



# GROUP OF TWENTY

## G-20 REPORT ON STRONG, SUSTAINABLE, BALANCED, AND INCLUSIVE GROWTH— ONLINE ANNEX

2022



Prepared by Staff of the  
**INTERNATIONAL MONETARY FUND\***

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

November 2022



## Annex I. Concepts, Definitions, and Measurement

**1. This annex presents concepts, definitions, and measurement relevant for the assessment of the quality of growth and policies.** Detailed charts for the four dimensions of strong, sustainable, balanced, and inclusive growth (SSBIG) are presented in Annex II.

### A. Strong, Sustainable, Balanced, and Inclusive Growth

**2. This section describes how strong, sustainable, balanced, and inclusive growth is operationalized across the four dimensions.** While indicators for each of the four individual aspects of growth are listed below, there are important areas of overlap across these four dimensions. For example, the sustainability of growth ultimately depends on growth also being balanced, and vice versa.

- *Strong growth.* This dimension refers to short-term, cyclical growth. Indicators include GDP growth, the output gap, and inflation (in levels and in deviations from inflation targets, where applicable).
- *Sustainable growth.* This dimension refers to medium- and long-term growth. Indicators include potential growth, total factor productivity growth, labor productivity growth, and progress towards tackling climate change.
- *Balanced growth.* This dimension refers to the composition of growth (e.g., domestic versus external demand) and whether there is a build-up of external and domestic imbalances. *External excess imbalances* are derived from the IMF's External Sector Report, which provides estimates of the extent to which current accounts and real effective exchange rates differ from those warranted by fundamentals and desired policies, while taking into account reserve coverage and international investment position indicators. Indicators of *domestic private imbalances* include (non-financial) private sector debt and asset quality ratios. *Domestic public* imbalances are measured by the level of general government gross debt.
- *Inclusive growth.* This dimension refers to the degree of inequality in *outcomes* and in *opportunities*. Indicators of inequality in *outcomes* include the Gini coefficient and the ratio of the bottom income decile to the top income decile (i.e., the average income of the lowest 10 percent of earners relative to the average income of the top 10 percent of earners). The Gini coefficient captures inequality of outcomes in the broadest sense but is highly sensitive to changes in the middle of the income distribution and is less sensitive to changes in the tails of the distribution. The ratio of the bottom to the top income deciles captures changes in the extreme ends of the income distribution. Indicators of inequality in *opportunities* include measures of access to education and health (e.g., public expenditure on education and health can be an indicative measure of quality and access).

## B. Policies

### 3. This section discusses the indicators used for assessing the policy stances across the fiscal, monetary, and structural reform policy areas.

- *Fiscal policy.* The fiscal policy stance is measured as the change in the cyclically adjusted primary balance (CAPB), where the balance is computed in percent of potential GDP. A contractionary (expansionary) fiscal policy stance reflects a positive (negative) change in the CAPB. The current and projected fiscal policy stance reflects the WEO baseline projections. The deviation of the recommended from the projected stance is expressed as the difference between IMF staff's recommended versus projected change in the CAPB. Therefore, IMF staff recommends a more contractionary (expansionary) fiscal stance than the projected one where the deviation of the recommended from the projected change is positive (negative). The recommended path for the CAPB assumes that recommendations are implemented in each year (e.g., the recommended change in year  $t$  assumes that recommendations for year  $t-1$  are implemented).
- *Monetary policy.* The monetary policy stance is measured as the difference between the actual real policy interest rate and approximations/estimates of the (unobservable) natural real interest rate. A contractionary (expansionary) or tight (accommodative) monetary policy stance reflects an actual real policy interest rate above (below) the natural rate. Given the uncertainty surrounding these measures, the projected baseline path in the heatmaps in the main text is based on IMF staff's assessments, and policy recommendations are expressed as deviations from this path.
- *Structural reforms.* The structural reform policy areas considered are those for which there are quantifiable indicators of structural reforms. These include (i) product market regulation; (ii) trade liberalization; (iii) employment protection legislation; (iv) tax structure reform (direct vs. indirect taxes); (v) Research and Development (R&D) spending; (vi) labor tax wedge; (vii) childcare spending (or other reforms to increase female labor force participation); (viii) active labor market policies; and (ix) unemployment benefit replacement rates. While this set of indicators captures key structural reform needs, it does not necessarily provide a complete description of the structural reform agenda for every country. Structural reform recommendations reflect consensus assessments of the IMF and the OECD and are expressed in terms of reform priorities ("high", "medium", or "low").<sup>1</sup>

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<sup>1</sup> IMF and OECD recommendations are based on priorities for additional reforms (relative to reforms already incorporated in the baseline), aggregated based on a simple rule. For example, a "high" priority rating requires that both IMF and OECD staff found reforms in a certain area to be very urgent.

## Annex II. Supplementary Charts

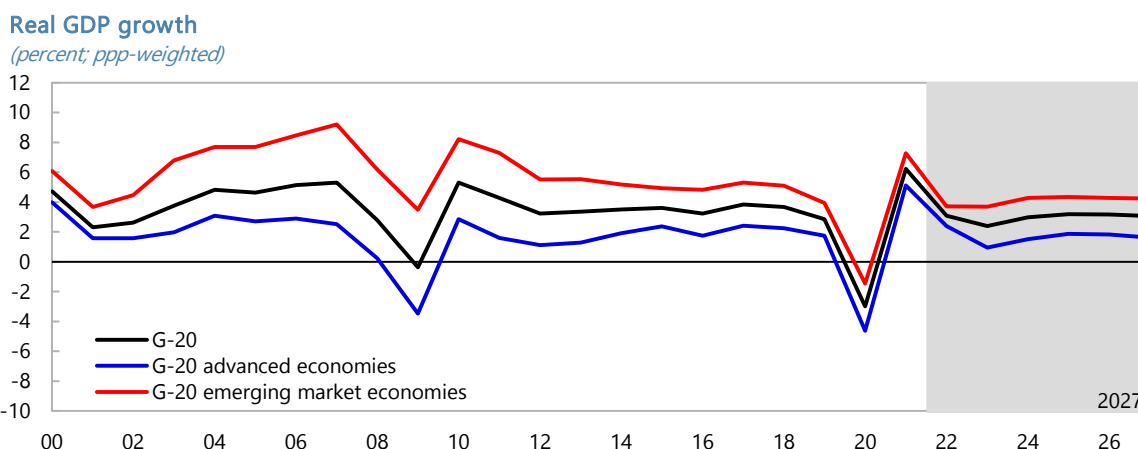
**1. This annex presents statistics on Strong, Sustainable, Balanced, and Inclusive Growth (SSBIG) and the macroeconomic policy stance.** The indicators for SSBIG correspond to those described in Annex I: (i) strong growth; (ii) sustainable growth; (iii) balanced growth; and (iv) inclusive growth. Data are mainly from the October WEO database, complemented with other sources where needed and as specified in footnotes to the charts. Aggregates include the European Union, unless otherwise specified. While the European Union includes both advanced and emerging market economies, for presentational purposes, it is depicted in charts among advanced economies.

**2. The size of output and inflation gaps as well as the assessment of policy stances are qualified relative to historical fluctuations.** In particular, the standard deviation of historical realizations across G-20 economies are added to some charts. Differentiation by advanced and emerging market economies is used in some cases. Where relevant, shadings in the charts indicate the following ranges: within  $\frac{1}{2}$  standard deviation from 0; within  $\frac{1}{2}$  and 1 standard deviation from 0; and outside the 1 standard deviation interval.

**3. Measurement uncertainty is illustrated for the output gap.** The charts show three different methods for estimating potential output and the output gap: one method where the estimates and projections are from the WEO database and two alternative methods to illustrate measurement uncertainty. The alternative methods include (i) one where potential output is derived from a simple HP filter; and (ii) one which is based on consensus forecasts of 1-, 2-, and 5-year-ahead growth rates.

