Updated SSP scenarios

(February 2022 - Johannes Koch, Marian Leimbach PIK)

The following is a summary, for more information see [Koch and Leimbach (2021)](.).

GDP scenarios

The data set of updated SSP GDP per capita scenarios was constructed by harmonizing the original SSP projections (OECD GDP scenarios – Dellink et al. 2017) available from the IIASA SSP database with recent data from the World Bank's (WB) World Development Indicator Database (Accessed October 2021) and the International Monetary Fund's (IMF) World Economic Outlook of October 2021.

The original SSP projections are in constant 2005 international dollars at purchasing power parity (PPP) (short-notation: 2005$PPP), and cover the time period between 2010 and 2100 in 5 year time steps. The data from the WB and IMF is given in 2017$PPP. The base year 2017 corresponds to the year of the most recent International Comparison Program report that provides the PPP estimates. We provide SSP projections in both 2005$PPP and 2017$PPP. The data set also includes the PPP/MER conversion rates of both base years. (These are provided as extra information, not as explanation on how to convert between the 2017$PPP and 2005$PPP projections. See Koch and Leimbach (2021) for more information.)

The updated SSP projections are available as yearly data until 2030 and in 5 year time steps thereafter. For the years until 2020, they match the data from the WDI. For the years between 2021 and 2026 they follow the WEO's short-term estimates of GDP per capita growth, covering the growth impacts of the Corona shock. Between 2026 and 2100, the scenarios follow a path that, by 2100, leads them back to the same GDP per capita relative to that of the USA, as in the original scenarios.

Depending on whether the GDP per capita in 2026 of the updated scenarios is higher or lower than that of the original SSP projections, the convergence back to the same GDP per capita relative to that of the USA, is either accelerated or prolonged. In the case of lower GDP per capita, SSP1 and SSP5 start converging right away, i.e. by 2026, SSP2 starts by 2031, and SSP3 and SSP4 by 2036. In the case of higher GDP per capita, the convergence behavior is reversed: SSP3 and SSP4 start converging right away, SSP2 by 2031, and SSP1 and SSP5 by 2036. Until convergence is commenced, the SSPs use the same growth rate as the original projections, thus avoiding substantial changes in the growth rates. This SSP specific convergence behavior was implemented following the underlying SSP story-lines: in SSP1 and SSP5, high GDP per capita growth is expected,

therefore faster catch-up (or slower slow-down) is a reasonable assumption. The inverse is true for SSP3 and SSP4.

The SSP GDP projections are the product of the SSP GDP per capita projections and the SSP population projections. Until 2020, the SSP population projections match again WDI data. For the years between 2021 and 2026 the projections follow short-term World Bank population growth estimates from the Population Estimates and Projections database (accessed October 2021). Population data between 2026 and 2100 represent new projections from IIASA/Wittgenstein center (http://pure.iiasa.ac.at/id/eprint/16710 and http://pure.iiasa.ac.at/id/eprint/15226/1/lutz_et_al_2018_demographic_and_human_capital.pdf).

Sources:

Koch, J. and Leimbach, M. (2021). Update of SSP GDP projections: capturing recent changes in national accounting, PPP conversion and Covid 19 impacts. Working paper. (link)

Dellink, R., J. Chateau, E. Lanzi, B. Magné (2017). Long-term economic growth projections in the Shared Socioeconomic Pathways, Global Environmental Change, Volume 42, 2017, Pages 200-214.

Sectoral disaggregated scenarios

The developed structural change scenarios represent projections of sectoral shares. The shares of the sectors agriculture, manufacturing and services on economy-wide employment, value added and final energy are projected until 2050. The development of these key variables of economic activity is provided for each of the five SSP scenarios. We decided to represent structural change by share variables which, in contrast to absolute level values, can much easier be adopted by other models. They are independent of the data sources and therefore the units of respective variables used in those models.

The structural change scenarios are constructed on the basis of a regression model which combine country-level data from different sources. Based on given initial shares on labor, value-added, and energy for 2015 and based on estimated regression coefficients, projections are computed by using the above described SSP GDP and population scenarios as independent variables. A detailed description is given in Leimbach, Marcolino and Koch (2021), "Structural change scenarios within the SSP framework" (submitted to Futures).