Methodology Note:
Measuring Distance to SDGs

Introduction

With the aim of helping its member countries implement the 2030 Agenda, and at their request, the OECD has developed a unique methodology to measure the distance that OECD countries need to travel to achieve the SDG targets. Since 2016, a series of reports have presented the OECD average and country-level distance from SDG targets, based on indicators from UN and OECD databases. These reports have also presented the current data gaps and identified areas where statistical development would be critical to assess whether OECD governments are meeting the commitments they made when signing the 2030 Agenda in 2015.

Beyond providing a static snapshot of where countries stand today, OECD (2022[1]) developed a methodology to assess progress towards the SDGs over time, including a trend assessment (i.e. whether the trend is upward, stable or downward based on current policies) and projections based on stochastic methods to assess the likelihood of achieving the 2030 targets.

Selecting Indicators

The foundation of the assessment is **the Global SDG Indicator Framework**[1], which was developed by the IAEG-SDGs[2] and adopted by the UN General Assembly. This is based on the consultations with delegates to the OECD Committee on Statistics and Statistical Policy and reflects a number of considerations, including the role of the statistical community in monitoring the UN process and the Global SDG Indicator Framework as the *only* internationally endorsed framework for monitoring the Sustainable Development Goals. The indicators included in this framework are considered by the statistical community to be the best choice for monitoring the SDG targets across countries, given the state of available information. By adhering as closely as possible to the Global SDG Indicator Framework, the scope for additional judgements and interpretations of the SDG targets is limited.

While the SDGs and the Global SDG Indicator Framework apply to all countries, as acknowledged by the 2030 Agenda, the targets (and therefore the indicators) are aspirational and global, and may need to be adapted to national context:

> *"Targets are defined as aspirational and global, with each Government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each Government will also decide how these aspirational and global targets should be incorporated into national planning processes, policies and strategies."*

In this spirit, and while recognising the need for comparability among OECD member countries, the present assessment goes beyond the Global SDG Indicator Framework in a few cases. In particular, for:

[1] According to the Resolution adopted by the UN General Assembly on Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development, the indicator framework is to be refined annually and reviewed comprehensively by the UN Statistical Commission every five years (i.e. in 2020 and in 2025). For instance, in 2020, the IAEG-SDGs proposed 36 major changes to the framework in the form of replacements, revisions, additions and deletions as part of the 2020 Comprehensive Review; these recommendations were approved by the UN Statistical Commission in March 2020.

[2] The Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs), composed of representatives of selected national statistical offices and including regional and international agencies as observers, was created in 2015 at the forty-sixth session of the UN Statistical Commission with the goal to develop and implement a global indicator framework for the Goals and targets of the 2030 Agenda. Since then, the global indicator framework developed by the IAEG-SDGs had been endorsed by the UN Statistical Commission and adopted by the UN General Assembly.

- Monitoring indicators and targets for which no comparable data are currently available. For example, Target 11.3 on sustainable urbanisation is meant to be monitored by the "ratio of land consumption rate to population growth rate". Yet, data series on this indicator are not currently included in the UN Global SDG Database. This assessment thus relies on OECD series on the average annual change in built area per capita (see Haščič and Mackie (2018[2]) for more details).
- Tailoring the analysis to the policy challenges confronting OECD countries, as reflected by the different work streams of the Organisation. For instance, focusing on mobile coverage to keep track of Target 9.c on connectivity would be inconsistent with the work carried out by the OECD working party on Communication Infrastructures and Services Policy that recognises the important interaction between fixed and mobile connectivity. Therefore, in this assessment, the monitoring of Target 9.c is complemented by a measure of fixed broadband subscriptions.

Choosing between different data sources

The assessment is based on data from both the UN Global SDG Database and OECD sources, which are used to populate the Global SDG Indicator Framework. However, neither of these sources provides an "off the shelf" solution for monitoring the SDGs in OECD countries. This means that a significant amount of data processing is required to support the work undertaken for the assessment.

UN data

The UN Global SDG Database compiles data provided by the UN System and other agencies (including the OECD) acting as "custodians" of specific indicators.[3] This database primarily aims at feeding the UN Secretary-General's annual report on "Progress towards the Sustainable Development Goals". In 2024, OECD countries were covered in this database by 669 unique data series[4] that allow keeping track of progress towards 163 of the 169 SDG targets[5] over a period that can extend more than 50 years. This database is fully aligned with the Global SDG Indicator Framework, meaning that each data series included in the database is associated to one of the indicators identified by the IAEG.

A number of steps were taken to structure the database to support the analysis in this assessment:

- First, some variables were transformed to make them usable for the analysis, for instance by converting monetary variables into constant PPPs or by attributing specific numerical values to data expressed as ranges (e.g. "<5" became 2.5).

[3] Custodian agencies are UN bodies and other international organizations responsible for compiling and verifying country data and metadata, and for submitting the data, along with regional and global aggregates, to the UN Statistics Division (UNSD). These agencies are also responsible for developing international standards and recommending methodologies for monitoring. Another responsibility of the custodian agencies is to strengthen national monitoring and reporting capacity. When country data are missing or collected using a different methodology or inconsistently reported by different sources, custodian agencies may need to produce estimates or adjust the data for specific countries (with all final data submitted to UNSD being validated and approved by countries).

[4] Some data series are repeated under two or three different targets.

[5] While the Database compiles all SDGs following the Global SDG Indicator Framework, these indicators may be at different stages of development, with some indicators already well developed and regularly collected and others at early stages of conceptual development and data collection. These global indicators are classified into three tiers based on their methodological development and data availability (see https://unstats.un.org/sdgs/iaeg-sdgs/tier-classification/ for further details).

- Second, systematic controls and quality checks were run to identify possible inconsistencies in data series.
- Third, all data series were carefully reviewed to discard those that do not directly measure the achievement of SDG Targets.[6]
- Finally, some data series refer to different population groups (e.g. by gender, age or disability status) but also by mode of transport, types of products, etc. The UN database is structured to allow identifying the "main" population, with additional data series being considered as "disaggregation" of the main one. In most cases, the choice of the most suitable series for this assessment was obvious. For instance, the proportion of fatal occupational injuries per 100 000 employees (indicator 8.8.1) is available by migratory status and gender but also for the total population, which was here selected as the main data series. However, in other cases, it was not possible to consider a specific data series as more representative than others. For example, the number of deaths attributed to non-communicable diseases (3.4.1) is available in the UN database for four different diseases (cardiovascular disease, cancer, diabetes or chronic respiratory disease). For these data series, all the different indicators were considered separately.

