incomplete markets, can impair health and educational attainment and, therefore, growth (Galor and Moav 2004; Aghion, Caroli, and Garcia-Penalosa 1999; Quadrini and others 2015; Brueckner and others 2018). Political responses to inequality can also result in distortions to tax policies and institutions which could impact growth.[7] At the extreme, inequality can also drive social unrest and political instability (Saadi Sedik and Xu 2020) with potentially more sever output costs.

8. Other factors can jointly affect a country's inequality and output over time, moving them in the same or opposite direction. For example, market failures such as those leading to rent extraction can increase inequality and hurt growth. On the other hand, structural transformations can entail both positive and negative correlations between growth and inequality. Such processes include industrialization and urbanization (Kuznets 1955; Williamson 1985; and Lindert 1986)[8], as well as other waves of technological change, and globalization.

- *Technological progress*. When a new technology emerges through the process of creative destruction, new industries and firms emerge and incumbents wane or adjust. As returns to capital—or to complementary labor—increase at the expense of substitutable labor, tradeoffs between growth and inequality emerge (Acemoglu and Autor 2011; Acemoglu and Restrepo 2022; Cazzaniga and others 2024). However, inequality can decline once new technologies have been broadly adopted by firms and workers. At the same time, structural transformations tend to increase the demand for skills and, by raising the skill premia, raise inequality. Over time however, inequality may fall again, as learning-by-doing and knowledge spillovers create broad-based productivity gains that compress skill premia (Aghion and others, 1999).

[7] Alesina and Rodrick (1994) outline how pressure for redistribution could lead to higher than optimal tax rates which depress investment and growth. Meanwhile Glaeser, Scheinkman, and Shleifer (2003) outline how elites can subvert institutions to protect established interests at the expense of innovation and growth.

[8] More recently, Rodrik, (2016) argues that with (premature) deindustrialization, workers can struggle to find higher-paying jobs in a growing services sector; and Ravallion and Chen (2022) test the Kuznets hypothesis for *China*.

- *Globalization*. For advanced economies, globalization allows access to lower-wage workforces, which can alter firm production choices when faced with slow or costly local labor market adjustments (Autor, Dorn, and Hansen 2016), putting upward pressure on within-country inequality.[9] At the same time, access to cheaper imports raises consumption by lower-income households, reducing within-country inequality. Among emerging market and developing economies, within-country inequality may also decline with globalization, as positive growth could benefit larger shares of the population and lift overall social conditions. However, while trade and financial liberalization might be associated with higher growth, they can also have adverse distributional consequences (Cerra and others 2021, Chapter 8). For instance, inward FDI tends to flow into higher skilled sectors in recipient countries, increasing the relative demand for higher skilled workers. Meanwhile outward FDI flows from advanced economies could be associated with fewer employment opportunities in relatively lower-skilled domestic sectors. Similarly, in the absence of labor mobility, trade liberalization can slow poverty reduction in regions with higher exposure to tariff cuts, as shown by Topalova (2007) for *India*. [10]

B. Decomposing the Kuznets Process: A Primer

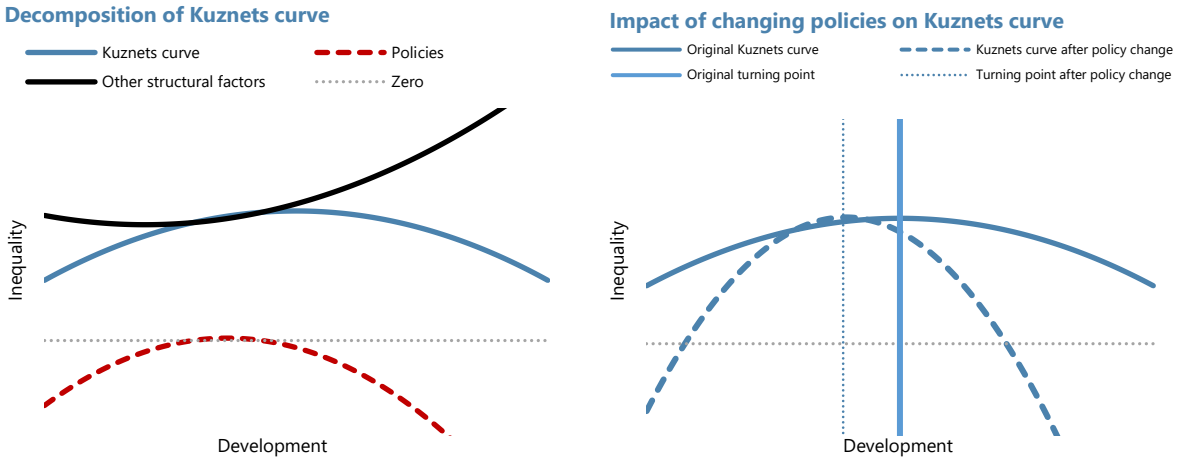
9. The Kuznets framework allows for the possibility of tradeoffs between growth and inequality over time. Kuznets (1955) hypothesized that, in the absence of policy intervention, a transition from an agricultural to an industrial economy can create a tradeoff between development and inequality. He posited the existence of an inverted U-shaped long-run relationship between income inequality and GNP per capita across countries—the "Kuznets curve". The underlying "Kuznets process" is characterized by increasing income inequality at early stages of development because only a small segment of the population benefits from the economic growth caused by the types of structural transformations described above. But as the economy matures, a turning point is reached, after which there is no tradeoff, as inequality declines, because economic gains and opportunities are shared among an increasing share of the population.

10. The shape of the Kuznets curve is indicative of the size and duration of the growth-inequality tradeoff. A concave curve—the standard Kuznets curve (Figure 5)—implies a tradeoff at early stages of development (a positive slope) and, beyond a turning point, no tradeoff at later stages of development (a negative slope). In contrast, a convex curve implies no tradeoff at early stages of development (a negative slope) and a tradeoff at later stages of development (a positive slope). Where slopes are positive and steeper, the inequality costs from economic growth are more severe and, therefore, a shallower slope softens the tradeoff and would be preferable. In practice, factors affecting both output per capita and inequality, including structural transformations, help determine the shape of the Kuznets process, turning points, and a country's position along the curve.

[9] For more on the increased role of G20 emerging market economies in the global economy, see IMF 2024b.

[10] In recent years, some of the potential adjustment costs to globalization have led to a questioning of the potential for unequal benefits from globalization and contributed to signs of geoeconomic fragmentation, see IMF 2024c.

Figure 5. A Stylized Decomposition and Shift in the Kuznets Curve



Source: IMF staff calculations.

Notes: The LHS chart shows a stylized decomposition of the Kuznets curve (blue) into the contribution of policies (dashed red) and other structural factors (black). Policy is related to lower inequality levels at low and high stages of development—insulating countries from the adverse inequality effects of a structural process, such as globalization, affecting countries at the extremes of the development spectrum. This stylized example is consistent with the empirical analysis illustrated in Figure 6. The RHS chart shows the implications of changing policy settings relative to the initial curve (LHS chart), through a reform that brings the turning point earlier in the development path. The vertical line indicate the turning points before (solid blue) and after (dotted blue) the reform. The implication for an individual country is that its Kuznets curve will incorporate features of the process before and after the reform

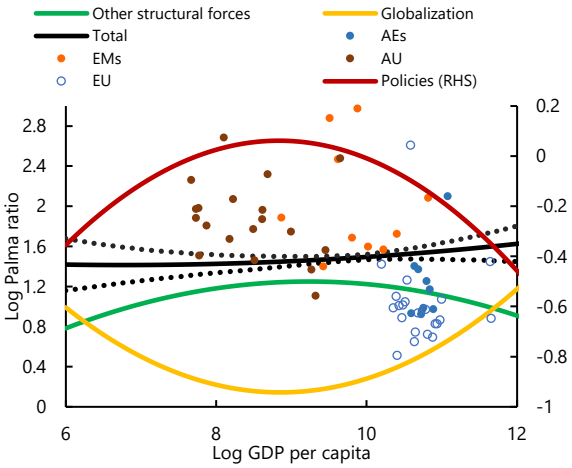
11. Policies and institutions can modify the shape of the traditional Kuznets curve. Although all countries have been exposed to structural transformations over time, including globalization and technological progress, differences in their Kuznets processes likely also reflect current domestic policy settings. In this way, the Kuznets framework can be expanded to decompose the process into contributions from both policies and other structural factors (Figure 5, LHS) [11]. For example, policies that are associated with lower levels of inequality at earlier and later stages of development contribute to a concave relationship between growth and inequality and can be said to "reinforce" the Kuznets process. In contrast, policies that are related to flatter or convex shapes "invert" the Kuznets process, as they are accompanied by softer growth-inequality tradeoffs—or the tradeoff is eliminated altogether—at earlier stages of development. It follows that policy *changes* can transform a country's Kuznets process by shifting the curve up or down—increasing or decreasing inequality for a given level of output, respectively—or by changing its shape—the curvature and/or the level of development at which the turning point is reached. For example, a reform that brings the turning point earlier along a country's development path and increases the concavity of the Kuznets curve can be associated with reductions in inequality (Figure 5, RHS). Therefore, understanding the role of policies and institutional arrangements is essential to assess within-country inequality dynamics and the potential implications of changing policy settings, with a view to mitigating costly trade-offs between economic development and inequality.

[11] By allowing policy variables to affect the shape of the growth-inequality relation, the empirical approach is agnostic about whether all countries follow the traditional inverted-U curve.

C. The Role of Policies and Institutions in the Long-Run

12. Empirical analysis is used to shed light on potential factors contributing to the Kuznets process (Annex V). [12] Only those policies that are found to have a statistically significant contribution—given data coverage—are discussed, for example, certain fiscal policies and labor market regulations. Because these policies may be responding to economic conditions or correlated with other omitted factors, the findings should not be interpreted as causal evidence of their impact on inequality or growth. For this reason, country specific case-studies from the literature are used to complement the findings of this note.

Figure 6. Decomposition of the Kuznets Process for G20 Economies Under Current Policies



Sources: World Inequality Database (WID); CBR Labour Regulation Index; Fraser Institute Economic Freedom of the World; University of Gothenburg Quality of Government Dataset; IMF, *World Economic Outlook*, and IMF staff estimates.

Notes: The black line shows the evolution of inequality along the development trajectory for a hypothetical economy with policies set to the previous year's cross-county medians and is equal to the sum of the colored lines. The red line represents the contributions from setting labor market institutions (LMIs) and transfers to their median values. The yellow line represents the contribution from the median globalization value. The green line represents the evolution of the median economy with policy and control variables equal to 0 and includes the contribution from the median country and last year fixed effects in the estimation. Dots represent individual countries' current predicted position based on their latest observed LMI, transfers, and globalization values—deviations from the black line are driven by differences in policy and control variables relative to the hypothetical median economy. See Annex V.

13. Countries find themselves at different positions relative to the Kuznets curve implied by current median policy settings. The current median degree of exposure to globalization—measured using trade and financial openness—tends to exert the strongest influence on the Kuznets process, inverting it and reducing growth-inequality tradeoffs for countries in their earliest stages of development (Figure 6) [13]. Meanwhile, current median policy settings, such as labor market institutions and social transfers, contribute to a standard inverted U-shaped curve, implying a tradeoff between growth and inequality at early stages of development. Other forces that can influence a country's development—and are not accounted for by policy settings and globalization—also seem to reinforce the standard concave relationship between growth and inequality. Among these, skilled-biased technological change (SBTC) has been shown to drive development and inequality in advanced countries, but the evidence is mixed for emerging and developing economies (Acemoglu 1998; Berman and others 2000), also because of lags in technology adoption. Although data limitations at

[12] Although information across G20 countries, EU and AU members is used, the emphasis is on the experience of the median country over time—the so-called *within variation* is exploited to establish empirical results.