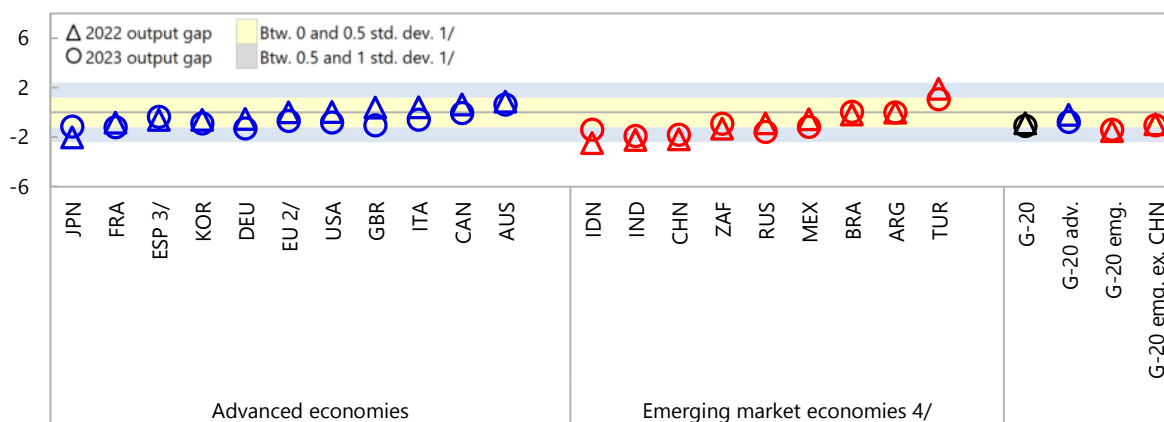
## A. Dimension: Strong Growth

Figure AII.1. Real GDP Growth and Output Gap, 2000–26



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

**WEO output gap estimate**  
(percent of potential GDP)



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

1/ Standard deviations are calculated from 1990 to 2019, excluding outliers above 99% and below 1% for each income group.

2/ EU: consists of both advanced economies and emerging market economies.

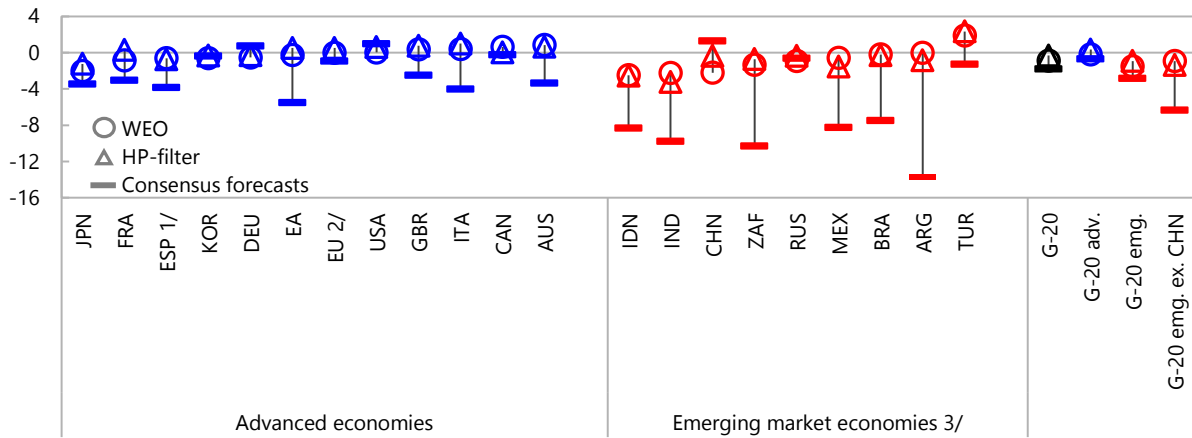
3/ ESP: permanent invitee.

4/ SAU: output gap estimates for 2022 and 2023 are not available.

**Figure AII.2. Output Gap: Alternative Estimates, 2022 and 2023**

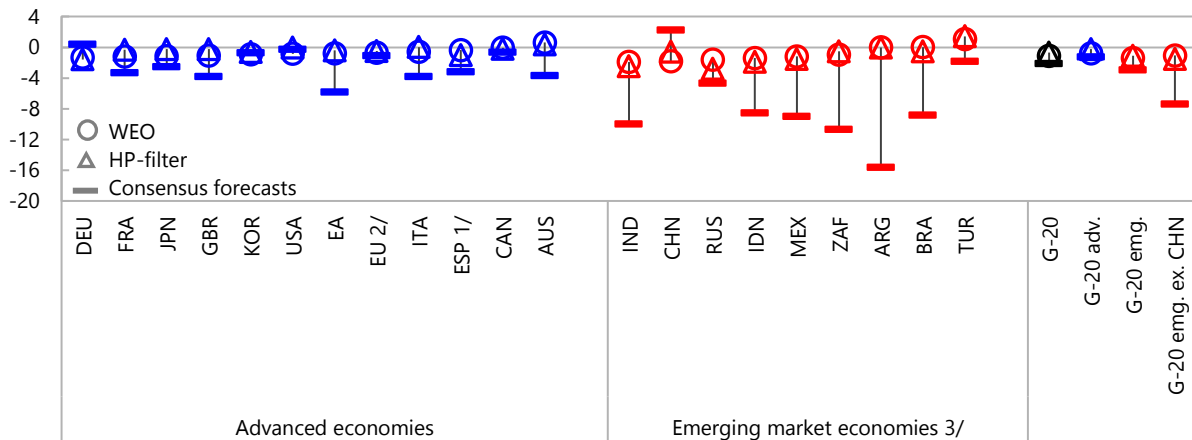
**Different measures of output gap, 2022**

(percent of potential GDP)



**Different measures of output gap, 2023**

(percent of potential GDP)



Sources: IMF, World Economic Outlook; Consensus Forecasts; and IMF staff calculations.

Note: As time-series estimates for potential growth are not available from Consensus Economics. Output gap estimates based on Consensus forecasts use real and potential GDP projections based on current year and 5-year-ahead growth rates from Consensus Economics, July 2022 and 2022Q1, respectively.

1/ ESP: permanent invitee.

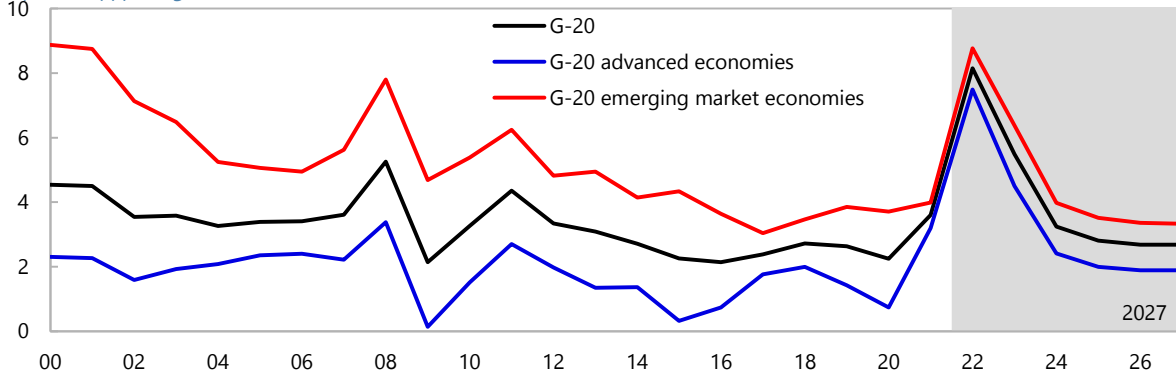
2/ EU: consists of both advanced economies and emerging market economies.

3/ SAU: output gap, HP-filter estimate, and 5-year ahead Consensus Forecast data are not available.

Figure AII.3. Inflation, 2000–27

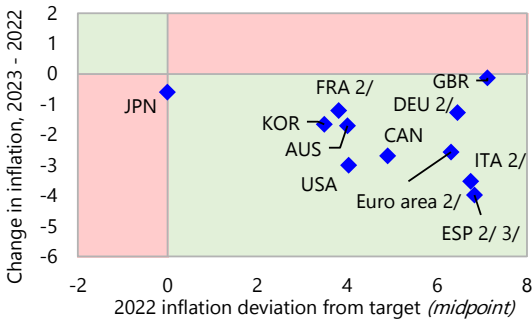
CPI inflation

(percent; ppp-weighted)



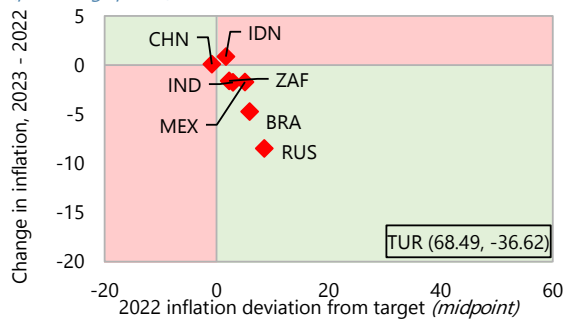
Change in annual inflation and deviation from inflation target: Advanced economies 1/

(percentage points)



Change in annual inflation and deviation from inflation target: Emerging market economies 4/

(percentage points)



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

1/ PCE inflation projections have been used for USA and period-average CPI for all other countries.