Following these adjustments, the assessment obtains 912 basic data series from the UN Global SDG Database, each linked to a specific SDG Indicator.

OECD data

In some cases, the degree of harmonisation and quality of the data used in the assessment has been enhanced by using data from OECD sources related to the IAEG-SDG Indicators. This allows the analysis to be tailored to the policy challenges faced by OECD countries, as reflected in the different workstreams of the Organisation.

The selection of OECD sources rested on an extensive consultation with other OECD directorates and affiliated bodies (such as the OECD Development Centre, the International Energy Agency or the International Transport Forum) that allowed to identify the most relevant and up-to-date sources. There are at least three main justifications for considering additional OECD data in this assessment:

- First, OECD data often complement the UN Global SDG Database through better quality data. OECD data generally follow strict standardisation procedures, validated by member countries, which facilitate cross-country comparison. The rigorous processes used by the OECD to collect and disseminate data allows meeting high statistical standards, thus providing higher quality and consistency than some of the data included in the UN Global SDG Database. For instance, under target 8.2, the indicator for productivity growth agreed by the IAEG is "8.2.1 Annual growth rate of real GDP per employed person". While this indicator is available in the UN Global SDG Database, OECD databases also include measures of productivity based on the number of hours worked, which provides a better assessment of the total quantity of labour inputs used in production (OECD, 2001[3]).
- Second, OECD data allows mirroring specific conditions from OECD countries. For instance, while mortality rates included in the OECD and the UN Global SDG Database are both based on the same original source (the WHO Mortality Database), the former are age-standardised (by the Secretariat) based on the structure of the OECD population in 2010. This avoids that countries'

[6] In particular, some data series in the UN Global SDG Database only provide additional detail to the "main" indicator. For instance, Indicator 5.5.1 on gender representation in parliaments includes the total number of seats in national parliament, the number of seats held by women as well as the proportion of seats held by women. Only the latter is included in the OECD framework underpinning this assessment.

comparisons are unduly influenced by differences in the age-structure of the population between different countries.

- Third, OECD sources usually provide a wider country coverage of member countries, longer time-series and more up-to-date data while remaining close to the spirit of the 2030 Agenda. Analysis included in OECD (2019[4]) showed that, for the vast majority of the IAEG indicators, the numerical values of these indicators based on OECD sources strongly correlate with those from the UN Global SDG Database.

After extensive review and consultation with other OECD directorates, 80 OECD data series have been identified to complement the 912 data series in the UN Global SDG Database. These OECD data cover 70 targets and span all 17 goals.

Restrictions

Together, UN and OECD sources comprise 992 data series but not all of them are included in the analysis. While these data are deemed by the statistical community to be accurate and relevant, in order to support a comparative benchmarking exercise, the data also needs to be broadly available among OECD countries and over time.

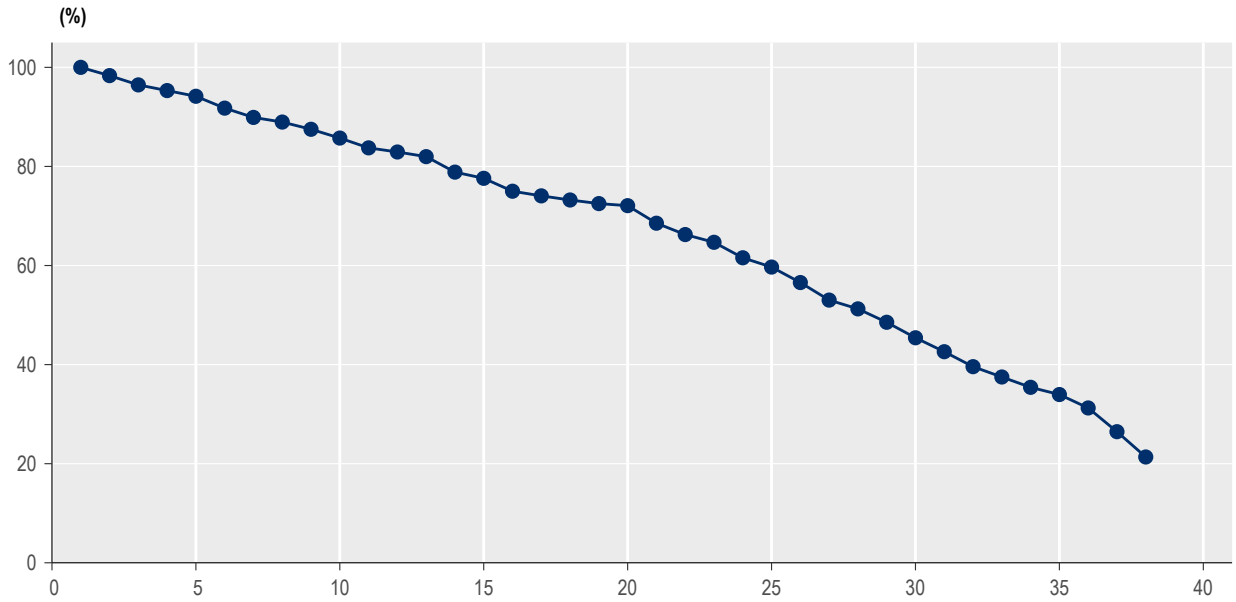
Minimum country coverage

Data series need to cover a minimum set of countries. Including indicators with a limited country coverage would decrease the robustness of the analysis. As the methodology underpinning this assessment uses a comparative approach to gauge a country's performance on SDGs, a limited distribution of data across countries is likely to affect the results. Both the normalisation method used in this assessment – which uses the standard deviation measured among countries performance at a given point in time – and (part of) the target-setting – with some end-values based on best performance observed across OECD countries – are comparative in nature and can thus be affected by a limited country coverage.

Yet, as country coverage grows, target coverage falls. Figure 1 shows that there is a clear trade-off between the number of countries included in the analysis and the number of available data series. While partial country coverage hinders the robustness of the analysis, a partial indicator coverage limits its comprehensiveness. Setting a high minimum threshold for country coverage would prevent a comprehensive assessment of member countries' performance on the 2030 Agenda, as no indicators may be available for some targets to support our analysis.

Half of the data series feeding this assessment cover most OECD countries (Figure 1). However, in practice, some of the data series are available for a much smaller number of OECD countries. For instance, around one in ten data series cover 6 OECD countries or less. Conversely, less than one in four data series cover all 38 OECD member countries. The assessment arbitrarily sets the minimal threshold for country coverage at 15 (together with time-series threshold) as using a higher threshold would drastically reduce the number of data series considered in this assessment.