[13] See IMF (2024c) for a discussion of the benefits of globalization and Atkin and Donaldson (2022) for a survey of the literature on the benefits of trade for economic development.

the country-level preclude the inclusion of SBTC in the analysis[14], the positive correlation between SBTC and globalization that has been established conceptually (Aghion 1999; Acemoglu 2003) and empirically (for example for *Argentina* and *South Africa*)[15] in the literature is leveraged to provide a plausible interpretation of the results. Relative to the median Kuznets process, African Union members tend to find themselves at a point where the combination of policies and exposure to globalization suggest that economic development comes with limited increases in inequality.[16] On the other hand, for advanced economies, exposure to globalization might drive up within-country inequality, consistent with evidence for the *United States,* for example (Autor and others 2016)[17]. This result is consistent with the Stolper-Samuelson (1941) and the predictions by Costinot and Vogel (2010).

Fiscal Policies

14. Fiscal policies can determine the pattern of incentives to save and work and, therefore, the overall redistributive stance of an economy which can help improve inequality and growth outcomes. The combination of domestic fiscal policies—social spending, taxes, and transfers—already generate a certain level of redistribution within each economy, with implications for the shape of a country's Kuznets curve. Of these policies, social spending programs that target the poorest and most vulnerable—for example, social assistance, school feeding, unemployment insurance, or pensions—are among the most effective tools to address inequality, even if growth falters (Dell'Anno 2018; Amarante and Arim 2022; Chong and Gradstein 2007). Other social spending—notably investment in education—can be particularly important in the face of structural transformations and institutional shifts that raise the skills premium, as it enables a larger segment of the population to get a larger share of the benefits.

15. Certain fiscal policies can also help reduce disparities in net (post-tax) incomes. For example, well-targeted transfers support vulnerable groups while keeping fiscal costs manageable. Targeted conditional cash transfer programs—such as *Brazil*'s Bolsa Familia and *Mexico*'s Prospera—have been found to have a positive impact on formal employment (Bianchi and Boba 2013; Frutero, Leichensring, and Paiva 2020). On the revenue side, direct taxation is the most powerful redistributive tool if its design entails a progressive marginal tax rate schedule (Annex 2). In advanced economies redistributive capacity is stronger where top marginal income tax rates are higher, or where (in-work) tax credits for low-income households are introduced, and loopholes in the taxation of capital income and wealth are limited. In emerging market and developing economies, the potential of direct taxation

[14] "Skill-bias" is inherently hard to measure (Goldberg and Pavnick 2007). Nevertheless, available indicators of policies that could contribute to SBTC (or reflected its outcomes) were tested, but the results were not significant or had low statistical power. See Annex V for more details.

[15] Bustos (2011) finds evidence that the MERCOSUR trade agreement led to technological upgrading and wider skill-based wage gaps within exporting firms in *Argentina*. Rattsø and others (2013) expand the standard open economy Ramsey model to include technology adoption and skill bias and calibrate parameters for *South Africa*. The results imply that trade effects via technology adoption and skill bias influence wage inequality in middle-income countries.

[16] This finding is consistent with the negligible effects that capital account liberalization laws had in *Egypt*, once macroeconomic and political instability is accounted for (Rezk and others 2022).

[17] The authors find that in the *United States*, employment has fallen in industries more exposed to import competition, while in others, gains from globalization are slow to materialize.

is better tapped with wider tax bases, which depends on strong compliance and revenue administration.

16. Current fiscal policies imply a redistributive capacity that tends to reinforce the Kuznets process and is correlated with lower levels of inequality (Figure 7, panel A, LHS). In addition, there is evidence that changes in fiscal policies that increase the overall redistributive capacity of the median G20 economy are associated with lower gross income inequality in countries at high and low stages of development (Figure 7, panel A, RHS)—enhancing redistributive capacity from a weak to a strong setting, a 1 percent increase in GDP per capita is associated with a decline in inequality that is 50 percent larger in the median G20 emerging market economy and 5 times larger in the median G20 advanced economy. This finding may reflect the fact that some policies may be responding to growth and inequality developments, others are not accounted for in the model, or measures of the features of the tax and transfer system are of low quality. Moreover, some policies, such as progressive direct taxation, can both reduce inequality and harm growth (De Mooij and others 2021).

- Current social spending policies appear to reinforce the Kuznets process only marginally (Figure 7, panel B, LHS). However, if policy makers increase social spending and transfers, lower income countries also experience declines in inequality—which can be as large as 20 percent in one-fifth of the African Union— even with constant output. Meanwhile, at higher levels of development, inequality pressures tend to soften under strong policy settings—the median G20 emerging market economy grows, increases in inequality could be moderated by up to 30 percent (Figure 7, panel B, RHS).

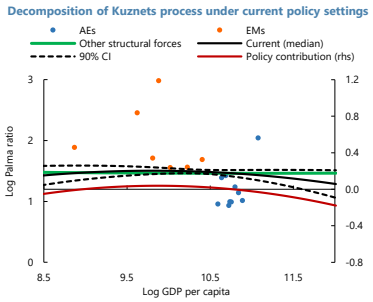
- Overall spending on education can be important for tackling inequality at low levels of development. In poorer countries, current education spending—including the financing of education-related government bodies—tends to invert the Kuznets process, delivering important equity gains as economies grow (Figure 7, panel C, LHS). While even greater spending on education can be related to softer tradeoffs at earlier stages of development, countries may not experience declines in overall inequality (Figure 7, panel C, RHS). Furthermore, the relation of such broad investments with the Kuznets process for large emerging market and developed economies is less clear cut, suggesting the need for more targeted spending.

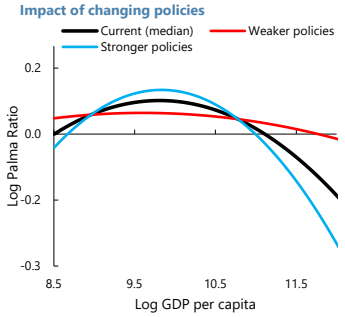
- Current levels of *targeted spending* on secondary education across G20 economies tend to reinforce the Kuznets process (Figure 7, panel D, RHS). However, additional investment in secondary education can help a country move past a long-lasting growth-inequality tradeoff and into an otherwise unattainable virtuous phase of positive growth and decreasing inequality—albeit over the long term (50 years out) given the weak economic outlook (Figure 7, panel D, RHS). This is in line with empirical evidence for *Mexico* (Atkin 2016).[18]

[18] The author shows that trade integration reduces school attendance and highlights the importance of education policies to offset the adverse effects of globalization on inequality and long-term growth.

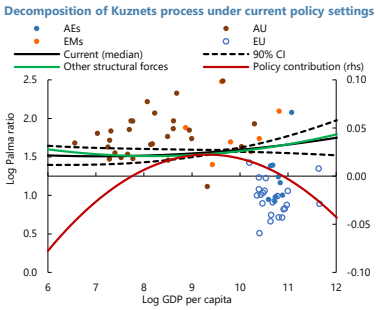
Figure 7. Fiscal Policy

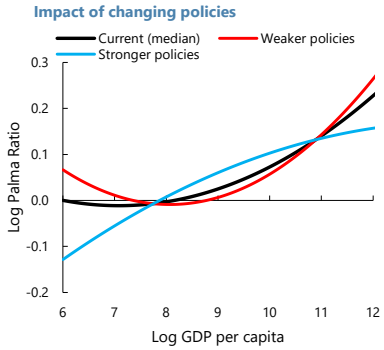
A. G20 Advanced and Emerging Market Economies: Capacity to Redistribute



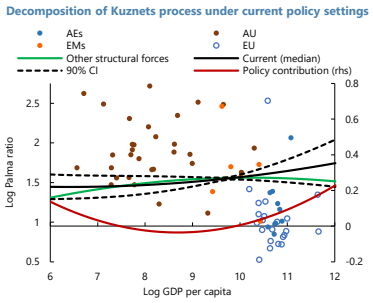


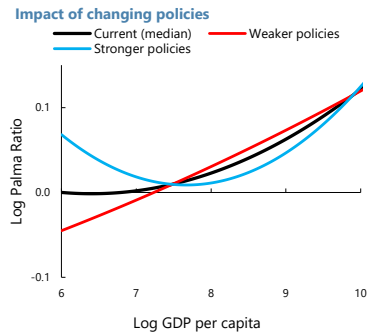
B. G20 Economies, EU, and AU: Social Spending and Transfers



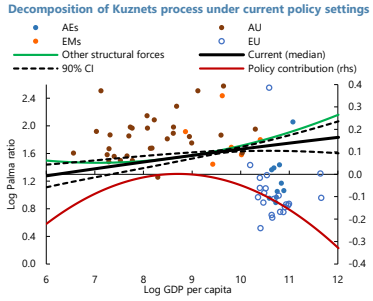


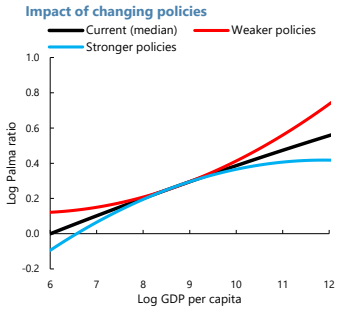
C. G20 Economies, EU, and AU : General Public Education Spending





D. G20 Economies, EU, and AU: Investment in Secondary Education





Sources: World Inequality Database (WID); Fraser Institute Economic Freedom of the World; University of Gothenburg Quality of Government Dataset; Standardized World Income Inequality Database (SWIIID); IMF, *World Economic Outlook*, and IMF staff estimates. Notes: For details on the LHS figures, see note to Figure 6. For RHS figures, the black line is computed in a similar way as in the LHS figure, but it is normalized to 0 at the lowest level of log real GDP per capita in the sample. Weaker (stronger) policies plots represent the model-implied path of an economy with policy at the 10th (90th) percentile in the last year of the sample. Policy-specific shifts are statistically significant at the 10 percent level.

Labor Market Institutions

17. Labor market institutions (LMIs)—the laws and practices governing labor markets—can impact job search and matching processes as well as employers' monopsony power, with implications for growth and inequality. Regulations that inhibit the formation of dual labor markets or strengthen worker bargaining power can modify the Kuznets process. Dual markets mean that stagnant and low-skill (or informal) sectors can grow, notably during economic downturns and perpetuate the tradeoff between development and inequality (Storm 2017). Policies that strengthen workers' bargaining power—either by protecting them against unfair dismissal or their right to strike, unionize, and engage in collective bargaining—can generate an inverted U-shape relation between growth and inequality, by providing workers with agency, and lead to reforms that level the playing field for lower earners. Such policies can also bring forward the turning point in the Kuznets process, reducing tensions between growth and inequality at lower stages of development. Nonetheless, the results are silent on the appropriate design of labor market regulations that protect workers' rights: While the right to engage in collective bargaining may lower inequality, excessive collective agreements can create rigidities that interfere with the efficient allocation of resources, undermining growth and employment, including where the informal sector is large (Leyva and Urrutia 2020).[19]

18. The median labor market regulations currently in place reinforce the Kuznets process, but the results suggest that reforming them can eliminate the growth-inequality tradeoff at higher levels of development (Figure 8).

- Current regulations that curb the formation of dual markets and unfair employment termination processes are associated with tradeoffs only at the early stages of development. However, reforms to these regulations can be accompanied by softer tradeoffs, with more limited increases as economies grow.
- Existing policies designed to protect a broad range of workers' rights also reinforce the standard Kuznets curve, consistent with evidence for the *United States* (Fortin and others 2023) and other G20 advanced economies (Jaumotte and others 2013). However, reforms that strengthen these policies are linked to earlier turning points—from an average of 12 years to the present day for large G20 emerging market economies, and from three decades in the future to less than a decade for smaller G20 emerging markets.
- Other labor market institutions, such as the minimum wage, can reduce inequality in advanced economies, although their effectiveness depends on the interaction with other social programs—notably, public investment in education—as well as the size of the informal sector or the prevalence of temporary jobs (DiNardo and others 1996; Jaumotte and Osorio Buitron 2019; Lee 1999; Teulings 2003).[20] In emerging market and developing economies, a larger share of outsiders (unemployed and informal workers) stand to lose from increases in minimum wages,

[19] The authors construct a model and calibrate it for *Mexico*. They the show that burdensome labor market regulations in the formal sector reduce productivity and misallocate resources, even as the presence of the informal sector helps smooth changes in employment and consumption.