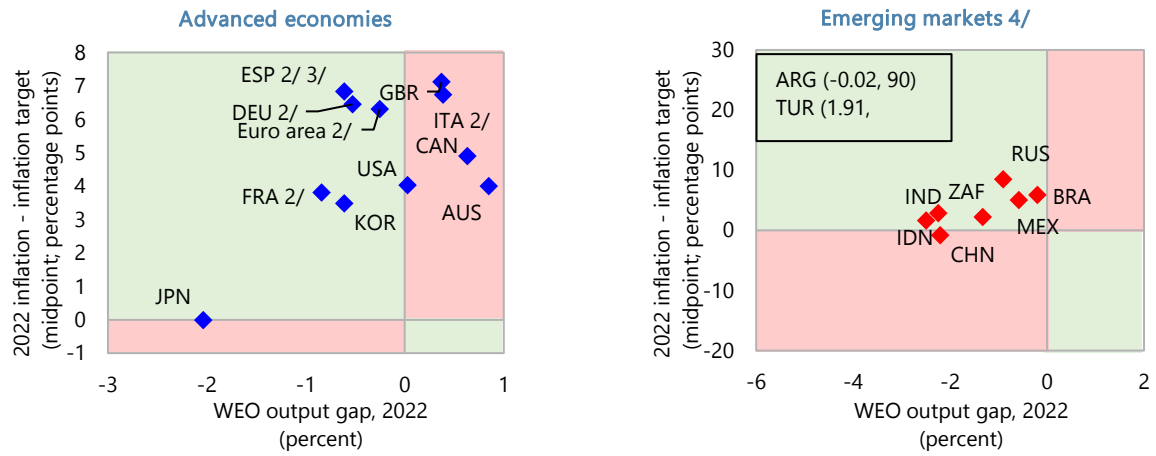
2/ The European Central Bank (ECB) targets the Harmonized Index of Consumer Prices as a medium-term objective for the euro area as a whole. For presentational purposes, the ECB objective is also used for individual euro area members.

3/ ESP: permanent invitee.

4/ SAU: does not have an inflation target.



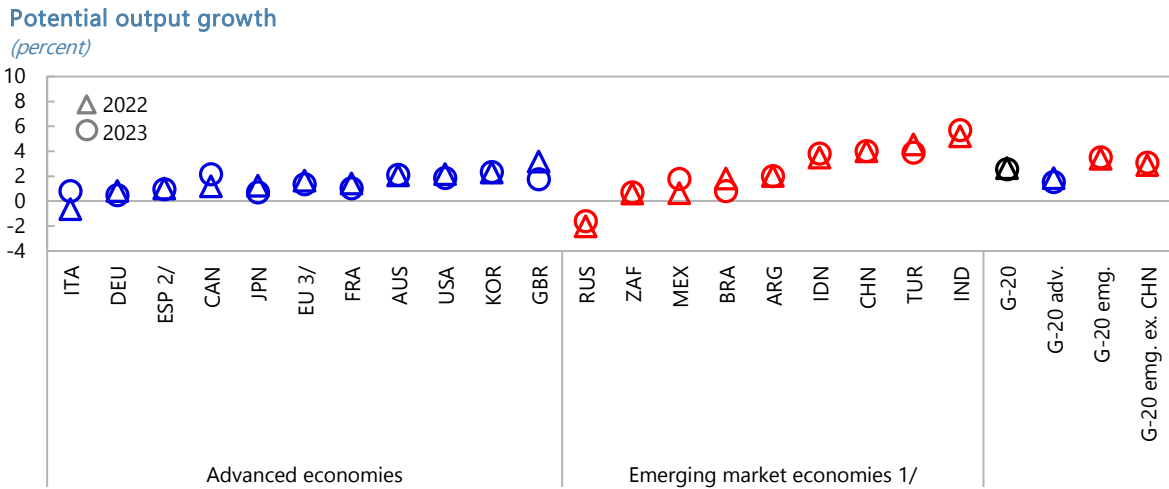
**Figure All.4. Output Gaps and Deviations from Inflation Targets, 2022 1/**



Sources: IMF, *World Economic Outlook*; IMF staff calculations.  
 1/ US: PCE inflation projections; ARG, TUR, RUS: end-of-period CPI inflation; period-average CPI for all other countries.  
 2/ The European Central Bank (ECB) targets the Harmonized Index of Consumer Prices as a medium-term objective for the euro area as a whole. For presentational purposes, the ECB objective is also used for individual euro area members.  
 3/ ESP: permanent invitee.  
 4/ SAU: does not have an inflation target.

**B. Dimension: Sustainable Growth**

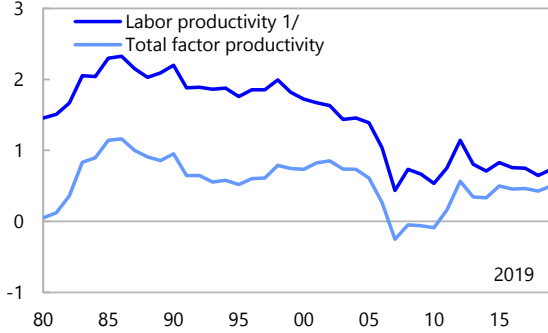
**Figure All.5. Potential Growth, 2022–23**



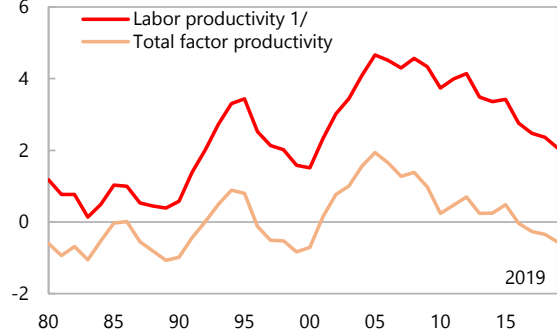
Sources: IMF, *World Economic Outlook*; IMF staff calculations.  
 1/ SAU: potential GDP estimates for 2022 and 2023 are not available.  
 2/ ESP: permanent invitee.  
 3/ EU: consists of both advanced economies and emerging market economies.

**Figure AII.6. Productivity Growth, 1980–2019**

**Productivity growth: Advanced economies 2/**  
(ppp-weighted; 5-yr center moving average)



**Productivity growth: Emerging markets 3/**  
(ppp-weighted; 5-yr center moving average)



Sources: Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015), "The Next Generation of the Penn World Table" American Economic Review, 105(10), 3150-3182, available for download at [www.ggdc.net/pwt](http://www.ggdc.net/pwt); IMF, *World Economic Outlook*; IMF staff calculations.

1/ Labor productivity is calculated as real GDP per person employed.

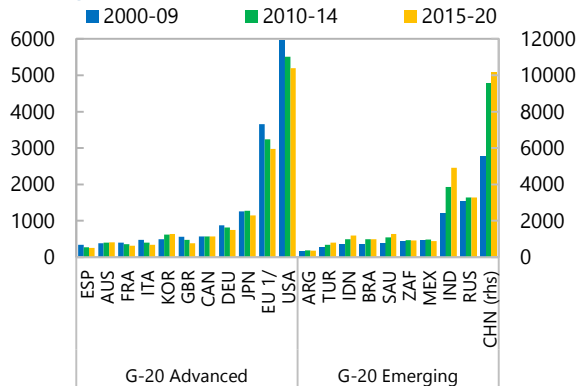
2/ Includes ESP, but not other EU advanced economies due to data limitations.

3/ Excludes RUS, SAU, and other EU emerging market economies due to data limitations.