Figure 1. Distribution of data series by number of OECD countries covered



Source: OECD calculations.

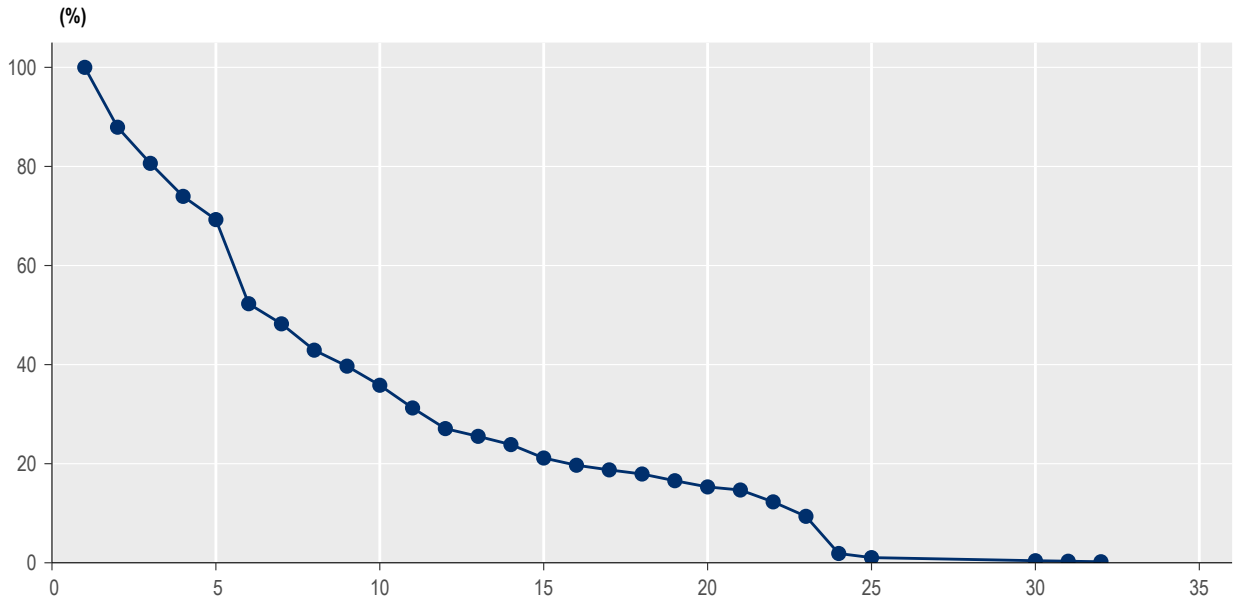
Beyond minimal country coverage, an additional criterion for data selection is that the series should ensure a sufficient global coverage. The OECD has 38 Member countries spanning the globe, from North and South among four world regions (America, Europe, Asia and Oceania). Therefore, an additional requirement for inclusion in this assessment is that a data series should cover at least 3 of these world regions.

Minimum length of time series

A dynamic assessment of countries' performance on SDGs raises additional data challenges, related to the availability of robust time-series information. Two different concepts allow gauging the "length" of the available time series: the time span (i.e. the number of years between the first and the last available data point) and the number of observations within that time span. When estimates are produced annually, the time span equals the number of observations, but this is not the case when observations are available at irregular intervals. As a threshold, the methodology used in this assessment requires at least three observations (see Measuring countries' performance over time) and at least one third of over-all time country coverage of the data series for each year. Yet, the more observations (and the longer the time span), the better is the assessment of the dynamic of the data series. In addition, the assessment uses data from 2000 and after considering analytical soundness.

As shown in Figure 2, the number of available data series falls sharply when the average number of observations increases. For instance, while some data series may have 50 data points or more, only 25% of the series used in this assessment have more than 10 data points. Wherever possible, data series are tracked for the last two decades. However, in practice, to accommodate the fact that some of the available time series are much shorter, the minimum requirement for inclusion in this analysis is that at least 3 observations should be available from 2000 and each year of a data series has at least 1/3 of available country coverage of the series.

Figure 2. Distribution of data series by average number of time-series data points covered



Source: OECD calculations.

Additional limitations

The assessment applies a standardised methodology to measure the distance between OECD countries' current performance and where they should be in 2030. As detailed in the following section, "Setting target levels and normalisation", its methodology rests on three elements: (1) selecting indicators and data; (2) setting end-values for the indicators; and (3) normalising the values to a common basis, in order to allow assessing distances across different fields.

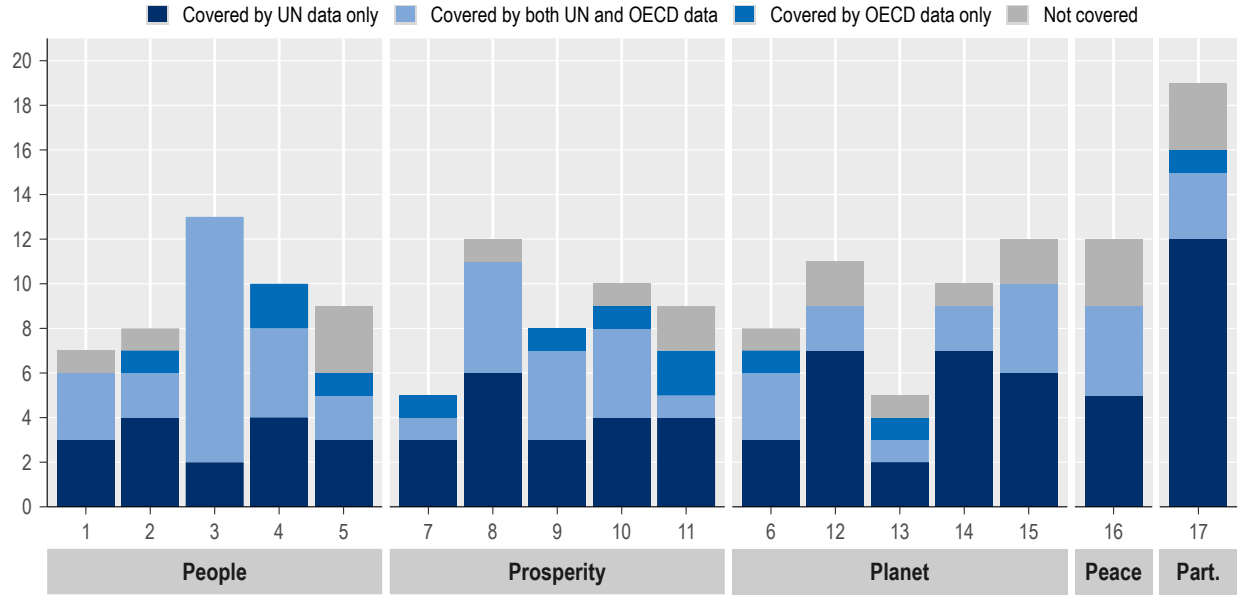
Therefore, while some data are available and meet the selection criteria mentioned above, they may not support the analysis in this assessment. For instance, end-values could not be set for a subset of these indicators, which are only useful to contextualise or complement other indicators. These indicators, while still included in this assessment when informative of the context of a specific issue, typically lack a clear normative direction (i.e. to judge what is good and what is bad). For instance, while no end-value is specified by the target for recycling rate (indicator 12.5.1), there is a clear normative direction (the more, the better). Therefore, even when there is no clear target to be reach, it is possible to benchmark outcomes to top performing countries. Conversely, forest area as a share of total land (indicator 15.1.1) in countries with a desert climate will never be as high as in countries such as Finland or Japan, where more than two-third of total land is covered by forest. In these cases, structural differences and circumstances, will never allow to match the achievement of the best performers.