[20] For instance, workers in the informal sector, or even those employed under temporary contracts, are often excluded from benefits and in some cases are not covered by collective agreements.

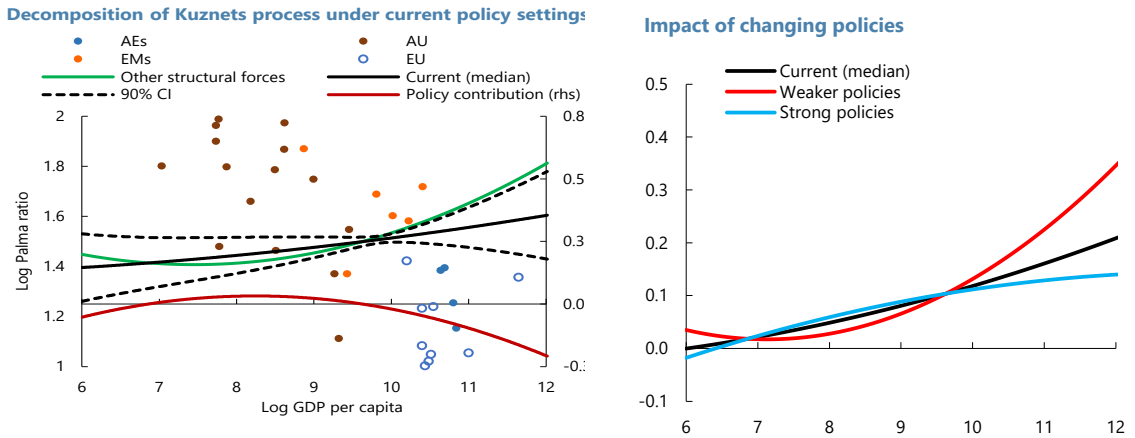
suggesting a stronger tradeoff between development and inequality absent additional social policies to tackle informality (Annex 1).

Other Institutions

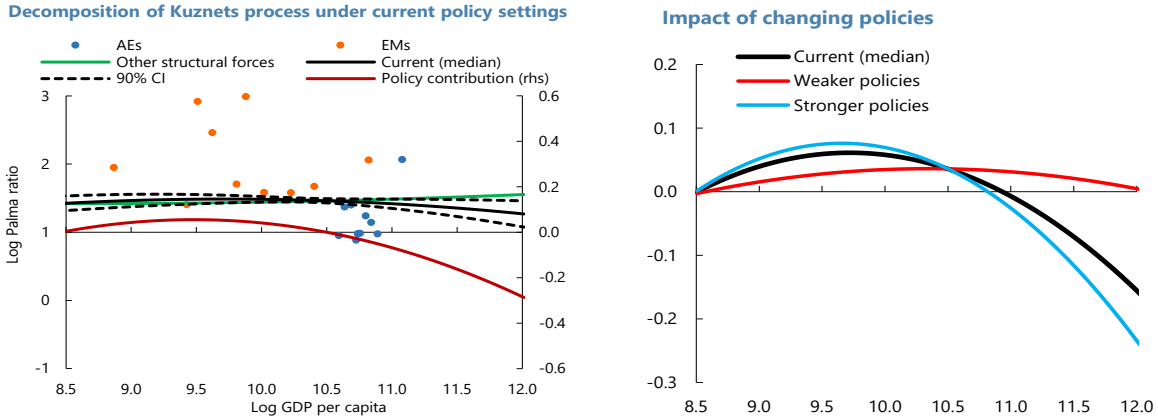
19. Increases in inequality can lead to pressure for democratization, encourage institutional shifts that support growth, and enhance the system's redistributive capacity. A potential explanation is that social unrest and political instability associated with increases in inequality can drive successful institutional changes and reforms, which enhance the design and implementation of redistributive policies, and ensure the existence of a turning point in the Kuznets process. Indeed, studies have argued that democratization facilitated the high-growth low-inequality "miracle" in *Korea* (Acemoglu and Johnson 2001; Acemoglu and Robinson, 2002).[21] Alternatively, policy settings can reflect social norms or preferences with implications for the overall shape of the Kuznets curve (Saez 2021, Annex 2).

Figure 8. Labor Market Institutions

All G20: Regulations to Inhibit Dual Labor Markets



G20 Advanced Economies and Emerging Markets: Workers' Rights Legislation



Sources: World Inequality Database (WID); IMF, *World Economic Outlook*; CBR Labour Regulation Index; and IMF staff estimates.
Notes: For details on the LHS figures, see note to Figure 6. For RHS figures, see note to Figure 7. The policy-specific shifts in the underlying econometric specifications are statistically significant at 90 percent confidence.

[21] Although increases in inequality can also lead to an "authoritarian disaster" of low-growth and high inequality, as evidenced by the experience of some African countries.

20. The quality of government can have different effects on the relationship between growth and inequality. Consistent with findings in the literature, variables that capture the current functioning of the government—for example, whether the head of government is freely elected; the legislative's role in determining policies; the absence of pervasive government corruption; and government accountability, openness, and transparency—appear to invert the Kuznets process such that inequality declines even at early stages of development. Indicators of the perceived quality of political institutions—which proxy for the current strength of the social contract—instead tend to reinforce the Kuznets process.

D. Medium-Term Prospects Given Current Policies

21. Current policies are associated with decreasing within-country inequality for most G20 advanced economies, but the outlook is more mixed for G20 emerging market economies and African Union members (Figure 9.) [22] Much of the heterogeneity reflects differences across policy settings, as well as countries' position on their individual development paths. Looking ahead, projected inequality trends highlight areas for additional policy action.

- The share of public spending on education and education-related government entities is consistent with decreasing inequality in most advanced economies (except for Korea). But, at current levels of spending and under current GDP projections from the IMF's July 2024 *World Economic Outlook* Update, such spending is not expected to be accompanied with a curbing of inequality in most G20 emerging market economies, as well as for most members of the African Union. This result suggests that these countries have room to improve their education policy settings.

Figure 9. Current Policy Settings and the Inequality Outlook

Decreasing inequality Increasing inequality

Country Group	Country	Education	Transfers	LMIs
G20 AEs	AUS	●	●	●
	CAN	●	●	●
	DEU	●	●	●
	FRA	●	●	●
	GBR	●	●	●
	ITA	●	●	●
	JPN	●	●	●
	KOR	●	●	●
	USA	●	●	●
G20 EMs	ARG	●	●	●
	BRA	●	●	●
	CHN	●	●	●
	IDN	●	●	●
	IND	●	●	●
	MEX	●	●	●
	RUS	●	●	●
	SAU	●	●	●
	TUR	●	●	●
	ZAF	●	●	●
EU		●	●	●
AU		●	●	●

Source: IMF staff estimates.
Notes: This figure summarizes the results from model-based projections detailed in Annex VI, using the July 2024 WEO forecasts for 2029 real GDP per capita. The columns represent the different models used to construct the forecasts. "Education" corresponds to forecasts derived from the model in Figure 7, panel D; "LMIs" refers to the model in Figure 8, panel A; and "Transfers" to the model shown in Figure 7, panel B. A red dot indicates a country where the current policy setting and growth outlook for 2029 imply a forecast of increasing inequality, while a green dot indicates a forecast of decreasing inequality. For the African Union and European Union, results reflect whether the majority of countries are expected to see increasing or decreasing inequality given their policy settings and stages of development.

[22] Forecasts are conditioned on five-year ahead growth forecasts and current policy settings. The methodology is described in detail in Annex II.

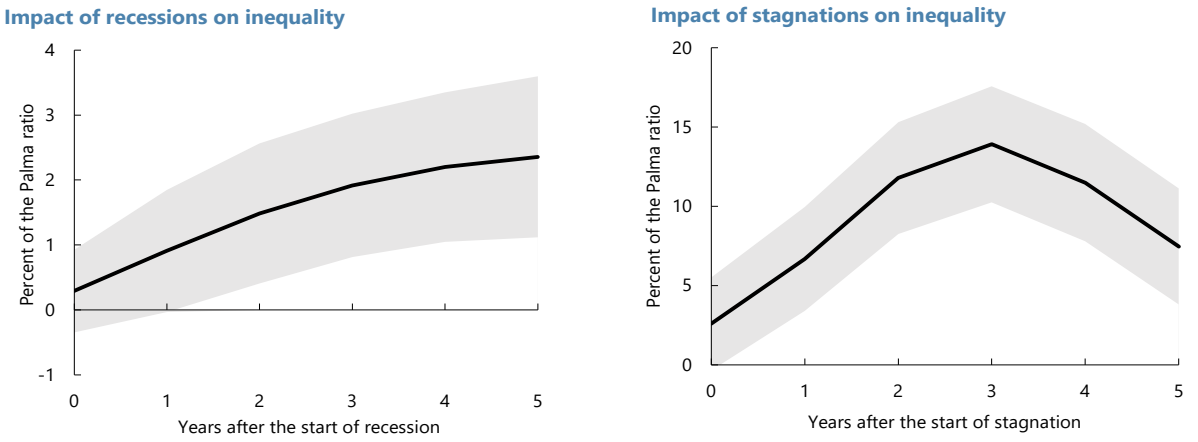
- Similarly, the current degree of resources allocated to social transfers is consistent with decreasing inequality in most advanced economies (except for *Korea* and the *United States*) and most of the African Union, but is associated with increasing inequality in many G20 emerging market economies (except for *Mexico*, *Saudi Arabia*, and *South Africa*).

- For advanced economies, current labor market regulations generally are expected to be consistent with decreasing inequality. But the *United States* is an exception, as the protection of workers' rights is weak and temporary agency work is pervasive. Among G20 emerging market economies, current labor market institutions are expected to be accompanied with increasing inequality in *China, Russia,* and *Türkiye*, while in the African Union, they are consistent with decreasing inequality in half of its members—mainly low-income countries and those that have previously received HIPC debt relief within Sub-Saharan Africa.

THE IMPORTANCE OF MACROECONOMIC STABILITY

Inequality tends to increase during downturns, with long-lasting periods of economic stagnation associated with even worse outcomes. This phenomenon highlights the importance of implementing appropriate macroeconomic stabilization policies—including fiscal policies described earlier—to avoid such outcomes. Structural reforms, such as labor market regulations, can also help mitigate the adverse inequality effects of weakening economic activity.

Figure 10. Evolution of Inequality Around Recessions and Stagnation Episodes



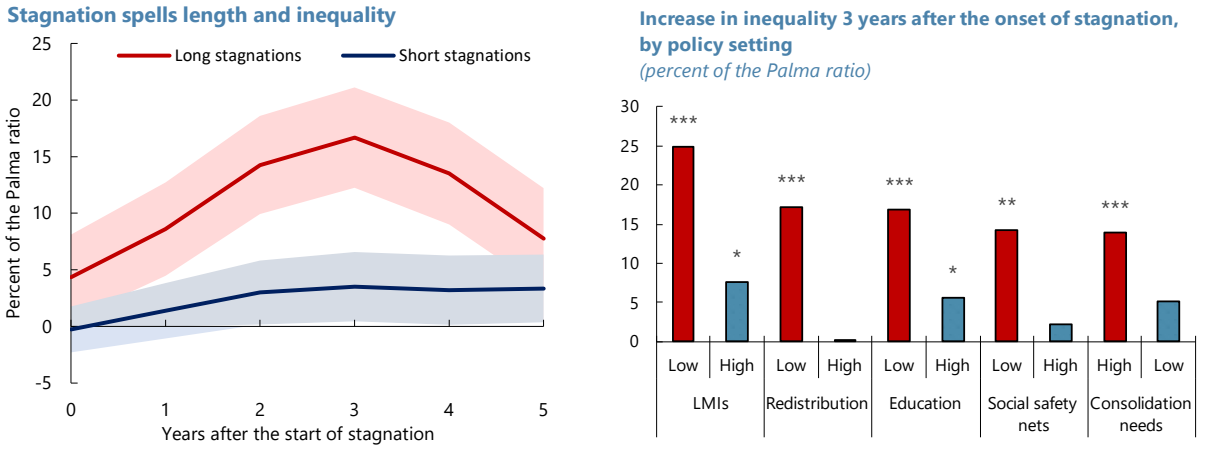
Source: IMF staff estimates.
Notes: Response of the log of the palma ratio is with respect to pre-recession (stagnation) levels to a one standard deviation shock to output during recessions (stagnations). The shaded areas represent 90 percent confidence intervals. For more details see Annex VII.