**Figure AII.7. Climate, 2000–20**

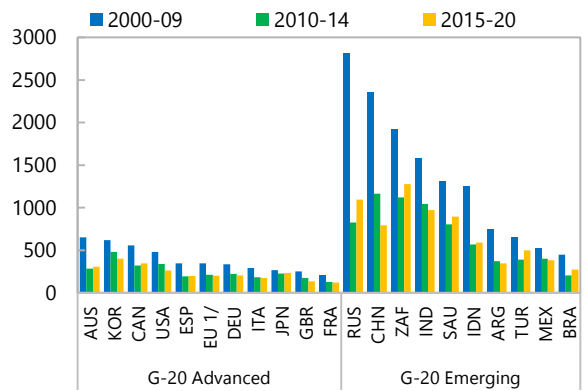
**G-20: Total emissions**

(Average; metric ton of CO<sub>2</sub> equivalent of GHGs)



**G-20: Emissions intensity of output**

(Average; total CO<sub>2</sub> equivalent of GHGs/ million dollar GDP)



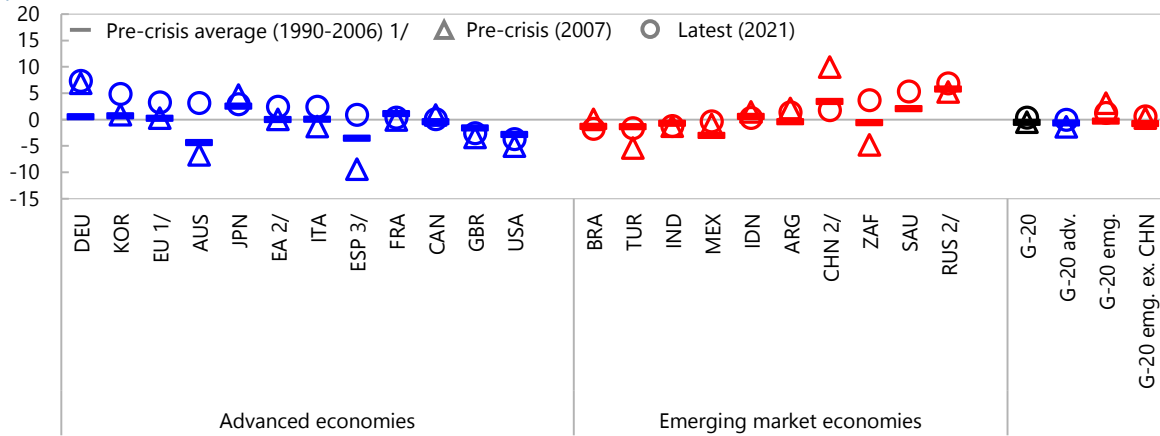
Sources: Global Carbon Project/ClimateWatch; and IMF staff calculations.

1/ EU: consists of both advanced economies and emerging market economies.

### C. Dimension: Balanced Growth

**Figure All.8. Current Accounts, 1990-2021**

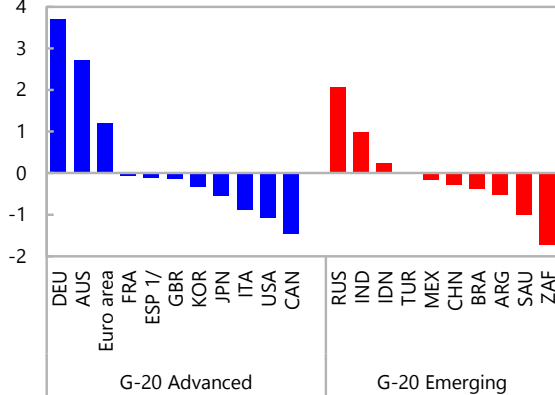
**Current account balance**  
(percent of GDP)



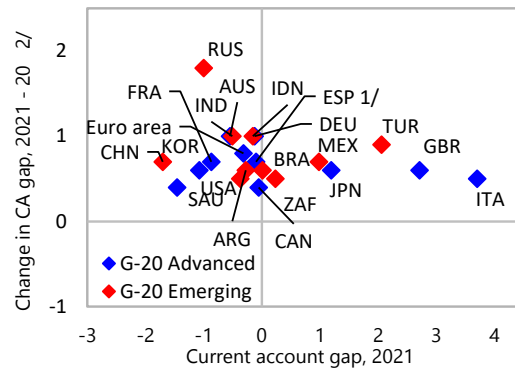
Sources: IMF, *World Economic Outlook*; and IMF staff calculations.  
 1/ EU: consists of both advanced economies and emerging market economies.  
 2/ RUS: earliest data from 1982; CHN and euro area: from 1997.  
 3/ ESP: permanent invitee.

**Figure All.9. Current Account Gaps, 2020-21**

**Current account gap, 2021**  
(percentage points)



**Current account gap assessment, 2020-21**  
(percentage points)

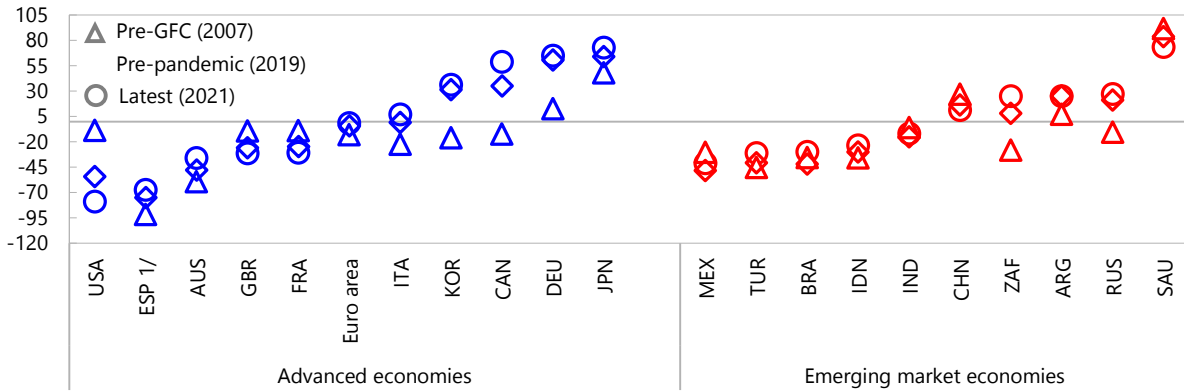


Source: IMF, *External Sector Report*, 2022.  
 1/ ESP: permanent invitee.  
 2/ CA denotes the current account. Gaps are relative to IMF staff assessed current account norms.

**Figure All.10. Net International Investment Positions, 2007–21**

**Net international investment position**

(percent of GDP)



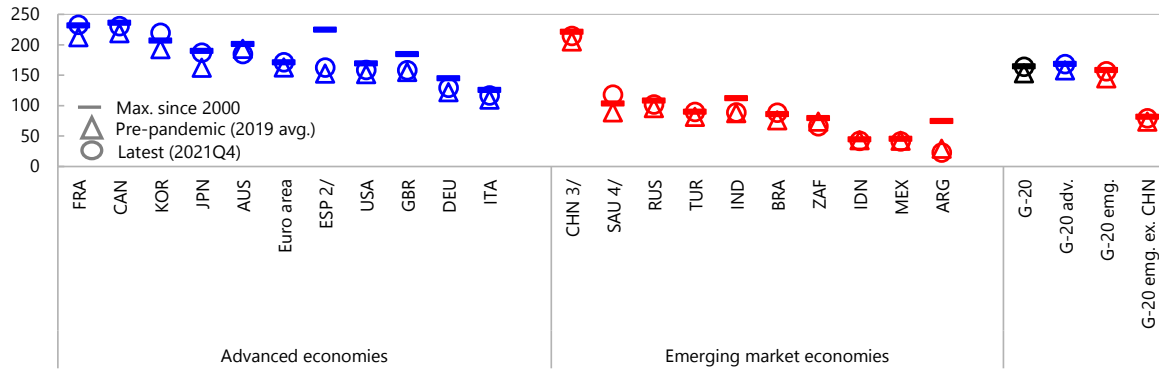
Sources: IMF, *Balance of Payments Statistics*; IMF, *World Economic Outlook*; IMF staff calculations.

1/ ESP: permanent invitee.

**Figure All.11. Private Non-Financial Sector Debt, 2000–21**

**Private debt 1/**

(percent of GDP)



Sources: BIS; Haver Analytics; IMF, *World Economic Outlook*; IMF staff calculations.

1/ Credit to the private non-financial sector, which includes borrowing by non-financial corporations and households and reflects lending by domestic and foreign banks, as well as holdings of debt securities.