In addition, indicators that can only take a binary (yes or no) form, such as indicator 16.10.2 (assessing whether "countries adopted and implemented constitutional, statutory and/or policy guarantees for public access to information"), are only considered for assessing current performance, but not for progress over time.

The supporting dataset

In total, this assessment relies on 197 of the indicators defined by the Global SDG Indicator Framework (or for close proxies of these indicators), covering enough OECD countries to support a comparative assessment. These indicators cover 146 of the 169 SDG targets. Target coverage is uneven across the 17 goals. For instance, Figure 3 shows that all the targets pertaining to some of the goals, such as Health (3) and Education (4), are covered by at least one indicator. Conversely, some other Goals have significant data gaps. For instance, 20% or more of the targets under some goals, such as Gender (5), Cities (11), and Peace, justice and strong institutions (16), is not covered by our dataset.

Figure 3. Share of the 2030 Agenda's targets covered in this assessment by at least one data series, by goal and primary source

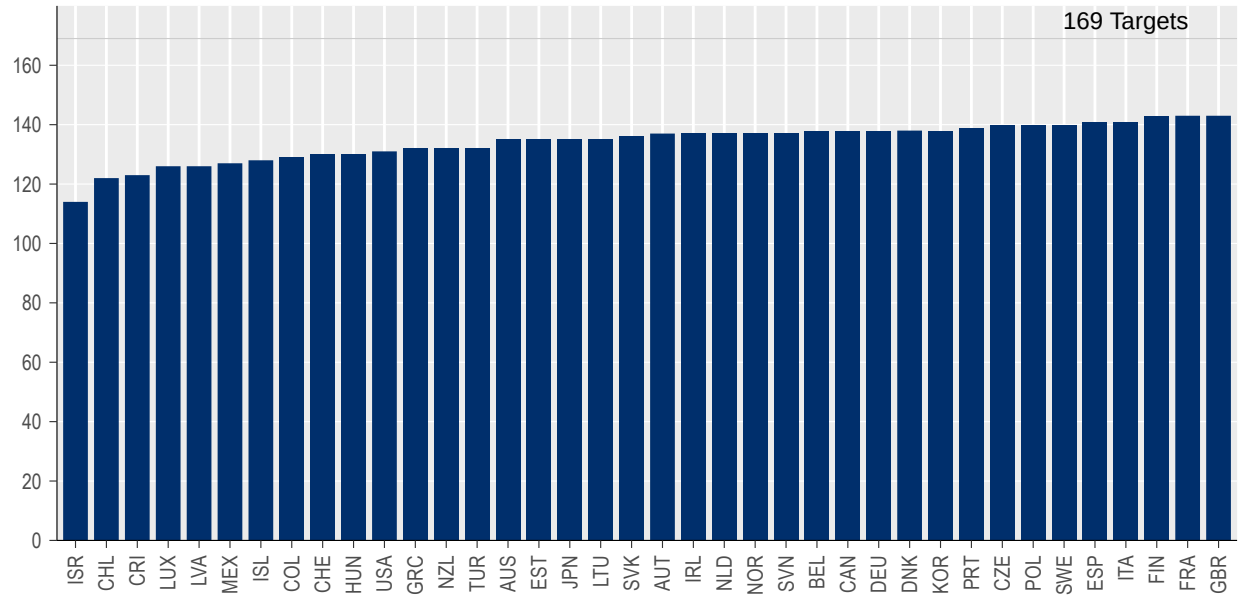


Source: OECD calculations.

Note: Numbers from 1 to 17 stand for the goals: 1 No poverty, 2 Zero hunger, 3 Good health and well-being, 4 Quality education, 5 Gender equality, 6 Clean water and sanitation, 7 Affordable and clean energy, 8 Decent work and economic growth, 9 Industry, innovation and infrastructure, 10 Reduced inequality, 11 Sustainable cities and communities, 12 Responsible consumption and production, 13 Climate action, 14 Life below water, 15 Life on land, 16 Peace, justice and strong institutions and 17 Partnerships for the goals. These goals are grouped under five broad themes (the "5Ps"): People, Planet, Prosperity, Peace and Partnership. This figure does not include Target 11.c on support to urbanisation as it does not have indicators defined by the UN Global List (as of 2024/05/17).

Target coverage varies among OECD countries. Figure 4 shows that it ranges from less than 75% (i.e. 126 of 169 targets) in Israel, Chile, Costa Rica, Luxembourg, and Latvia to closed to 85% (i.e. 143 out of 169) in the UK, France, and Finland. Although this is an improvement in coverage relative to both previous assessments and to other SDG-related measurement initiatives, significant data gaps for all OECD countries clearly remain. In addition, it should be noted that these coverage rates reflect the OECD focus of the assessment, with indicator coverage being lower for countries that joined the OECD in most recent years.