22. The interplay between growth and inequality during economic downturns can differ from that observed over the long run. Recessions can exacerbate income and wealth inequality, because lower-income workers tend to be hit disproportionately more (Heathcote, Perri, and Violante 2010). Furthermore, scarring from recessions can persist, resulting in permanent declines in potential growth (Ball 2014; Blanchard, Cerutti, and Summers 2015). Prolonged periods of low economic growth—stagnation episodes—can also increase inequality, as sluggish wage growth and job creation increase structural unemployment and reduce the labor share of income.

23. Recessions and stagnations are associated with increases in inequality. Findings suggest that recessions are associated with modest increases in inequality, whereas stagnation periods are followed by larger increases that build over time (Figure 10). These different results may reflect the fact that recessions encompass both supply and demand shocks, while stagnation episodes are typically supply-side phenomena entailing shocks of a more permanent nature.[23]

24. Longer lasting stagnations are linked to greater increases in inequality. Longer duration stagnation episodes—lasting at least 4 years—are found to be associated with inequality increases of 17 percent after 3-years. Stagnations are also associated with lasting increases on inequality—with medium-term effects of 8 percent for longer duration episodes, and 3 percent for shorter duration ones (Figure 11, LHS).

Figure 11. Evolution of Inequality Around Stagnation Episodes



Source: IMF staff estimates.
Notes: Response of the log of the Palma ratio is with respect to pre-stagnation levels to a one standard deviation shock to output during stagnation spells. Long stagnations are defined as those that lasted at least 4 years. In LHS the shaded areas represent 90 percent confidence intervals. RHS denotes significance levels with "*", "**", and "***" indicating 10, 5, and 1 percent significance levels, respectively. For more detail see Annex VII.

25. Certain policies are linked to smaller increases in inequality around stagnation episodes. Longer stagnation episodes likely reflect weaker policy settings or inadequate stabilization policy responses, and they tend to be more common in the aftermath of banking crises (Blanchard and others, 2017). Furthermore, evidence suggests that the evolution of inequality during stagnation episodes is influenced by initial policy settings (Figure 11, RHS). LMIs that limit dual labor markets, greater recourse to redistributive fiscal policies, sufficient fiscal space[24], higher education spending,

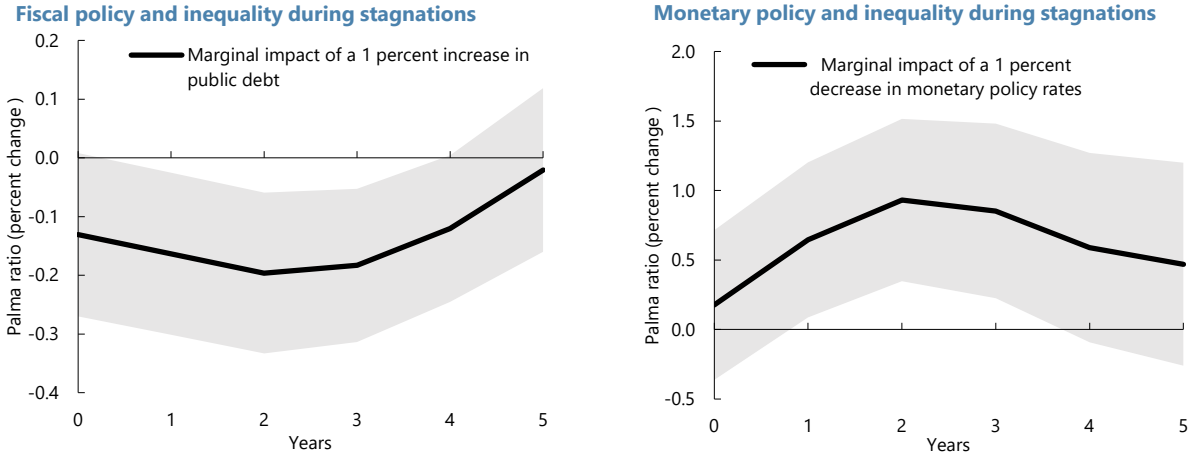
[23] April 2024 WEO projections for real GDP per capita suggest 28 countries of the G20 are at risk of stagnation, with real GDP per capita below pre-pandemic levels since 2020 and beyond 2023. Out of the 28 countries, 17 are part of the AU, and 6 are part of the EU.

[24] The measure of fiscal space is based on the primary balance sustainability gap following Kose and others (2022) and IMF (2010). The results are consistent with Romer and Romer (2018) who show that the loss of fiscal (and monetary) space implies larger economic costs from future downturns, due to the constrained ability of demand management tools to accommodate negative shocks. See Annex VII for more details.

and stronger social safety nets are all associated with smaller increases in inequality following the onset of a stagnation episode, which are 10 and 20 percentage points lower.

26. An inability or failure to respond to economic slowdowns with the appropriate monetary and fiscal policy mix could be accompanied by more pervasive inequality. Inadequate macro stabilizing policies may reflect weak policy frameworks or policy makers inability to identify the cause of the downturn and the size of the output gap (Blanchard, Cerutti, and Summers 2017). Indeed, there is some evidence that expansionary monetary policy on its own could be associated with higher inequality, emphasizing the importance of appropriate fiscal policy[25] design (Figure 12).[26]

Figure 12. Fiscal and Monetary Policy and Income Inequality



Source: IMF staff estimates.
Note: The shaded areas represent 90 percent confidence intervals.

[25] Alternative measures of fiscal expansion around stagnations are also linked to reductions in inequality. For example, a 1 percent of GDP increase in the cyclically adjusted expenditure is associated with a reduction in the Palma ratio of about 0.75 percent after 3 years of the onset of the stagnation period.

[26] By remaining focused on its primary function, monetary policy along with supportive fiscal policy, can effectively counter economic downturns (Bonifacio and others, 2021). Furthermore, ensuring low and stable inflation is important for inclusive growth, as it helps preserve the purchasing power of wages. The effect of monetary policy on inequality is conceptually ambiguous (O'Farrell and others 2017; Holm and others 2021), but Furceri and others (2018) show that endogenous monetary policy responses— driven by growth or inflation surprises—are linked to higher inequality, in line with the results in Figure 12. Evidence on the impact of unconventional monetary policy is inconclusive (see the literature review in Saiki and Frost 2020).

POLICY EFFORT IS REQUIRED TO BOOST INCLUSIVE GROWTH

Against a backdrop of weak and uneven growth, inclusive growth requires the use of a policy mix that not only boosts growth prospects but also addresses inequality. This note highlights key policy areas where additional efforts could support inclusive growth. Fiscal and structural policies have leading roles to play over the longer-term: in particular, strengthening labor market institutions, enhancing redistributive policies, and investing in education and skills. Over the nearer-term, appropriate monetary and fiscal responses to cyclical downturns can bolster inclusivity and prevent costly and prolonged periods of recession.

27. Current policies play an important role in determining the current relationship between growth and inequality across countries. Appropriate domestic policy settings can help resist protectionist pressures by ensuring that structural transformations, including globalization, boost growth and reduce poverty, while minimizing potentially adverse effects on within-country inequality. Where labor market regulations inhibit the formation of dual markets and protect worker's rights, or where fiscal policy is designed to enhance redistribution, countries can reach a turning point after which development-induced increases in inequality reverse. Among the tools available to enhance redistribution, social spending—notably targeted investment in education—and transfers, are particularly effective in lifting vulnerable groups as economies develop. Moreover, shorter-term economic downturns tend to increase gross income inequality, particularly where macroeconomic stabilization policies are inadequate.

28. Reforms can improve growth and inequality outcomes and mitigate tradeoffs, but policy recommendations should consider each country's context. Increasing redistribution is related to lower inequality, but it also exacerbates output-inequality tradeoffs at early stages of development and delays the point after which those tradeoffs disappear.[27] Measures to enhance redistribution must consider the composition and incidence of tax and benefits, as well as both inequality and growth outcomes, thus avoiding unintended distortions. The analysis suggests that policymakers should prioritize fiscal policy reforms that strengthen social safety nets—including through cash transfers and targeted spending—as they reduce inequality even with constant (weak) output and tend to soften the growth-inequality tradeoff at almost all stages of development[28]. In the current context, education and skills policies must also consider strategies to harness the advantages of AI, tailoring them to a country's specific context (Cazzaniga and others 2024).

29. To be sustainable, policies to mitigate inequality should be financed as far as possible by domestic revenue mobilization. For instance, many advanced economies can finance additional social spending by simultaneously raising revenues and enhancing the redistributive capacity of the tax system through higher top marginal income tax rates, (in-work) tax credits for low-income

[27] These results are based on observed overall redistribution outcomes, which are not necessarily linked to specific policies.

[28] See Brollo (2024) for a detailed discussion.

households and eliminating loopholes in the taxation of capital income and wealth. But for many emerging market and developing economies, indirect taxes (value-added tax and excises) are the revenue workhorse, as they are easy to enforce and collect. Eventually, however, reforms to direct taxation can grow the base and improve the progressivity of the system, by bringing more people—for example, professionals—into the tax net and increasing payments by high-earners. Prioritization and sequencing of revenue mobilization reforms should consider country-specific social and political conditions.

30. Macroeconomic stabilization policies also have an important role to play by preventing costly stagnations. Evidence that cyclical fluctuations can raise inequality, notably if they lead to longer-lasting stagnation episodes, places a premium on appropriate monetary and fiscal policy responses to shocks, as well as efforts to strengthen the corresponding policy frameworks and ensure the sufficiency of policy buffers to respond to future shocks.

31. Multilateral cooperation is necessary to ensure that the benefits from globalization and technological change are shared by all. No country stands to gain from reversing decades of economic integration. Policymakers should maintain stable and transparent trade policies and avoid discriminatory policies that induce trade and investment distortions and, hence, undermine growth. Countries should continue to work towards strengthening multilateral frameworks, which can help preserve the downward trend in between-country inequality. In addition, governments should work together to maximize the benefits of adopting new technologies, notably AI. [29]

[29] See Dabla-Norris and others (2024) for a detailed discussion.

References

Acemoglu, D., and Robinson, J. 2001. "A Theory of Political Transitions." *American Economic Review* 91. pp. 938–963.

Acemoglu, D., and A. J. Robinson. 2002. "The political economy of the Kuznets curve." *Review of Development Economics* 6(2), pp. 183–203.

Acemoglu, D. 2003. Patterns of skill premia. *The Review of Economic Studies* 70(2), pp. 199–230.

Acemoglu, D., and D. Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." Chapter 12 in *Handbook of Labor Economics*, O. Ashenfelter and D. Card (eds.), edition 1, Vol. 4, pp. 1043–1171.

Acemoglu, D., and P. Restrepo. 2020. "Robots and Jobs: Evidence from US Labor Markets." *Journal of Political Economy* 128 (6), pp. 2188–44.

Aghion, P., G. Caroli, and C. Garcia-Penalosa. 1999. "Inequality and Economic Growth: The Perspective of the New Growth Theories." *Journal of Economic Literature* 37(4), pp 1615–1660.