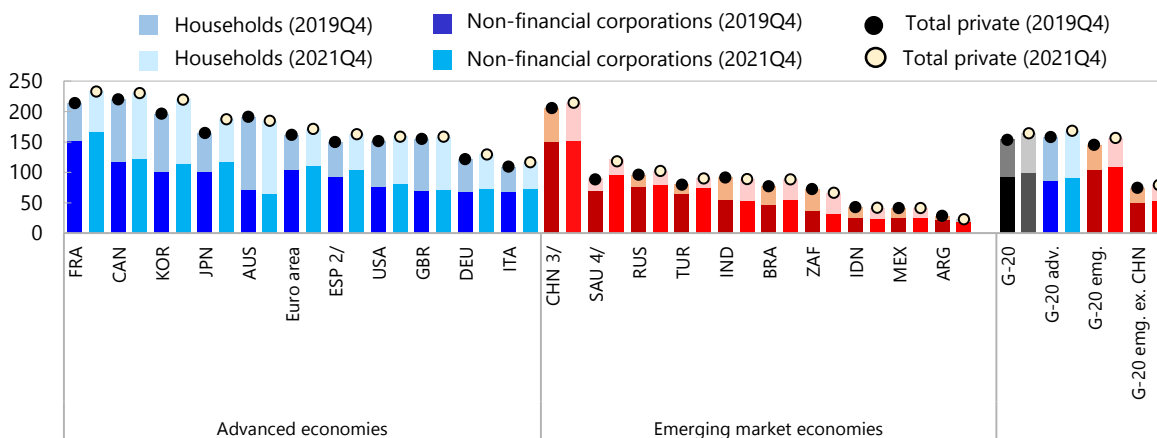
2/ ESP: permanent invitee.

3/ CHN: private debt includes local government financing vehicles (LGFV) debt.

4/ SAU: data expressed in percent of non-oil GDP.

**Figure All.12. Private Non-Financial Sector Debt by Sector, 2019–21**

**Private debt by sector 1/**  
(percent of GDP)



Sources: BIS; Haver Analytics; IMF, *World Economic Outlook*; IMF staff calculations.

Note: For the legend, blue: advanced economies, red: emerging economies, and purple: G-20.

1/ Credit to the private non-financial sector, which includes borrowing by non-financial corporations and households and reflects lending by domestic and foreign banks, as well as holdings of debt securities.

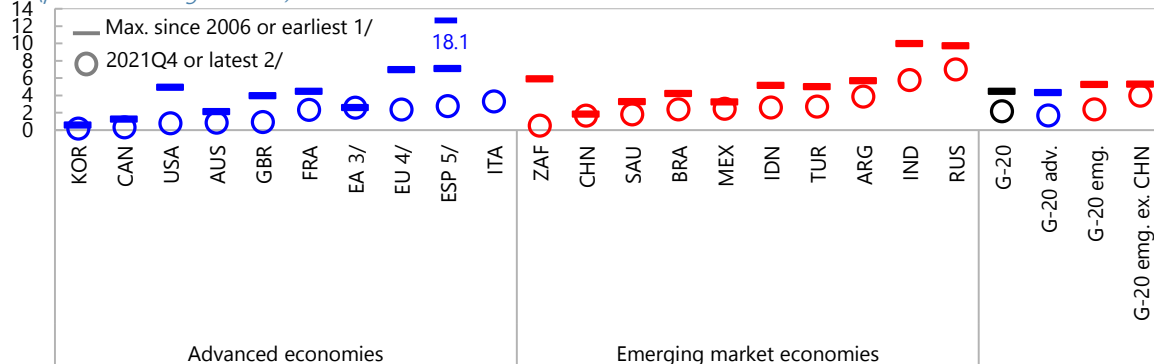
2/ ESP: permanent invitee.

3/ CHN: private debt includes local government financing vehicles (LGFV) debt.

4/ SAU: data expressed in percent of non-oil GDP.

**Figure All.13. Non-Performing Loans, 2006–2021**

**Non-performing loans**  
(percent of total gross loans)



Sources: IMF, Financial Soundness Indicators; IMF, *World Economic Outlook*; and IMF staff calculations.

1/ FRA, GBR, IND, KOR, RUS, ZAF: data available from 2008; JPN, SAU, USA: from 2009; CHN: from 2010. Euro area: maximum is calculated since 2008 due to data limitations.

2/ ARG, CAN, CHN, ESP, IND, IDN, TUR: latest data from 2022Q1; BRA, FRA, RUS: latest data from 2021Q3; KOR: latest data from 2021Q2; MEX, ZAF: latest data from 2021Q1; DEU: latest data from 2019; JPN: no data available.

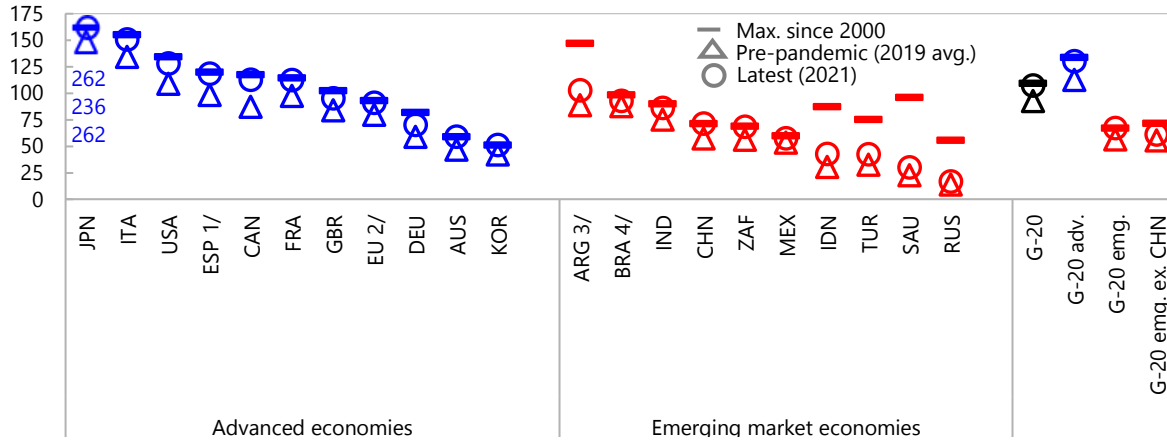
3/ Euro area: average of NPLs of 17 countries, weighted by nominal GDP. FIN and LUX are excluded due to data limitations.

4/ EU: consists of both advanced economies and emerging market economies.

5/ ESP: permanent invitee.

**Figure All.14. Public Sector Debt, 2000–21**

**General government gross debt**  
(percent of GDP)



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

1/ ESP: permanent invitee.

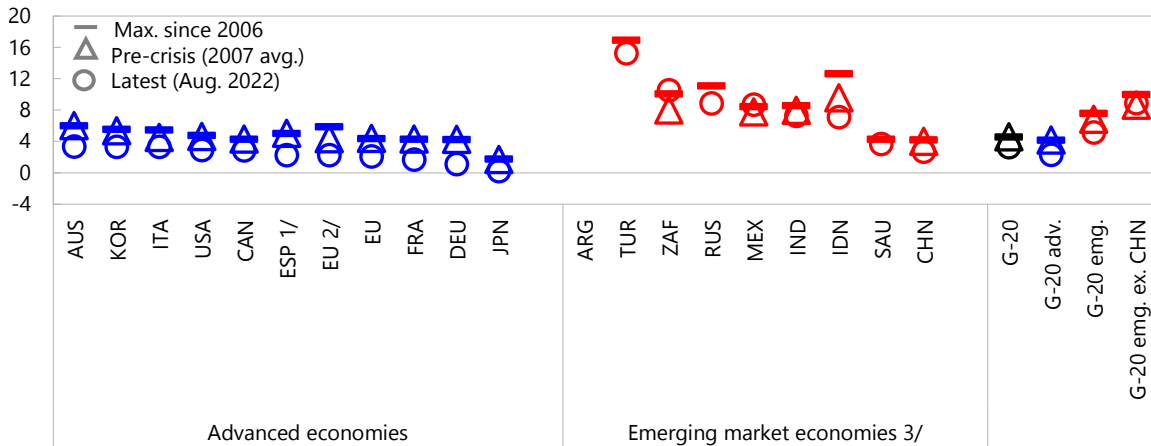
2/ EU: consists of both advanced economies and emerging market economies.