Figure 4. The coverage of targets by OECD countries

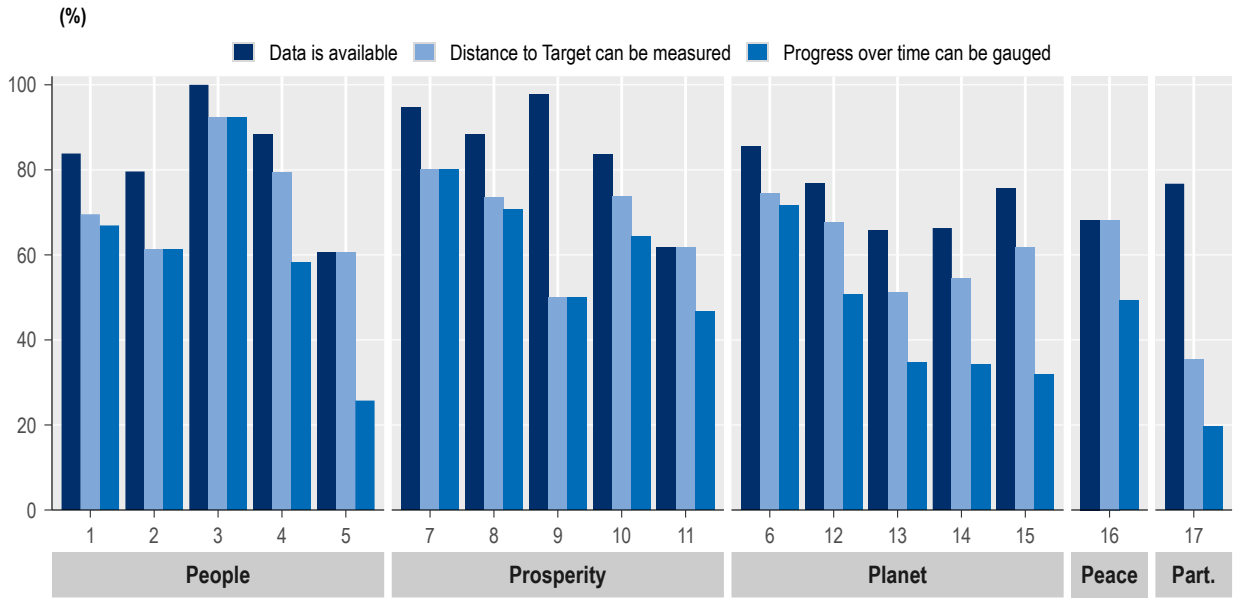


Source: OECD calculations.

While the basic data used for this assessment allow covering 146 SDG Targets, a distance to target could only be assessed for 118 of them (i.e. 28 SDG targets are only supported by data that lack a clear normative direction). Figure 5 shows that, on average, target coverage is also quite uneven across the 17 goals when the analysis is limited to indicators that allow an assessment of the distance to targets. While the distance to target can be estimated for 70% or more of the targets for 7 of the 17 goals, none of them has all the targets covered. Conversely, for Goal 17 on implementation, less than half of the targets are covered by data that allow distance to be estimated.

Data gaps become starker when looking at data series that allow measuring progress towards target. Health and education are the only goals for which the data series included in this assessment allow monitoring of more than 9 out of 10 targets, while for the goals on gender equality (SDG 5), life on land (SDG 15) and partnership (SDG 17), 1/3 or less of the targets are covered by relevant data to support the analysis.

Figure 5. Target coverage, by type of assessment, OECD average



Source: OECD calculations.

Note: Numbers from 1 to 17 stand for the goals: 1 No poverty, 2 Zero hunger, 3 Good health and well-being, 4 Quality education, 5 Gender equality, 6 Clean water and sanitation, 7 Affordable and clean energy, 8 Decent work and economic growth, 9 Industry, innovation and infrastructure, 10 Reduced inequality, 11 Sustainable cities and communities, 12 Responsible consumption and production, 13 Climate action, 14 Life below water, 15 Life on land, 16 Peace, justice and strong institutions and 17 Partnerships for the goals. These goals are grouped under five broad themes (the "5Ps"): People, Planet, Prosperity, Peace and Partnership.

Setting target levels and normalisation

The assessment applies a standardised methodology to measure the distance between OECD countries' current performance and where they should be in 2030. Once data series are selected, an appropriate end-value (target level) is set to each of them in order to measure the distance between the current position and the target level to be achieved. The 2030 Agenda does not always specify the end-value to be attained. Therefore, this assessment relies on a four-step process for setting end-values:

- Wherever possible, the target levels specified in the 2030 Agenda were used. This is typically a fixed value identified in the wording of the target (e.g. maternal mortality ratio below 70 for every 100 000 live births for Target 3.1) or, in a small number of cases, expressed as a relative improvement from current levels (e.g. reduce by at least half the proportion of people living in poverty for Target 1.2). These are classified here as "type-A" targets.
- Where no target value is identified by the text of the 2030 Agenda, target levels were drawn from existing international agreements (e.g. reduce PM2.5 pollution to less than 10 micrograms per cubic meter, according to the WHO) or based on OECD expert judgment (e.g. water stress is considered to be low if total freshwater abstraction is below 10% of total internal renewable resources (OECD, 2017[5]). These are classified as "type-B" targets.
- When no target value could be identified from either the 2030 Agenda or expert assessments, the target level is based on "best performance" among OECD countries observed in the most recent available observation. This is defined in this assessment as the average level attained by the top 10% of OECD countries (e.g. in the case of the recycling rate of municipal waste). These are classified as "type-C" targets.

- Finally, for indicators lacking a clear normative direction (e.g. the forest area as a proportion of total land area), no target level is set and therefore no "distance from target" is measured in this assessment.

Finally, in order to compare performance across different targets, indicator values were normalised using a modified version of the z-score (i.e. the distance from target levels is expressed as the number of OECD standard deviations observed across countries in the most recent year). This approach is described in this assessment as the "standardised difference" between the country's current position and the target end-value. The higher the distance, the further the country will need to travel to achieve its target. A zero distance means the country has already achieved the 2030 target. Negative scores mean the country already exceeds the target and, in this assessment, are reported as 0 (i.e. countries are not rewarded for going beyond the target). The distance to target is then defined as the average distance of data series that support the target (with equal weights between IAEG indicators).

Measuring countries' performance over time

Static assessment may not capture the underlying path of countries' performance. For instance, when a country is already at (or near) its 2030 target, it may slip behind if recent developments point to a worsening of its performance. Conversely, a country that is still far from its 2030 target might still be expected to reach it by maintaining the rapid progress that it achieved in the recent past. Examining OECD countries' recent historical performance provides a key complement to the assessment of their current positions and is therefore key to inform priority setting.