Alesina, A., and D. Rodrik. 1994. "Distributive Politics and Economic Growth." *The Quarterly Journal of Economics* 109 (2), pp. 465–90.

Alvaredo, F. (2011). A note on the relationship between top income shares and the Gini coefficient. *Economics letters* 110(3), 274-277.

Alvarez, J., F. Benguria, N. Engbom, and C. Moser. 2018. "Firms and the Decline in Earnings Inequality in Brazil." *American Economic Journal: Macroeconomics* 10(1), pp. 149–189.

Amarante, V., and R. Arim. "Inequality and informality revisited: The Latin American case." *International Labor Review* 162 (3), pp.431–457

Atkin, D. 2016. "Endogenous skill acquisition and export manufacturing in Mexico." *American Economic Review* 106(8), pp. 2046–2085.

Atkin, D., and D. Donaldson. 2022. "The role of trade in economic development". Chapter 1 in *Handbook of International Economics*, G. Gopinath, E. Helpman, and K. Rogoff (eds.), Vol. 5, pp. 1–59.

Atkinson, A. B. (2007). "Measuring top incomes: methodological issues". In *Top incomes over the twentieth century: A contrast between continental European and English-speaking countries*, pp. 18-42.

Autor, D., Dorn, D., and Hansen, G., 2016. "The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade." *Annual Review of Economics* 8, pp. 205-240.

Banerjee, A. 2000. "The Two Poverties." Working Paper 01–16, Department of Economics, Massachusetts Institute of Technology.

Beck, T., A. Demirgüç-Kunt, and R. Levine. 2007. "Finance, Inequality, and the Poor." *Journal of Economic Growth* 12(1), pp. 27–49.

Bergstrom, K. A. 2020. "The Role of Inequality for Poverty Reduction." Policy Research Working Paper 9409, World Bank, Washington, DC.

Berman, E., and S. Machin. 2000. "*Skill-biased technology transfer around the world.*" *Oxford review of economic policy* 16(3), pp. 12–22.

Bianchi, M., and M. Boba, 2013, "Liquidity, Risk, and Occupational Choices." *Review of Economic Studies* 80 (2), pp. 491–511.

Bourguignon, F. 2004. "The Poverty-Growth-Inequality Triangle" Working Paper 125, Indian Council for Research on International Economic Relations (ICRIER), New Delhi

Brollo, F. 2024. "Strengthening Social Protection to Pave the Way for Technological Innovation: Evidence from the US." Working Paper No. 2024/095, International Monetary Fund.

Brueckner, M., and D. Lederman. 2018. Inequality and economic growth: the role of initial income. *Journal of Economic Growth*, 23, pp. 341–366.

Bustos, P. 2011. "Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinian Firms." *American Economic Review* 101(1), pp. 304–40.

Card, D., and Cardoso, A. R., Heining, J., and P. Kilne. 2018. "Firms and Labor Market Inequality: Evidence and Some Theory." *Journal of Labor Economics* 36(S1), pp. S13–70.

Cazzaniga, M., F. Jaumotte, L. Li, G. Melina, A. Panton, C. Pizzinelli, E. Rockall, M. Mendes Tavares, 2024, "Gen-AI: Artificial Intelligence and the Future of Work." Staff Discussion Note No. 2024/001, International Monetary Fund.

Cerra, V., B. Eichengreen, A. El-Ganainy, and M. Schindler, (eds.). 2021. "How to Achieve Inclusive Growth." Oxford University Press and IMF.

Chong, A., and M. Gradstein, 2007. "Inequality and Institutions," *Review of Economics and Statistics* 89(3), pp. 454–465.

Chu, A. C., and P.F. Peretto. 2023. "Innovation and inequality from stagnation to growth." *European Economic Review* 160, pp. 104615.

Costinot, A., & Vogel, J. (2010). Matching and inequality in the world economy. *Journal of Political Economy*, 118(4), 747-786.

Dabla-Norris, E., de Mooij, R. Brollo, F., Garcia-Macia, D., Hanappi, T., Liu, L. and Minh, A.D., 2024. "Broadening the Gains from Generative AI: The Role of Fiscal Policies." Staff Discussion Note No. 2024/002, International Monetary Fund.

Darvas, Z. 2024. "Income inequality hardly changed during the COVID-19 pandemic," Bruegel.

Deaton, A. 2021. "COVID-19 and Global Income Inequality." National Bureau of Economic Research Working Paper No. 28392.

Deb, S., J. Eeckhout, A. Patel, and L. Warren. 2022. "What drives Wage Stagnation: Monopsony or Monopoly?" *Journal of the European Economic Association* 20(6), pp. 2181–2225.

Deb, S., J. Eeckhout, A. Patel, and L. Warren. 2024. "Market Power and Wage Inequality." *Econometrica* 92(3), pp. 603–636.

De Loecker, J., and J. Eeckhout. 2018. "*Global market power*." National Bureau of Economic Research Working Paper No. 24768.

DiNardo, J., N. Fortin, and T. Lemieux. 1996. "Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semiparametric Approach." *Econometrica* 64, pp. 1001–44.

Dollar, D., and A. Kraay. 2002. "Growth Is Good for the Poor." *Journal of Economic Growth* 7(3), pp. 195–225.

Dollar, D., and A. Kraay. 2004. "Trade, Growth, and Poverty." *The Economic Journal* 114(493), pp. 22–49.

Dollar, D., T. Kleineberg, and A. Kraay. 2016. "Growth Still Is Good for the Poor." *European Economic Review* 81(C), pp. 68–85.

Engbom, N., and C. Moser, Christian. 2022. "Earnings Inequality and the Minimum Wage: Evidence from Brazil." *American Economic Review* 112(12), pp. 3803–3847.

Ferreira, F. H. G., and M. Ravallion. 2009. "Poverty and Inequality: The Global Context." In *The Oxford Handbook of Economic Inequality*, Wiemer Salverda, Brian Nolan & Timothy M. Smeeding (eds.), Oxford University Press.

Fortin, N. M., Lemieux, T., and N. Lloyd. 2023. "Right-to-Work Laws, Unionization, and Wage Setting", Polachek, S.W. and Tatsiramos, K. (eds.) *50th Celebratory Volume*, *Research in Labor Economics* 50, pp. 285-325.

Fosu, A. K. 2017. "Growth, Inequality, and Poverty Reduction in Developing Countries: Recent Global Evidence." *Research in Economics* 71(2), pp. 306–36.

Furceri, D., and J. D. Ostry. 2019. "Robust Determinants of Income Inequality." Oxford Review of Economic Policy 35(3), pp. 490–517.

Furceri, D., Loungani, P., Ostry, J., and Puzzuto, P., 2021. "Will COVID-19 Have Long Lasting Effects on Inequality? Evidence from Past Pandemics," Working Paper No. 2021/127, International Monetary Fund.

Furceri, D., Loungani, P., and A. Zdzienicka. 2018. The effects of monetary policy shocks on inequality. *Journal of International Money and Finance* 85, pp. 168–186.

Galor, O., and O. Moav. 2004. "From Physical to Human Capital Accumulation: Inequality and the Process of Development." *The Review of Economic Studies* 71 (4), pp. 1001–1026

Galor, O. (2011). "Inequality, Human Capital Formation and the Process of Development." Chapter 5 in *Handbook of the economics of education*, E. A. Hanushek, S. Machin, L. Woessmann (eds.), Vol. 4, pp. 441–493, Amsterdam: North-Holland.

Glaeser, E., J. Scheinkman, and A. Shleifer. 2003. "The Injustice of Inequality." *Journal of Monetary Economics* 50(1), pp. 199–222.

Goldberg, P. K., and N. Pavcnik. 2007. "*Distributional effects of globalization in developing countries.*" *Journal of Economic Literature* 45(1), pp. 39-82.

Haanwinckel, D., and R. Soares. 2021. "Workforce Composition, Productivity, and Labour Regulations in a Compensating Differentials Theory of Informality." *The Review of Economic Studies* 88(6), pp. 2970–3010.

Haanwinckel, D. 2023. "Supply, Demand, Institutions, and Firms: A Theory of Labor Market Sorting and the Wage Distribution." National Bureau of Economic Research Working Paper No. 31318.

Halter, D., Oechslin, M., and J. Zweimüller. 2014. "Inequality and growth: The neglected time dimension." *Journal of Economic Growth* 19, pp. 81–1.

Holm, M. B., Paul, P., and A. Tischbirek. 2021. "The transmission of monetary policy under the microscope." *Journal of Political Economy* 129(10), pp. 2861–2904.

International Monetary Fund. 2017. Fiscal Monitor, Chapter 1, October.

International Monetary Fund. 2024a. World Economic Outlook, Chapter 3, April.

International Monetary Fund. 2024b. World Economic Outlook, Chapter 4, April.

International Monetary Fund. 2024c. G-20 Surveillance Note, February.

Jales, H. 2018. "Estimating the effects of the minimum wage in a developing country: A density discontinuity design approach." *Journal of Applied Econometrics* 33(1), pp. 29–51.

Jaumotte, F., S. Lall, and C. Papageorgiou. 2013. "Rising Income Inequality: Technology, or Trade and Financial Globalization?" *IMF Economic Review* 61(2), pp. 271–309.

Jaumotte, F., and C. Osorio Buitron. 2020. "Inequality: traditional drivers and the role of union power." *Oxford Economic Papers* 72(1), pp. 25–58.

Kose, M. Ayhan, Sergio Kurlat, Franziska Ohnsorge, and Naotaka Sugawara. 2022. "A Cross-Country Database of Fiscal Space." *Journal of International Money and Finance* 128 (November): 102682.

Kunst, D., R. B. Freeman, and R. Oostendorp. 2022. "*Occupational skill premia around the world: New data, patterns and drivers.*" *Labour Economics* 79, pp. 1–40.

Kuznets, S. 1955. "Economic Growth and Income Inequality." *American Economic Review* 45(1), pp. 1–28.

La Ferrara, E. 2019. "Presidential Address: Aspirations, Social Norms, and Development." *Journal of the European Economic Association* 17(6), pp. 1687–1722.

Lakner, C., and B. Milanovic. 2013. "Global income distribution: from the fall of the Berlin Wall to the great recession." Policy Research Working Paper Series 6719, The World Bank.

Lee, D. S. 1999. "Wage Inequality in the United States during the 1980s: Rising Dispersion or Falling Minimum Wage?" *Quarterly Journal of Economics* 114, pp. 977–1023.

Leigh, A. 2007. How closely do top income shares track other measures of inequality? *The Economic Journal* 117(524), F619-F633.

Leyva, G., and C. Urrutia. 2020. "Informality, labor regulation, and the business cycle." *Journal of International Economics* 126, 103340.

Lindert, P. H. 1986. "Unequal English Wealth Since 1670." *Journal of Political Economy* 94, pp. 1127–62

Machado Parente, R. 2024. "Minimum Wages, Inequality, and the Informal Sector." Working Paper.

O'Farrell, R., and Rawdanowicz, L. 2017. "Monetary policy and inequality: Financial channels." *International Finance* 20(2), pp. 174–188.

Piketty, T. 2014. "Capital in the 21st Century." Harvard University Press.

Piketty, T., E. Saez, and S. Stantcheva. 2014. "Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities." *American Economic Journal: Economic Policy* 6(1), pp. 230–71.

Quadrini, V., and Ríos-Rull, J.V., 2015. "Inequality in Macroeconomics". Chapter 14 in *Handbook of income distribution*, A. B. Atkinson and F. Bourguignon (eds.), Vol. 2, pp. 1229–1302, Elsevier.

Rattsø, J., and H. E. Stokke. 2013. "*Trade, Skill Biased Technical Change and Wage Inequality in South A frica*." *Review of International Economics* 21(3), pp. 419–431.

Ravallion, M., and S. Chen. 2022. "Is that really a Kuznets curve? Turning points for income inequality in China." *Journal of Economic Inequality* 20, pp.749–776.