3/ ARG: data cover federal government gross debt in percent of GDP.

4/ BRA: general government data refer to the nonfinancial public sector.

**Figure All.15. Sovereign Bond Yields, 2006-22**

**10Y sovereign bond yield**  
(percent)



Sources: Bloomberg L.P.; Haver Analytics; European Central Bank; IMF, *World Economic Outlook*; and IMF staff calculations.

1/ ESP: permanent invitee.

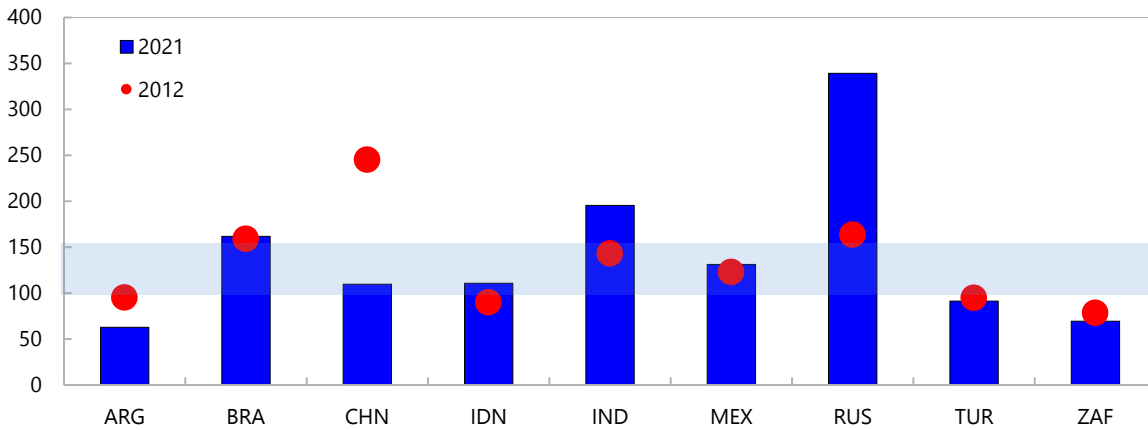
2/ EU: consists of both advanced economies and emerging market economies.

3/ ARG: missing historical data due to data limitations; RUS and TUR: data start from 2010; SAU: data start from Oct. 2016.

**Figure AII.16. Reserve Adequacy in Emerging Market Economies, 2012–21**

**Reserve adequacy**

(percent of unadjusted ARA metric)



Source: IMF, Assessing Reserve Adequacy.

Note: Shaded area reflects the range within which reserves are assessed as broadly adequate based on the IMF composite Assessing Reserve Adequacy (ARA) metric. See IMF, 2015, “[Assessing Reserve Adequacy—Specific Proposals](#)”. China: use ARA metric adjusted for capital controls.

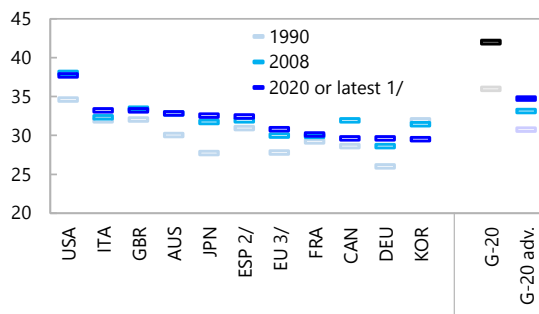
## D. Dimension: Inclusive Growth

### Income Inequality Trends (pre-pandemic)

**Figure AII.17. Income Inequality by Gini Coefficient, 1990–2020**

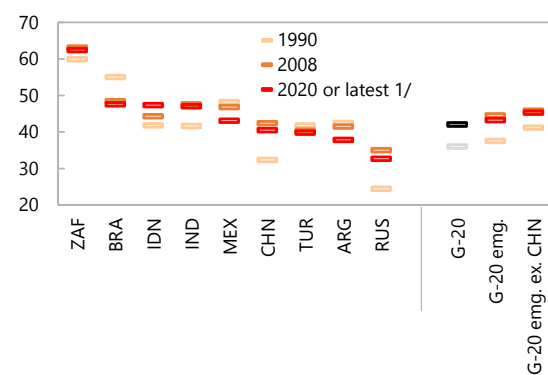
**Income inequality: Advanced economies**

(Gini coefficient, net)



**Income inequality: Emerging markets 4/**

(Gini coefficient, net)



Sources: Solt, F., 2020, The Standardized World Income Inequality Database, SWIID Version 9.3, June 2022; and IMF staff estimates.

1/ AUS, KOR, MEX: latest data are from 2018; ARG, BRA, DEU, ESP, FRA: from 2019; ZAF: from 2017.

2/ ESP: permanent invitee.

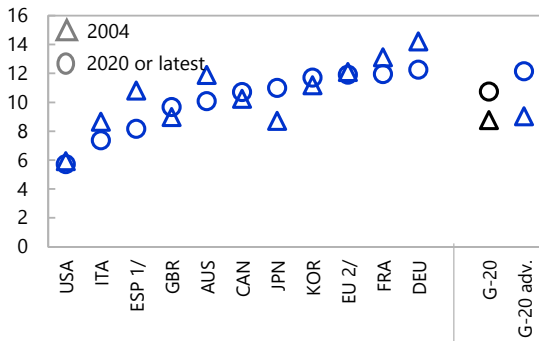
3/ EU: consists of both advanced economies and emerging market economies.

4/ SAU: excluded due to data limitations.

**Figure AII.18. Income Inequality by Income Decile, 2004–21**

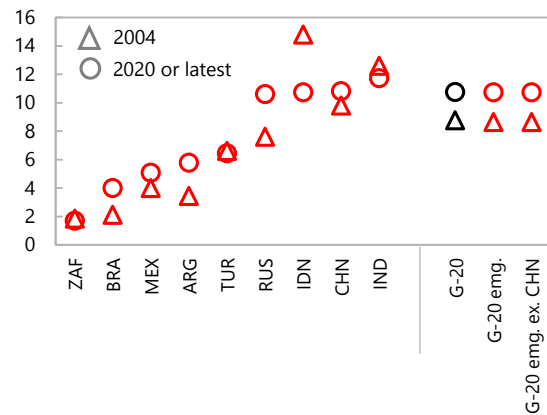
**Income inequality: Advanced economies**

(ratio between bottom and top income decile in percent)



**Income inequality: Emerging markets**

(ratio between bottom and top income decile in percent)



Sources: UNU-WIDER, World Income Inequality Database (WIID), June 2022; IMF, *World Economic Outlook*; and IMF staff calculations.

Note: Given data limitations, different concepts and coverage to assess inequality are used across countries: CHN, IDN, IND, RUS, ZAF, TUR: Resource concepts – consumption, area coverage – all; ARG: resource concept- (net/gross) income, area coverage-urban; Other countries: resource concepts – (net/ gross) income, area coverage – all. When 2004 numbers are not available, the following are: CHN, IND, ZAF: 2005; KOR: 2006; JPN: 2008. When 2020 numbers are not available, the following are used: IND: 2012; JPN: 2014; ZAF: 2015; KOR: 2016; CAN: 2017; AUS, DEU, GBR: 2018; FRA, ITA, USA, CHN, TUR: 2019; IDN: 2021. No data availability for SAU.

1/ ESP: permanent invitee.

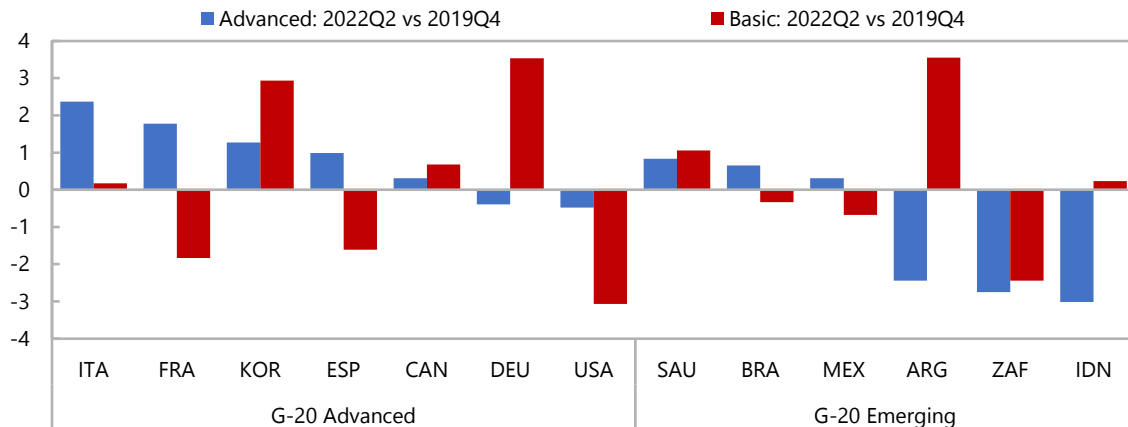
2/ EU: consists of both advanced economies and emerging market economies.