Conceptual framework

Assessing trends is a challenging exercise. It is even more challenging in the context of the SDGs, as the 2030 Agenda includes a wide range of different indicators whose developments are to be assessed over a long period of time. In addition, while the 2030 Agenda does not apply equally to all countries, a comparative assessment needs to be based a single procedure. Inter alia, this means that the same method should ideally be applied to different countries (irrespectively of their political, economic, social and environmental circumstances) and indicators (irrespectively of their nature).

Developing "dynamic baselines" requires both identifying past trends – which is difficult, especially when time series are short or lacunar – and predicting the future evolution of the different indicators – which requires making assumptions about the underlying drivers of change. Depending on the purpose of the exercise, different types of dynamic analysis could be carried out. These range from a simple detection of the recent trend to more sophisticated forecasting methods. Furthermore, some basic factors such as the length of the time series (i.e. the number of observations and the time span covered) or the type of data (e.g. ordinal or cardinal) considered are likely to influence the method used. While a wide range of tools could be used, two broad types of approaches can be distinguished (Hyndman, 2011[6]):

- *Explanatory models* – i.e. models combining data analysis and expert judgement. In this case, models assume that the variable to be projected is linked through an explanatory relationship to one or more other variables. For instance, the OECD uses short-term economic indicators such as business sentiment, consumer surveys, industrial production, retail sales, house prices etc. to predict near-term quarterly movements in GDP. The purpose of the explanatory model is to describe the form of the relationship between the variable of interest and its driving factors, and to use it to forecast future values of that variable. While this type of analysis can provide highly reliable results it could not be applied to forecast SDG Indicators: first, it needs to be supported by in-depth evaluation of the factors driving each data series and of contextual factors; second it may not be appropriate to long-term time horizon projections.

- *Time Series* (or exploratory) *models* – i.e. models where the analysis is based on observed data only and that make no attempt to uncover the factors driving the behaviour of the target variables. Within this class of models, the estimation can be parametric (e.g. linear, polynomial or exponential estimations) or non-parametric (Spearman's rho tests, modified Mann-Kendall test, Sen's slope estimators, etc.) These models provide transparent results and can be easily adapted to different contexts; they are therefore preferred to assess trends in this assessment.[7]

All these reasons have also led most authors and international organisations to adopt rather simple exploratory models for assessing the direction and pace of recent changes. Most of the time, trends are assessed by comparing the observed change of a given variable and that required to reach the target by 2030. Some models assume a *linear growth* (2020[7]) while others, rely on *geometric growth* (Eurostat, 2020[8]; UNESCAP, 2020[9]; UNSD, 2020[10]) – for a more comprehensive review, see Gennari and D'Orazio (2020[11]). In practice, the estimation of both linear and geometric models relies on linear regressions between the different observations of the same variable (e.g. the compound growth rate corresponds to drawing a line between the log-transformed values of the original variable).[8]

Exploratory models use the inertia of the variable to estimate the value they could reach in 2030. They are quite flexible and can provide results even with short time series. However, they are all parametric and thus rely on specific assumptions. When the distribution of some indicators is unknown, when it violates some underlying assumptions or it includes outliers, the results from exploratory analysis will be less reliable. These issues are particularly important in times of great uncertainties.

To overcome this issue, this assessment uses a dual approach to understand the dynamics behind the 2030 Agenda. On the one hand, it adopts a rather simple model for assessing the likely value of the different indicators by 2030 that is similar to the methods described above. Yet, instead of making direct estimates of the value of the indicator by 2030, it models the likelihood of achieving a specific level, as detailed on Box 1.

[7] Yet, it is important to stress that this approach only assess the long-term trajectory of a country in a "Business as usual" scenario, with policy variables only considered (implicitly) to the extent that they influenced the recent trend.

[8] While these approaches are suitable in the presence of relatively short time series, Gennari and D'Orazio (2020[11]) suggest that, even in these case, it would be preferable to estimate the slope of the regression line fitted across all the available data points (the original values of each variable vs. time in the linear case; and log-transformed values vs. time, in the case of geometric growth).

Box 1. Using Monte Carlo simulations to estimate the likelihood of meeting a target at some future date

Monte Carlo methods encompass a broad class of computational algorithms that rely on repeated random sampling to obtain numerical results. The underlying concept is to use "randomness" to solve problems. In this specific case, by construction, the simulation will approximate the minimum mean square error forecast following a simple geometric growth model. Monte Carlo algorithms allow going beyond the average outcome by modelling a complete *distribution* of future events. Therefore, the share of simulations that reach or exceed the target level by 2030 allow estimating the likelihood of reaching this SDG targets.

More concretely, a deterministic model would estimate a growth rate and use it to project the time series. Formally, if S_t is the level of achievement in time *t, n* is the final year and *r* is the estimated growth rate, this relationship could be expressed as:

$$S_n = S_0(1 + r)^n \quad (1)$$

In order to introduce a degree of uncertainty, Monte Carlo simulation allow for random variations of the growth rate. This allows projecting different plausible trajectories. Formally, if *r* is a random variable that can take different values at any point in time, defined as:

$$r = \frac{S_{t+1} - S_t}{S_t} \quad (2)$$

we can assume that r follows a normal distribution N(μ, σ)[9] and denote as X the random variable following a standard normal distribution

$$\frac{S_{t+1} - S_t}{S_t} = \mu + \sigma X \quad (3)$$

This equation can also be written as:

$$S_{t+1} - S_t = \mu S_t + \sigma S_t X$$

$$S_{t+1} = (1 + \mu)S_t + \sigma S_t X \quad (4)$$

which allows to estimate a possible value of $(S_t)_t$ at any point in time. In order to reduce the computation time, this assessment estimate the value of S in time *n* as:

$$S_n = S_0 \exp\left(\left(\mu - \frac{1}{2}\sigma^2\right)n + \sigma\sqrt{t}X\right)$$

Finally, S_n is estimated 10 000 times with different values for X. The likelihood of reaching the target is then defined as the shares of projected values that met the target level.