Rezk, H., Amer, G., Fathi, N., and Sun, S. 2022. "The impact of FDI on income inequality in Egypt." *Economic change and restructuring* 55(3), pp. 2011–2030.

Rodrik, D. 2016. "Premature Deindustrialization." *Journal of Economic Growth* 21(1), pp. 1–33.

Romer, C. D., and D. H. Romer. 2018. "Phillips Lecture—Why Some Times Are Different: Macroeconomic Policy and the Aftermath of Financial Crises." *Economica* 85(337), pp. 1–40.

Rubolino, E., and D. Waldenström. 2017. "Tax Progressivity and Top Incomes: Evidence from Tax Reforms." IZA Discussion Papers No. 10666, Institute of Labor Economics (IZA), Bonn.

Saadi Sedik, T., and R. Xu. 2020. "A Vicious Cycle: How Pandemics Lead to Economic Despair and Social Unrest." Working Paper No. 2020/216, International Monetary Fund.

Saiki, A., and Frost, J. 2020. "Unconventional monetary policy and inequality: is Japan unique?" *Applied Economics* 52(44), pp. 4809–4821.

Slemrod, J., and J. Bakija. 2000. "Does Growing Inequality Reduce Tax Progressivity? Should It?" National Bureau of Economic Research Working Paper No. 7576.

Stolper, W. F., and P.A. Samuelson. 1941. "Protection and real wages." *The Review of Economic Studies* 9(1), pp. 58–73.

Storm, S. 2017. "The new normal: Demand, secular stagnation, and the vanishing middle class." *International Journal of Political Economy* 46(4), pp.169–210.

Teulings, C. N. 2003. 'The Contribution of Minimum Wages to Increasing Wage Inequality,' *The Economic Journal* 113, pp. 801–33.

Topalova, P. 2010. "Trade Liberalization, Poverty and Inequality: Evidence from Indian Districts," *Globalization and Poverty*, pp. 291–336.

Ulyssea, G. 2018. "Firms, Informality, and Development: Theory and Evidence from Brazil." *American Economic Review* 108(8), pp. 2015–2047.

Ulyssea, G. 2020. "Informality: Causes and Consequences for Development." *Annual Review of Economics* 12(1), pp. 525–546.

Williamson, Jeffrey G. 1985. Did British Capitalism Breed Inequality? Boston, MA. Allen & Unwin.

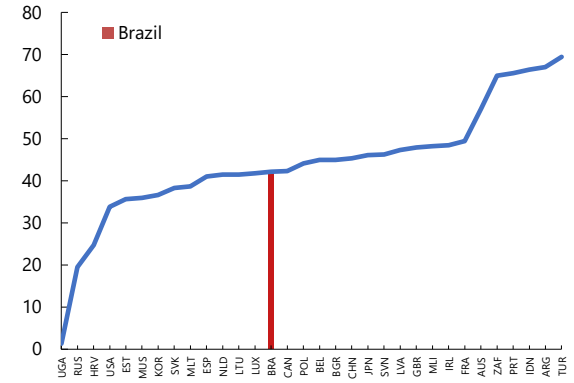
World Bank. 2022. Global Economic Prospects, Chapter 4, January.

Annex I. Informality and Inequality: Insights on Minimum Wages from Brazil[1]

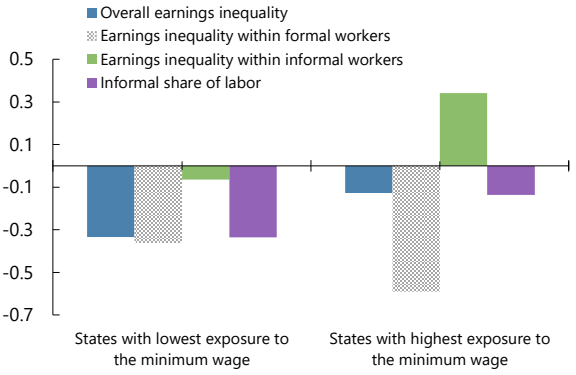
1. Labor market policies can shield workers from real income losses, notably during economic downturns. Weak productivity growth can dampen real wage growth, particularly in economies where employers have bargaining power (Card and others 2018). Importantly, some workers – particularly those with lower skills and income – might be disproportionately affected (Deb and others 2022, 2023). Against a backdrop of weak productivity growth and growth prospects, this Annex examines if adjustments to the minimum wage can protect the vulnerable against real income losses and promote equitable outcomes in the labor market, when well calibrated considering fiscal trade-offs.[2]

2. Minimum wages can be an important tool to reduce earnings inequality. For instance, in Brazil, labor income inequality fell by 20 percent between 1996 and 2018, as the minimum wage increased from 30 to 55 percent of median wages.[1/] Engbom and Moser (2022) find that the increase in the minimum wage accounted for 45 percent of the reduction in earnings inequality with far-reaching effects on wages at the top of the earnings distribution.[1] Firm-specific factors, improved educational attainment, and labor market policies, have also played a role (Alvarez and others 2018; Haanwinckel 2023).

Minimum wage to average earnings ratio
(2010-2019 average; percent)



Exposure to the minimum wage, inequality and informality *(percent changes between 1996 and 2012)*



Sources: ILOSTAT; Machado Parente (2024); and IMF staff estimates.
Notes: For the top chart, HUN, CZE, CYP, ROU and GRC were omitted for brevity. For the bottom chart, earnings inequality measured as the variance of log earnings. "Overall earnings inequality" includes both formal and informal workers.

3. Increases in the minimum wage are not a silver bullet, however, due to impacts on informality. In most EMDEs, a large share of workers is informal, which hinders growth and development (Ulyssea 2018, 2020). Minimum wages can displace workers to the informal sector by increasing labor costs at a faster pace than productivity (Jales, 2018). As such, minimum wages can affect inequality within formal and informal sectors. Exploiting state level variation in exposure to the minimum wage from 1996-2012, Machado-Parente (2024) finds that, while the reduction in inequality was broad-based,

[1] The author of this Annex is Rafael Machado-Parente.
[2] Moreover, since pensions and non-means-tested transfers in Brazil are indexed to the minimum wage, adjustments to the latter should be carefully calibrated to avoid constraining the fiscal space to finance the necessary social programs.

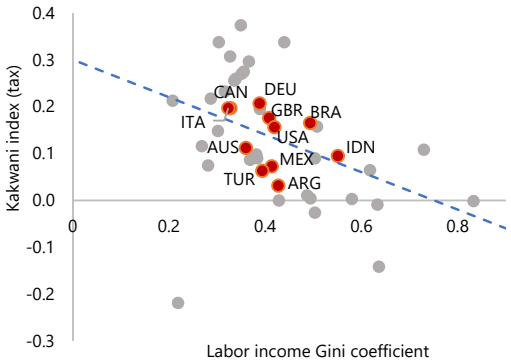
Brazilian states with a higher exposure to the minimum wage experienced smaller declines in overall earnings inequality. The result reflects larger increases in inequality within the informal sector, as well as milder reductions in the share of informal workers. The author estimates that, absent other policies, the increase in the minimum wage would have increased earnings inequality at the national level, because the adverse inequality effects in the informal sector more than offset the decline in inequality among formal workers.

4. Complementary social policies can help protect the vulnerable and foster formal employment. Policies to curb the size of the informal sector are key for boosting growth and allowing the minimum wage to address inequality. Haanwinckel and Soares (2021) find that education improvements explain most of the reduction in Brazil's informality between 2000 and 2012. Machado-Parente (2024) highlights that educational transformation allowed more people to benefit from increases in Brazil's minimum wage, thus limiting the negative effects brought about by the higher minimum wage. Therefore, social policies that reduce the cost of formal employment should accompany possible increases in the minimum wage.[1]

Annex II. Tax Policy and Inequality[1]

1. The relation between earnings inequality and personal income taxes is complex. Progressive income taxes are often prescribed to address high or rising income inequality. However, income tax progressivity also creates equity-efficiency trade-offs (Mirrlees 1971; Piketty and Saez 2013). The reason is that more redistribution can reduce work incentives, reducing overall pre-tax earnings.

Tax progressivity and income inequality, 2022 or latest year



Source: IMF staff estimates.
Notes: The Kakwani index compares the distribution of market income with the distribution of taxes paid and is calculated based on a single-earner household with two young children (Kakwani 1977). Kakwani index values vary between -1 and 1, with higher values indicating a more progressive tax system. Labor income gini coefficient derived from earnings deciles from the ILO Labour Income Share and Distribution (LISD) database "RoW" refers to non-G200member countries. Simulations span 60 countries covered by the TaxBen and TaxFit models.

2. The Figure plots the Kakwani index—a measure of progressivity of personal income taxes—against the Gini coefficient of gross labor earnings. Countries with higher levels of labor income inequality also have less progressive tax systems.

3. If the causal link goes from inequality to progressivity, optimal taxation theory predicts that higher inequality would *increase* progressivity. Hence, a potential explanation for the negative cross-country correlation between inequality and progressivity is that public choices deviate from the utilitarian social welfare function, and instead reflect societies where, for example, there is greater affinity between the middle-class and the poor —rather than the middle-class and the rich— Kristov, Lindert, McClelland (1992), especially during economic downturns (Lindert 1996). Similarly, Piketty and others (2014) argue that social norms discourage high compensation, which translates into both low inequality and high tax progressivity, while Saez (2021) notes that countries with more progressive tax systems tend to have social preferences that favor pre-tax redistribution, such as minimum wages and collective wage setting.

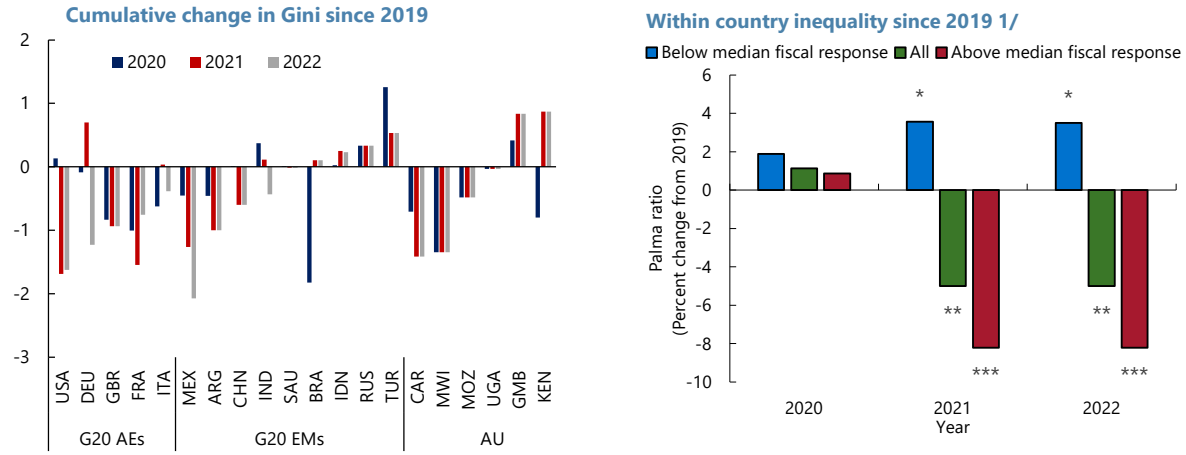
4. Even though the relationship between pre-tax income inequality and progressivity is unclear, (Slemrod and Bakija, 2000), there is no doubt that redistributive tax systems can smooth disparities in labor market outcomes. When combined with benefit transfers, taxes can jointly reduce income inequality both at the top of the income distribution (via tax progressivity) and at the bottom (with benefits). Combining well-targeted benefits with a progressive tax system can be self-reinforcing—as higher taxes on top earners funds transfers to low income households—with the potential benefit that declines in inequality would have been linked with improved economic conditions (Berg and others 2018).

[1] The author of this Annex is Duncan MacDonald.