**Indicative Measures for Inequality in 2020**

**Figure AII.19. Employment Rate by Skill Level, 2019–22**

**Change in employment rate by skill 1/**

(percentage point)



Sources: International Labor Organization; Country authorities; and IMF staff calculations.

Note: Basic: Lower secondary education and below. Advanced: Tertiary education and above.

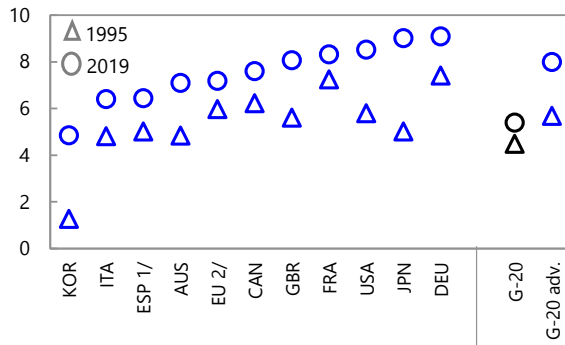
1/ 2019Q3 data is used for IDN, 2022Q1 data is used for ARG, IDN, and SAU.



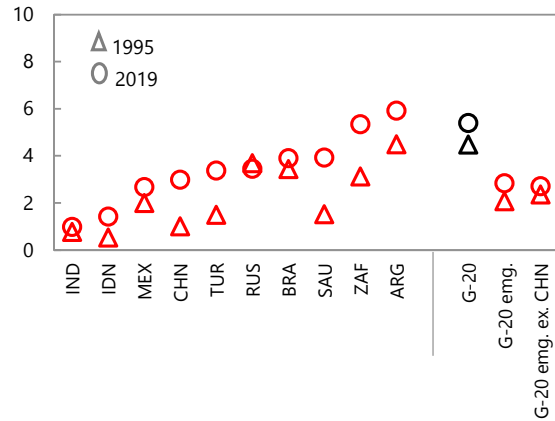
## Health and Education Spending Trends (pre-pandemic)

**Figure AII.20. Public Health Expenditures, 1995–2019**

Public health expenditures: Advanced economies  
(percent of GDP)



Public health expenditures: Emerging market economies  
(percent of GDP)



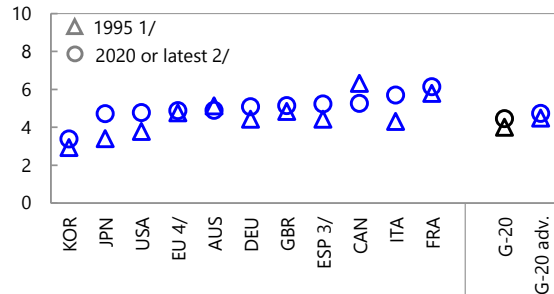
Sources: IMF, *World Economic Outlook*; World Bank, World Development Indicators; IMF staff calculations.

1/ ESP: permanent invitee.

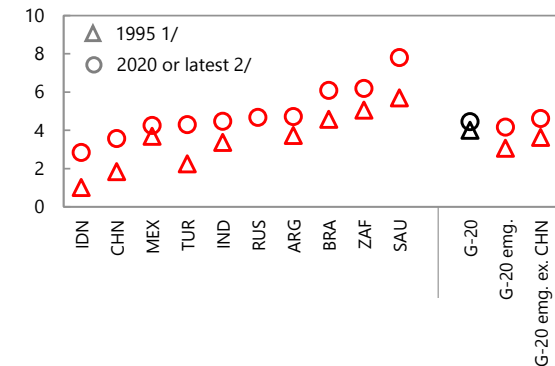
2/ EU: consists of both advanced economies and emerging market economies.

**Figure AII.21. Public Education Expenditures, 1995–2020**

Public education expenditures: Advanced economies  
(percent of GDP)



Public education expenditures: Emerging market economies  
(percent of GDP)



Sources: IMF, *World Economic Outlook*; World Bank, World Development Indicators; OECD; Ministry of Finance; and IMF staff calculations.

1/ IND: earliest data are from 1997; ARG and ZAF: from 1996; and RUS: no data for 1995.

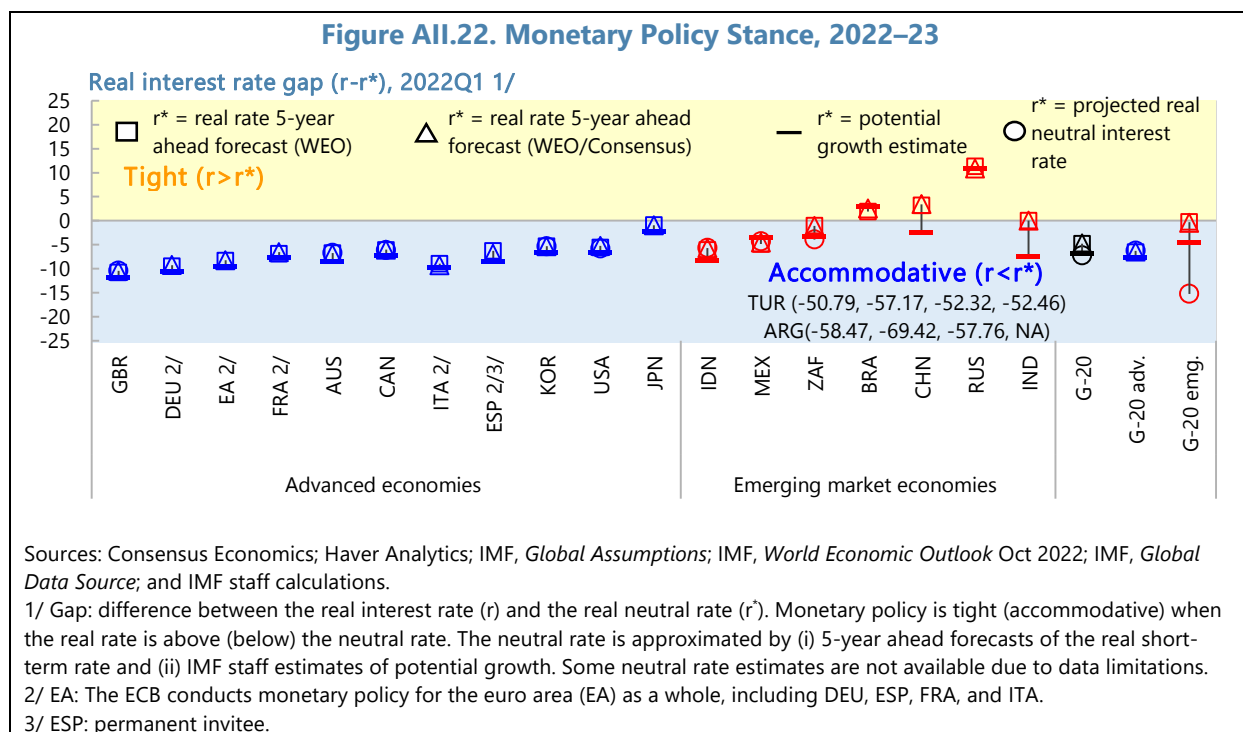
2/ BRA, MEX, RUS, and TUR: latest data are from 2018; CAN: from 2011; IDN, KOR: from 2019. Data for AUS, FRA, DEU, ITA, JPN, KOR, GBR, USA, and ESP are from the OECD database.

3/ ESP: permanent invitee.