In addition, instead of making explicit assumptions on the distribution of each variable, this assessment looks for the presence of a monotonic trend (i.e. whether the variable consistently increases, or decreases, through time). As detailed in OECD (2019[4]), trends are summarised by computing the Spearman (rank) correlation coefficient between the observed values of each data series (in their original units of

[9] While most deterministic approaches used to estimate progress toward targets do not account for the volatility of past growth rate, using a random model allows modelling the uncertainty relating to past volatility.

measurement) and time (expressed in years). Thus, a significant positive correlation (approaching 1.0) indicated a positive overall trend of the data series over time, while a significant negative correlation (approaching -1.0) indicated a negative overall trend. Non-significant correlations (around 0) indicated that no consistent trend could be determined over the time period assessed.[10] This rank-based approach has the advantage of being simple to implement. It also avoids making assumption on the distribution of data (skewness, presence of outliers, etc.) or on the type of growth (linear or geometric) exhibited by each variable. However, results obtained through trend detection methods need to be interpreted carefully as the direction of the trend does not say anything about whether the pace achieved by a country would be sufficient to meet the target level by 2030.

Details of the methodology for assessing trends

Combining the trend assessment with an estimation of the likelihood of reaching the target allows some flexibility. In short, rather than providing forecasts, this method allows to understand the underlying dynamics of the different indicators. Concretely, a trend can be "upward" (i.e. improving over time), "stable" or "downward" (i.e. deteriorating over time), while a target can be considered as "on track" (i.e. the current pace of improvement, when extended to 2030, should allow a country to reach its target value by the end of the period) or "off track" (in the opposite case). Therefore, there are six different situations, with each of them associated with one of the three cases listed below:

- "No progress or moving away from the SDG target" when the likelihood to reach the target is below 75%, and when the recent trend cannot be classified as a positive "progress toward the target", i.e. the correlation coefficient[11] between the indicator and the year is below 0.20 (or the coefficient is not statistically significant at 10%);
- "Progress is being made, but is insufficient to meet the target" when the likelihood to reach the target is below 75%, and the correlation coefficient between the indicator and the year is above 0.20 and significant at 10% level;
- "Target is on track to being achieved" when the likelihood to reach the target is above 75%.

When more than one data series is available for measuring a given SDG Indicator, the indicator is classified according to where most of underling data series stand. While these simplifications might overlook some specific situations, they provide a meaningful overall picture.

No progress or moving away from the SDG Target

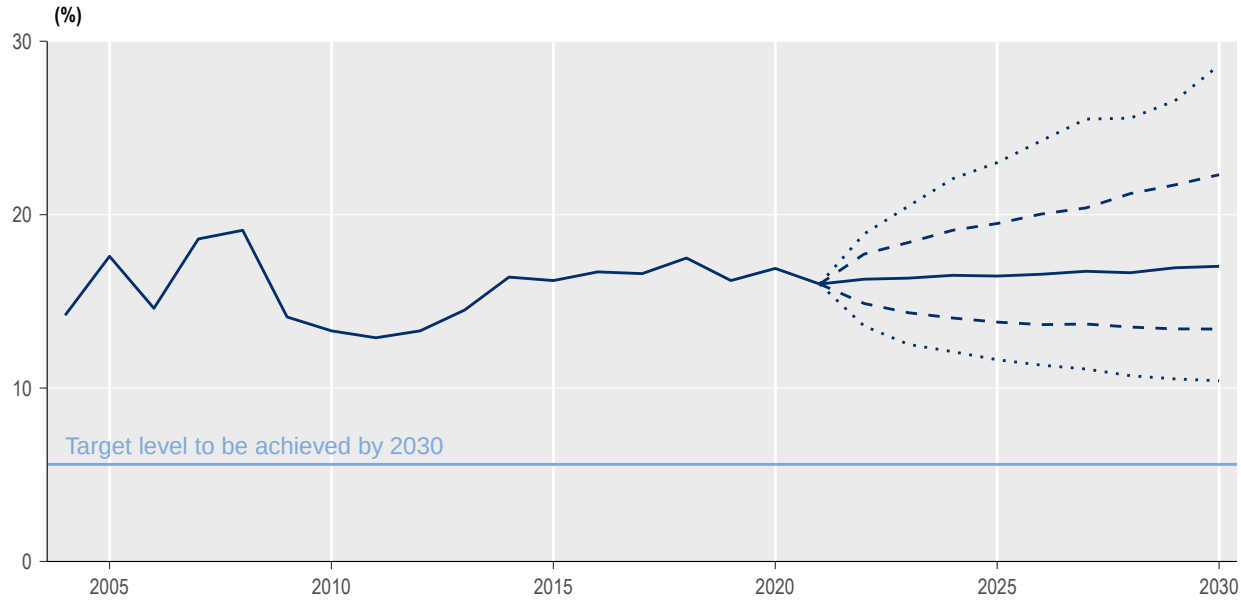
As mentioned above, an indicator is classified as "No progress or moving away from the SDG Target" when the likelihood to reach the target by 2030 is below 75%, and when the trend cannot be classified as a positive "progress toward the target". For example, an indicator may not show a specific trend and is unlikely that the target will be met by 2030. As shown in Figure 6, the relative poverty rate in Latvia had been hovering around 15% for the past 15 years. Therefore, in the absence of a significant change in this trend, Latvia is likely to stagnate around the same value, yet, given the volatility observed over the past 15 years, the model allows for wide variations around this average scenario. In any case, the relative poverty rate in Latvia is unlikely to reach the target level by 2030.

[10] Data series are considered as "constant" when the relative standard variation (i.e. standard deviation divided by the mean) is below 1%.

[11] The sign of the coefficient correlation is corrected for normative direction so that a positive correlation is always interpreted as a progress toward the target while a negative correlation is always interpreted as a decline.

Figure 6. Example of data series classified as "No progress or moving away from the SDG Target"