Annex III. Inequality and COVID-19

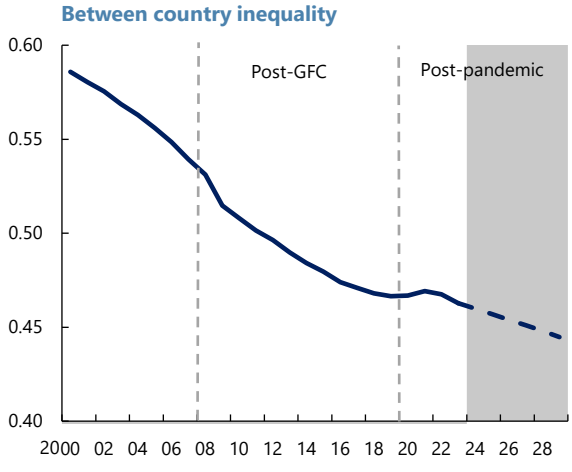
1. Historically, pandemics have been associated with higher within-country inequality through economic and health channels, due to the disproportionate implications for more contact intensive sectors—often those with larger shares of informal workers with lower-incomes, lower-skills, and less recourse to savings. Covid-19 was initially accompanied by a sharp and globally synchronous decline in economic activity, as governments-initiated lockdowns and social distancing measures to limit the spread of the virus. As such, there were reasons to believe that within-country inequality would have been more severely affected than in previous pandemics (Furceri et al (2021)).

Within and Between Country Income Inequality during Covid 19



Sources: World Income Inequality Database; IMF, *World Economic Outlook*, and IMF staff calculations.
1/ The chart shows the impulse response function of the log Palma ratio on output losses during the pandemic. Blue and red bars present the response for countries that experience an increase in the fiscal deficit below and above the median, respectively. that did not experience a large fiscal response, defined as countries whose fiscal balance did increase less than 4 percent of GDP in 2020.

2. But evidence suggests that within country inequality has decreased since the pandemic for many countries. This result likely reflects unprecedented policy responses that helped mitigate adverse changes in the distribution. However, significant differences in within-country inequality developments likely reflects differences in policy responses. Indeed, countries with less supportive fiscal policy responses are found to have experienced a mild increase in within country inequality. In some cases, long-term scarring effects from the pandemic—for instance, disruption to education—can still put upward pressure on within-country inequality (World Bank (2022).



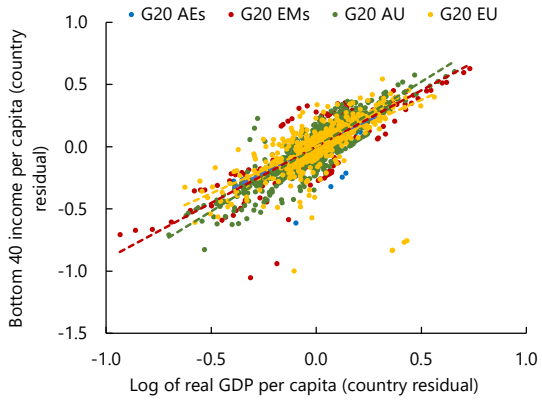
Sources: IMF, *World Economic Outlook*, and IMF staff calculations.

3. Cross-country variation in policy support may also have exacerbated between-country inequality. Estimates, suggest that between-country income inequality rose during 2020 and 2021 (Figure). In line with Deaton (2021), the uptick in 2020 can be largely attributed to India's pandemic experience—with a large drop in per capita income. Meanwhile the upward shift in 2021 can partly be attributed to the faster recovery in several advanced economies—notably the U. S.—which were able to rapidly mobilize unprecedented fiscal and monetary support. Notwithstanding these trends, April 2024 WEO data and projections imply that between-country inequality has returned to a downward trajectory.

Annex IV. Inequality and Poverty Reduction

1. Growth is strongly associated with increases in bottom incomes and lower poverty rates (Figure). Similarly, bottom incomes are higher and poverty levels are lower in countries with higher income per capita. These facts contrast with the case of inequality, where the relationship with income per capita growth is not as clear. The reason is that growth is not associated with large changes in inequality, which implies that the elasticity of per capita income in each decile to aggregate output per capita is relatively low.

Growth increases bottom incomes in G20 countries



Sources: World Inequality Database (WID); IMF, *World Economic Outlook*; IMF staff estimates.

2. However, this does not mean that inequality is unrelated to the reduction of poverty. Inequality can hinder poverty reduction via hampering growth (Bourguignon (2004), Fosu (2010)) or by reducing the pace at which growth reduces poverty (i.e., reducing the elasticity of bottom income levels to income per capita). Moreover, higher poverty can reduce the ability to further reduce poverty, leading to a negative feedback loop. Poverty-induced deterioration of health outcomes can impair skills attainment (Cerra and others 2021, Chapter 14). Combined with risk aversion (Banerjee 2000) and deteriorating aspirations (La Ferrara 2019) such constraints can reinforce poverty traps—negatively impacting accumulation of human and physical capital, long-term growth, and individuals' potential to escape poverty. In addition, poverty can be detrimental to aggregate economic growth by constraining individuals' ability to undertake investments (human or physical) due to an inability to access financing at a reasonable cost—emphasizing challenges related to credit market imperfections.

3. On the other hand, higher inequality can mean that a greater proportion of the population is on the margin between poverty and non-poverty, mechanically increasing the sensitivity of poverty to growth even when the elasticity of bottom deciles' income shares to growth is held constant. The empirical relationship between inequality and the sensitivity of poverty to growth combines these various mechanisms. Empirical estimates suggest that, on balance, inequality lowers the poverty-reducing impact of growth fluctuations at annual frequency

	Poverty line 2.15 USD (Percent change)			Poverty line 3.65 USD (Percent change)		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
GDP per capita growth	-5.553**	-6.687***	-9.421***	-6.466***	-7.152***	-8.944***
	(2.150)	(2.054)	(2.284)	(1.809)	(1.729)	(1.905)
ln GDP per capita	-0.175**	-1.877***	-1.969***	-0.261***	-1.657***	-1.823***
	(0.0719)	(0.291)	(0.356)	(0.0695)	(0.236)	(0.291)
Initial Palma Ratio x GDP per capita growth	3.146*	4.445***	5.931***	3.445**	4.256***	5.422***
	(1.712)	(1.634)	(1.727)	(1.420)	(1.356)	(1.425)
Change in Palma ratio	-0.136	-0.127	-0.0749	-0.169	-0.178	-0.114
	(0.214)	(0.202)	(0.207)	(0.178)	(0.169)	(0.173)
Initial Palma Ratio	0.0447	-0.377**	-0.224	0.0545	-0.213	-0.0392
	(0.0809)	(0.189)	(0.203)	(0.0702)	(0.159)	(0.169)
Observations	353	349	348	408	405	404
Country FE	NO	YES	YES	NO	YES	YES
Year FE	NO	NO	YES	NO	NO	YES
R-squared	0.131	0.393	0.438	0.142	0.385	0.418

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

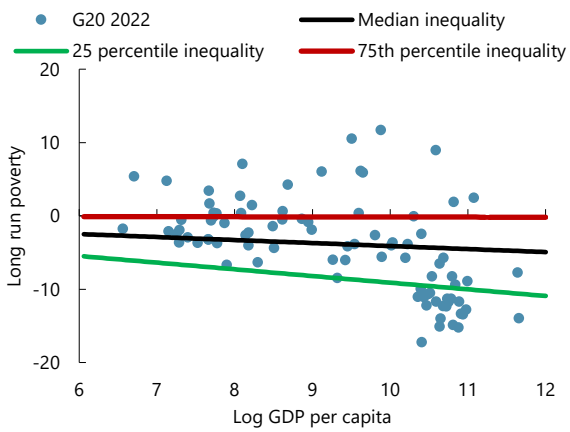
Source: IMF Staff's calculation

Note: Estimation controls for government functioning and initial levels of poverty. Country sample includes G20 countries, including the AU.

(Table). This relationship also holds in the long term. Empirical evidence using non-stationary panel estimation confirm that high inequality dampens the response of poverty to development (Figure).

4. To address poverty, the role of targeted policies is mixed. Studies often struggle to identify growth-enhancing policies and institutions that benefit the poor more than other segments in society (Dollar and Kray 2002; Dollar, Kleinberg, Kray 2016). But other studies emphasize the role of economic growth in poverty reduction, and the importance of pro-growth policies such as trade openness (Dollar and Kray 2004), and financial development (Beck and others 2007; Bergstrom 2020). Thus, structural reforms and multilateral cooperation remain priorities to revive growth prospects.

Poverty and development



Source: IMF staff estimates.
Notes: The lines correspond to the model fit of the long-run cointegration vector of poverty and GDP per capita. The red, blue, and green line present the cointegration relationship for the 25th, 50th, and 75th percentiles, respectively. Standard errors are clustered at the country level.

5. Nevertheless, policies that feature direct investment in opportunities for poor people are essential to prevent people from falling into poverty traps when adverse shocks hit. While useful, transfers should not consist merely of cash: they should also boost the population's capacity to generate income. Education and training as well as access to health care, micro-credit, water, energy, and transportation are powerful instruments.

Annex V. Estimating Kuznets Curves

1. This annex describes the estimation of country-specific Kuznets curves documented in Figures 6–8 in the main text.

To empirically recover an underlying relationship between economic development and inequality for individual countries or country groups, specifications like the following are considered:

$$y_{it} = \alpha_i + \delta_t + \sum \beta_1^k x_{i,t-k} + \sum \beta_2^k x_{i,t-k}^2 + \gamma_1 \cdot z_{i,t-\ell} + \gamma_2 \cdot z_{i,t-\ell} x_{i,t-\ell} + \gamma_3 \cdot z_{i,t-\ell} x_{i,t-\ell}^2 + \sum \rho^k y_{i,t-k} + \epsilon_{it}.$$

y_{it} is a measure of inequality in year t, and $x_{i,t-k}$ is the log of income per capita in purchasing power parity (PPP) 2017 US dollars in year $t-k$, where k ranges from 0 to 3. The inclusion of the quadratic term x_{it}^2 allows for the possibility of "turning points," as in the Kuznets hypothesis, around which the slope of the relationship between output per capita and inequality changes sign. The vector z_{it} contains policy and contextual variables. These variables are included with a lag $\ell = 4$ years, as they take time to affect inequality outcomes. The coefficients γ_1 represent changes in the level of the income per capita-inequality curve, while the coefficients γ_2 and γ_3 represent changes in the shape of the income per capita-inequality curve, including potentially shifting the value of income per capita at which the slope of its relationship with inequality changes sign. Regressions control for country and year fixed effects, as well as up to 4 lags of the inequality measure. The equation above is estimated with data from 1990 to 2022.

2. In the specification underlying Figure 6, the measure of inequality y_{it} is the logarithm of the Palma ratio and the variables considered in z_{it} are an index of labor market institutions to prevent the formation of a dual labor market, measured by variables taken from the CBR Labor Regulation Index (LMIs); redistributive policies, measured by transfers and subsidies as a percent of GDP (Transfers); and a measure of the extent of economic globalization given by the KOF Economic Globalization Index, which considers both trade and financial globalization (Globalization). The line "Other structural forces" is based on the estimates of the coefficients β_1^k, β_2^k on GDP not interacted with $z_{i,t-\ell}$. Figures 7–8 each in turn consider specifications focusing on one policy variable at a time. Table A5.1 below details the variables used in each specification.

3. To gain intuition for the results, we consider the relation between labor market regulations and transfers policies with inequality, as illustrated in Figure 6. For a hypothetical country with a log GDP per capita of 6.1 (the lowest observe in our sample) with a value of zero for both variables, an increase in both policy variables to their median values observed in the latest year of the sample is associated with reduction in inequality of about 0.35 log points (about 30 percent). A similar decline (about 0.45 log points) occurs for a country with a log GDP per capita of 11. For countries in the intermediate range of log GDP per capita, an increase in these policy variables was not found to be associated with a significant reduction in inequality.