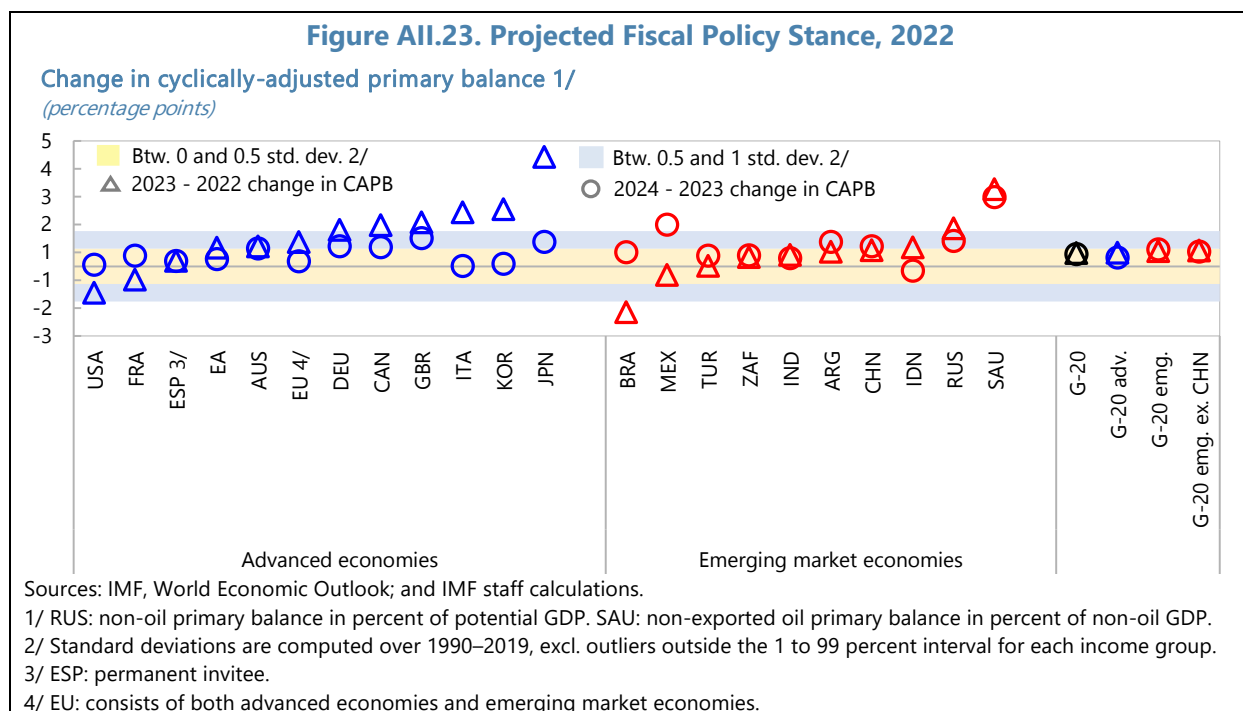
4/ EU: consists of both advanced economies and emerging market economies.

## E. Macroeconomic Policy Stance

### Monetary Policy



### Fiscal Policy



## Annex III. Simulations: Impact of Policy Recommendations

**1. This annex describes how the impact of implementing recommended policies is estimated and presents simulation results.** The impact on Strong Sustainable, Balanced, and Inclusive Growth is computed using the IMF's G-20 model.<sup>1</sup> The model evaluates the economic impact of a change in policies to reflect IMF staff's recommendations relative to those projected under the current baseline projections in a dynamic general equilibrium setting. The quantification of specific policies is described in section A of this annex. Simulation results are shown in section B.

### A. Quantifying Policy Recommendations

**2. The simulations are based on a quantification of policy recommendations as follows:**

- *Fiscal policy.* A more contractionary (expansionary) fiscal policy corresponds to a positive (negative) deviation between the recommended and projected changes in the cyclically adjusted primary balance (CAPB). The deviation is quantified by IMF staff's recommendations for the changes in the CAPB.
- *Monetary policy.* A moderately more contractionary (expansionary) monetary stance corresponds to a 75 basis points increase (decrease) in the policy rate relative to the baseline. A substantially more contractionary (expansionary) corresponds to a 150 basis points increase (decrease).
- *Structural reforms.* The simulations assume that recommended structural reforms are gradually implemented over 10 years, starting in 2022. The magnitude of the changes in the structural reform indicators is based on historical episodes of major reforms, with the speed of implementation reflecting the behavior exhibited by G-20 countries in the implementation of their growth strategies so far. Policy recommendations are expressed in terms of reform priorities: "high" priority reforms are implemented as  $\frac{3}{4}$  of the historical magnitude of major reforms; "medium" priority reforms as  $\frac{1}{2}$  of the historical magnitude; and "low" priority reforms as  $\frac{1}{3}$  of the historical magnitude. Reform priorities reflect a consensus assessment by IMF and OECD staff. The quantitative evaluation of the impact of structural reforms on productivity and labor markets is based on a series of OECD analytical papers.<sup>2</sup>

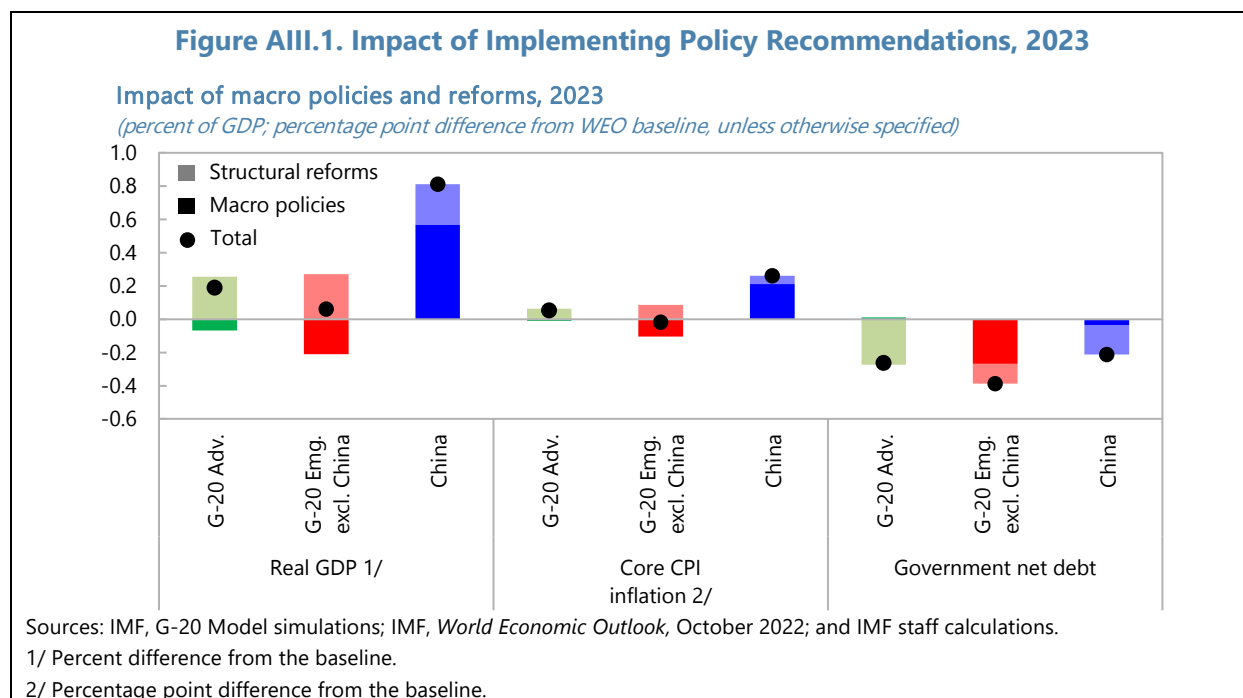
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<sup>1</sup> Andrieu, M., P. Blagrove, P. Espallat, K. Honjo, B. Hunt, M. Kortelainen, R. Lalonde, D. Laxton, E. Mavroeidi, D. Muir, S. Mursula, and S. Snudden, 2015, [The Flexible System of Global Models – FSGM](#), IMF Working Paper No. 15/64.

<sup>2</sup> Examples include Egert, B. and P. Gal, 2017, [The Quantification of Structural Reforms in OECD Countries: A New Framework](#), OECD Economics Department Working Paper No. 1354; Bouis, R. and R. Duval, 2011, [Raising Potential Growth After the Crisis: A Quantitative Assessment of the Potential Gains from Various Structural Reforms in the OECD Area and Beyond](#), OECD Economics Department Working Papers No. 835.

## B. Simulation Results: Impact of Policy Recommendations

### Short-Term Impact



### Medium-Term Impact