Relative poverty rate, Latvia



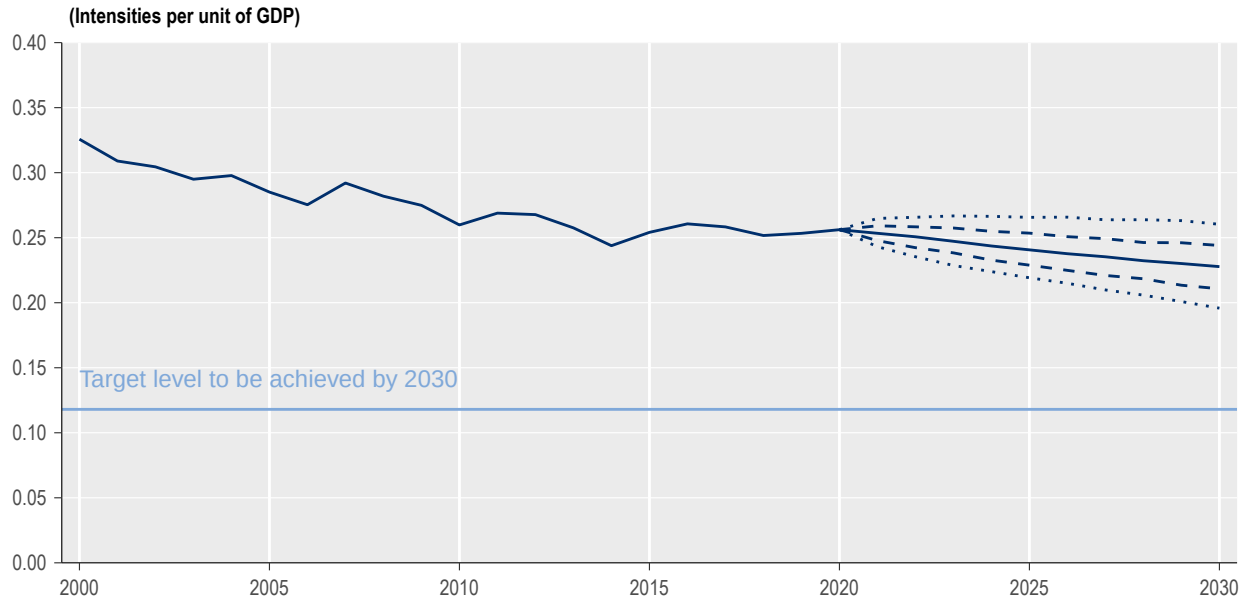
Note: The horizontal line stands for the agreed 2030 desired value to be reached. Dotted lines reflect 10th and 90th percentiles of projected data series; dashed lines reflect 25th and 75th percentiles of projected data series; plain lines reflect 50th percentile of projected data series.
Source: OECD calculations.

Progress has been made, but is insufficient to meet the target

An indicator is classified as "Progress has been made but is insufficient to meet the target" when the likelihood to reach the target is below 75%, and the correlation coefficient between the indicator and the year is above 0.20 and significant at 10% level. Concretely, there is only one scenario in this case: the trend is upward but few (or none) of the projected values will meet the target. An example is provided by Figure 7 on greenhouse gas emissions per unit of GDP in Chile. In 20 years, greenhouse gas emissions went from 0.33 tonnes of CO_2 equivalent per USD in early 2000 to 0.26 in 2020. While progress is being made, unless the pace of improvement is increased, it will not be enough to reach the target level by 2030.

Figure 7. Example of data series classified as "Progress has been made, but is insufficient to meet the target"

Greenhouse gas emissions, intensities per unit of GDP, Chile



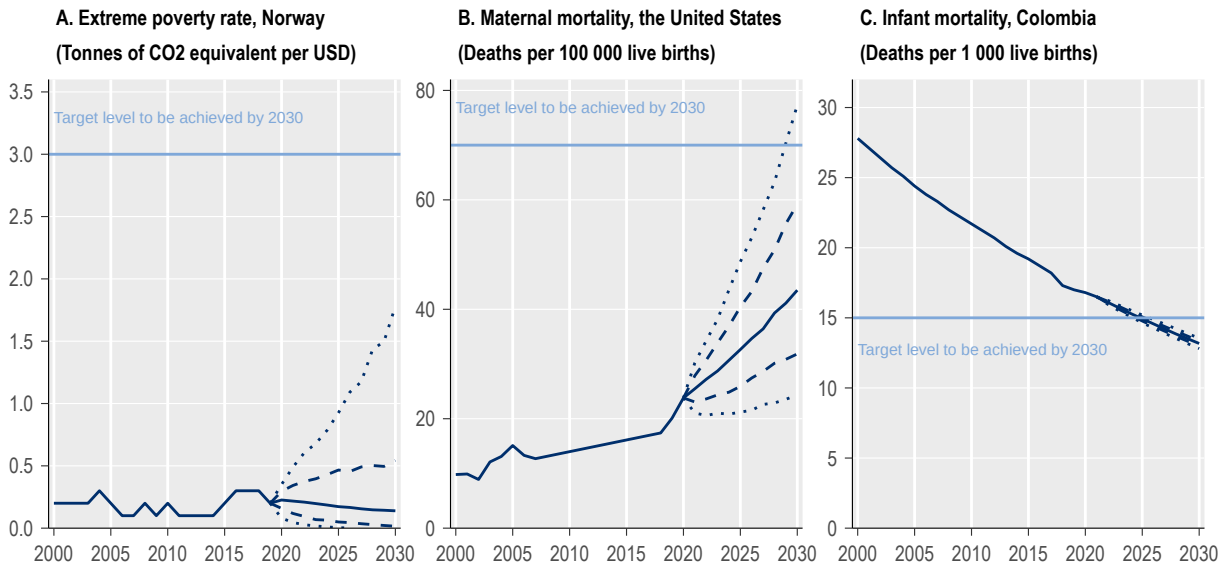
Note: The horizontal line stands for the agreed 2030 desired value to be reached. Dotted lines reflect 10th and 90th percentiles of projected data series; dashed lines reflect 25th and 75th percentiles of projected data series; plain lines reflect 50th percentile of projected data series.
Source: OECD calculations.

Target is achieved or on track to being achieved

An indicator is classified as "being achieved or on track to being achieved" when it has a high likelihood to meet the target by 2030. In this case again, there are three different possible scenarios:

- The trend is stable, and the indicator is classified as on track as more than 75% of projected series meet the target. For instance, Figure 8 panel A shows that in Norway, the extreme poverty rate had been stable between 0 and 0.5% for the past 20 years (i.e. below the target level set at 3%); therefore, it is likely that Norway will remain below the target level by 2030 unless significant changes occurs.
- The trend is worsening but the indicator is still likely to meet the target level by 2030. Figure 8 panel B shows that in the United States, maternal mortality has been on an upward trend while remaining significantly below the target level. Hence, while the maternal mortality ratio may keep going up, it is quite unlikely that the United States will not meet the target by 2030.
- The trend is improving, and the indicator is therefore likely to meet the target level by 2030. Figure 8 panel C shows the dramatic improvement of infant mortality in Colombia. While Colombia is not (yet) at target level, it is on a trajectory that would allow meeting the target by 2030.

Figure 8. Example of data series classified as "Target is achieved or likely to being achieved"



Note: The horizontal line stands for the 2030 target value to be reached. Dotted lines reflect 10th and 90th percentiles of projected data series; dashed lines reflect 25th and 75th percentiles of projected data series; continuous lines reflect 50th percentile of projected data series.
Source: OECD calculations.

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