4. Many other variables were tested, but the results were not statistically significant or robust. Among these, variables associated with SBTC are particularly relevant, but "Skill-bias"" is inherently hard to measure and most of the measures commonly employed in the literature are based on

endogenous outcome variables rather than exogenous technology shocks (Goldberg and Pavnick 2007). Available indicators of policies that could contribute to SBTC were tested, including public R&D investment (WDI), the regulatory measure of market organization and competition from the Bertelsmann Transformation Index (BTI), and the World Economic Forum's indicators of property rights and innovation capability. Only the latter was significant, with qualitative results similar to those obtained for the globalization variable, but with low statistical power due to the small sample. Potential SBTC outcome variables were also considered, including the stock of patents and the population share of scientists, but these had a very short sample, as did proxies for the skill premium, including the WDI Gini coefficient of education and Kunst and others (2022) estimates of the occupational skill premia. Finally, mark-up estimates were tested (De Loecker and others 2018), but the results were also not statistically significant.

Table A.V.1. Kuznets Curves: Empirical Specifications

Model	Variables	Definition	Source
Joint Model	LMIs index	Agency work is controlled/prohibited	CBR Labor Regulation Index
		Waiting period for industrial action	CBR Labor Regulation Index
		Replacement of striking workers	CBR Labor Regulation Index
	Transfers	Transfers and subsidies as percent of GDP	Economic Freedom of the World
	Globalization	Logarithm of the economic globalization index	
Education, panel A		Government expenditure on education (percent of government spending)	WDI
Education, panel B		Government expenditure on secondary education (percent of GDP)	WDI
Social Safety Nets		Transfers and subsidies as percent of GDP	Economic Freedom of the World
LMIs, panel A	LMIs index	Agency work is controlled/prohibited	CBR Labor Regulation Index
		Waiting period for industrial action	CBR Labor Regulation Index
		Replacement of striking workers	CBR Labor Regulation Index
LMIs, panel B	LMIs index	Maximum duration of fixed-term contracts	CBR Labor Regulation Index
		Minimum qualifying period of service for normal case of unjust dismisal	CBR Labor Regulation Index
		Reinstatement normal remedy for unfair dismisal	CBR Labor Regulation Index
		Right to unionization	CBR Labor Regulation Index
		Right to collective bargaining	CBR Labor Regulation Index
		Right to industrial action	CBR Labor Regulation Index
		Replacement of striking workers	CBR Labor Regulation Index
Redistribution		Estimated relative redistribution (percent)	SWIID

Source: IMF staff.

Annex VI. Forecasting Inequality

1. This annex describes the country-specific simulations documented in Figure 9 in the main text.

Simulations of the long-term implications of the outlook on inequality use the models as described in Annex V. Specifically, model-specific long-term projections of the log Palma ratio are defined as follows:

$$\hat{y}_i^z = \hat{\alpha}_i + \hat{\delta}_{22} + \sum\left(\hat{\beta}_1^k \ \hat{x}_{i,2029}^{WEO} + \beta_2^k\left(\hat{x}_{i,29}^{WEO}\right)^2\right) + \hat{\gamma}_1 \cdot z_{i,22} + \hat{\gamma}_2 \cdot z_{i,22}\hat{x}_{i,29}^{WEO} + \hat{\gamma}_3 \cdot z_{i,22}\hat{x}_{i,29}^{WEO} + \sum\hat{\rho}^k \, y_{i,22},$$

where $\hat{x}_{i,29}^{WEO}$ is the log of the 2029 income per capita in purchasing power parity (PPP) 2017 US dollars projected in the July 2024 WEO for country i, $z_{i,22}$ is the 2022 policy of consideration, and $y_{i,22}$ is the 2022 log Palma ratio. The coefficients $\hat{\alpha}_i, \hat{\delta}_{22}, \hat{\beta}_1^k, \hat{\beta}_2^k, \hat{\gamma}_1, \hat{\gamma}_2, \hat{\gamma}_3$, and $\hat{\rho}^k$ taken from the estimations underlying Figures 7-8 (see Annex V). Because each country has different policies, this allows the construction of a country-specific Kuznets curve which can be projected forward using the growth forecast through 2029 in the 2024 WEO as described above.

2. Figure 10 summarizes the influence of current policy settings on inequality. A policy setting is said to be associated with increasing (decreasing) inequality if projected inequality, $\hat{y}_i^z$, exceeds (is below) the model fitted values for 2022.

3. For example, Figure 10 suggests that Mexico, given July 2024 WEO growth projections and current policies, would be expected to experience increasing inequality in the models based on education and LMIs, while the forecast is of decreasing inequality in the model based on transfers. That is, Mexico's forecasted inequality in 2029 surpasses the 2022 predicted level of inequality when considering the growth-inequality tradeoffs implied by current education spending and LMIs at Mexico's expected development level. The LMI result is driven by Mexico's current policies to inhibit dual labor markets being distant to the strong policy line shown in the right-hand side of Figure 8A—hence facing significant inequality-growth tradeoffs around Mexico's expected development level (log GDP per capita of around 10). Meanwhile, given current social spending and transfer policies, Mexico's forecasted inequality level in 2029 decreases with respect to 2022 predicted inequality levels given the expected shift in Mexico's expected development level.

Annex VII. Recessions, Stagnations, and Inequality

1. This annex describes the estimation of the association of recessions and stagnations with inequality, documented in Figures 10–12 in the main text.

To empirically assess the effects of recessions and stagnations on inequality during the cycle, the following empirical model for inequality is estimated using local projections:

$$\log Palma\ Ratio_{c\,t+h} - \log Palma\ Ratio_{c\,t-1} = \beta_h \Delta GDP^r_{c\,t} + \delta_c + \gamma_t + x'_{c\,t}\alpha + \varepsilon_{c\,t+h}, h = 0,2,\cdots H.$$

Here, $\log Palma\ Ratio_{c\,t}$ is the log of the Palma ratio in country c and time t. The variable of interest is $\Delta GDP^r_{c\,t}$, which represents recession and stagnation losses. Recession periods are defined following Harding and Pagan (2002) and Blanchard, Cerutti, and Summers (2015), while stagnation periods are defined according to Miniou and others (2016).[1]

2. The regression controls for other influencing factors. Particularly, the regression controls domestic variables, x_{ct}, that could affect both inequality and growth, including political economy, education, labor market policies, globalization, population growth, and initial levels of inequality. The regression also controls for country fixed effects, δ_c, to control for country-specific unobserved factors, as well as year fixed effects, γ_t, to account for global economic cycles.

3. Results in Figure 9 presents the impulse response function of the Palma ratio around recessions and stagnations. Empirical findings indicate that recessions are associated with a positive, albeit small, change in inequality. Output losses during recessions are associated to increases on the Palma ratio after 2 years, resulting in a medium-term increase of approximately 2.5 percent. That is, for the average G20 country, a recession would increase from 5.6 to about 5.7. The correlation between stagnation spells and inequality is modest. Estimates suggest that around stagnations, changes in the Palma ratio are positive and significant one year after the onset of the episode, peaking at a 15 percent increase 3 years later. That is, for the average G20 country, a stagnation period would be associated with an increase from 5.6 to about 6.4.

4. To assess potential non-linearities, the following extended model is considered:

$$\log Palma\ Ratio_{c\,t+h} - \log Palma\ Ratio_{c\,t-1} = \sum_{g\in G} \beta_h^g \Delta GDP^r_{c\,t} \times I\left(G_{c,t} = g\right) + \delta_c + \gamma_t + x'_{c\,t}\alpha + \varepsilon_{c\,t+h}.$$

Here, non-linearities are estimated via groupings across characteristics. As such, variables $I\left(G_{c,t} = g\right)$ are binary variables. For example, when considering the non-linearities due to the length of stagnations, groups will refer to stagnations of length above and below 3 years. The coefficient of interest is β_h^g, which represents the impulse response at horizon h for group g.

[1] Stagnation episodes are defined as periods of sustained negligible or negative per capita income growth, while excluding brief interruptions of growth. The depth of stagnation is defined as the difference between the income per capita at the onset of the episode and the lowest level of income reached during the stagnation spell. Depth is expressed in percent terms and captures a counterfactual (relative to a constant output scenario).

5. Left hand side of Figure 10 shows the estimated response of inequality depends on the length of stagnation. Long stagnation periods (above 3-years) are linked to higher increases in inequality, with a peak change of 17 percent and medium-term changes of 8 percent. Short stagnations are also associated with positive and significant changes on inequality, though significantly smaller, at 3 percent over the medium term -broadly consistent with the estimates for recessions.

6. Right hand side of Figure 10 shows the estimated response of inequality after 3 years across groups of policies and institutions. Particularly, the policy variables considered are an index of labor market institutions to prevent the formation of a dual labor market, measured by the CBR Labor Regulation Index concerning "different forms of employment"; consolidation needs, measured by the primary balance sustainability[2], calculated using WEO data following Kose et al (2022); redistributive policies, measured by the difference between pre and post-tax Gini; education policies, measured by government education spending as percent of GDP; social safety nets, measured by the ratio of government health spending to total health spending. Countries are classified as high consolidation needs if the primary balance sustainability gap is below the historical average (1.5 percent of GDP). As of 2023, all G20 advanced economies (a total of 9 core members), 8 of the 10 G20 emerging market economies, 17 of 24 euro-area countries, and 21 of 46 African Union countries exhibited a sustainability gap below average. Estimates suggest LMIs that prevent or limit the formation of dual markets, along with measures to ensure fiscal sustainability, can mitigate the effects of stagnation on inequality. In countries where LMIs facilitate the emergence of dual markets, inequality can increase significantly, by about 25 percent in the Palma ratio. This contrasts with countries that limit the emergence of dual markets, where the increase in inequality is around 10 percent. Additionally, countries experiencing debt distress or distressed debt dynamics see substantial increases in inequality—close to 20 percent—likely due to unsustainable growth paths and limited fiscal space. Countries with lower consolidation needs show milder increases in inequality, of about 5 percent.

7. Empirical evidence suggests redistribution, education spending, and social safety nets are linked to smaller correlations between stagnation and inequality. Countries with above the median levels of redistribution do not experience significant increases in inequality during stagnation periods. Increased education spending and a higher share of government spending on health, which reflect the strength of social safety nets, are also associated with smaller increases on inequality around stagnation episodes.

8. The following model is estimated to assess the marginal effects on inequality of fiscal and monetary responses during stagnations:

$$\Delta\, Palma\ Ratio_{c\,t+h} = \beta_h^0 \Delta GDP_{c\,t}^r + \alpha_h^0 Policy_{c,t} + \beta_h^1 Policy_{c,t} \times \beta_h^0 \Delta GDP_{c\,t}^r + \delta_c + \gamma_t + x'_{c\,t}\alpha + \varepsilon_{c\,t+h}.$$

Here $Policy_{c,t}$ refers to the monetary and fiscal expansions. The interaction between policy and output losses captures the attenuating or amplifying effect of policy around stagnations. Fiscal expansion is

[2]The primary balance sustainability gap is the difference between the primary balance and the debt-stabilizing primary balance.

measured as the percentage increase in public debt with respect to pre-stagnation periods. Monetary expansion is measured as the deviation of the monetary policy rate with respect to the trend, as to capture the monetary policy cycle.

9. Figure 12 in the main text displays the sensitivity of the correlation between stagnations and inequality with respect to fiscal and monetary policy responses. Empirical results show that fiscal policy is associated with a more muted relation between stagnations and inequality. If a country enters stagnation with a 1 percent higher level of public debt, the increase in the Palma ratio around could about 20 basis points. Monetary policy expansions are associated with increases in inequality during stagnations. A monetary expansion of 100 basis points is linked to an increase in the Palma ratio of about 1 percent. The results suggest that an appropriate policy mix and robust policy frameworks are related to smaller increases in inequality given economic output losses.