Updating the economic projections of the SSPs: Integrating observed history with original storylines

Rob Dellink*
Joint work with Jean Chateau, Laura Atarody*, Ruben Bibas* and Elisa Lanzi***
OECD * Environment Directorate / ** Economics Department

8 February 2024
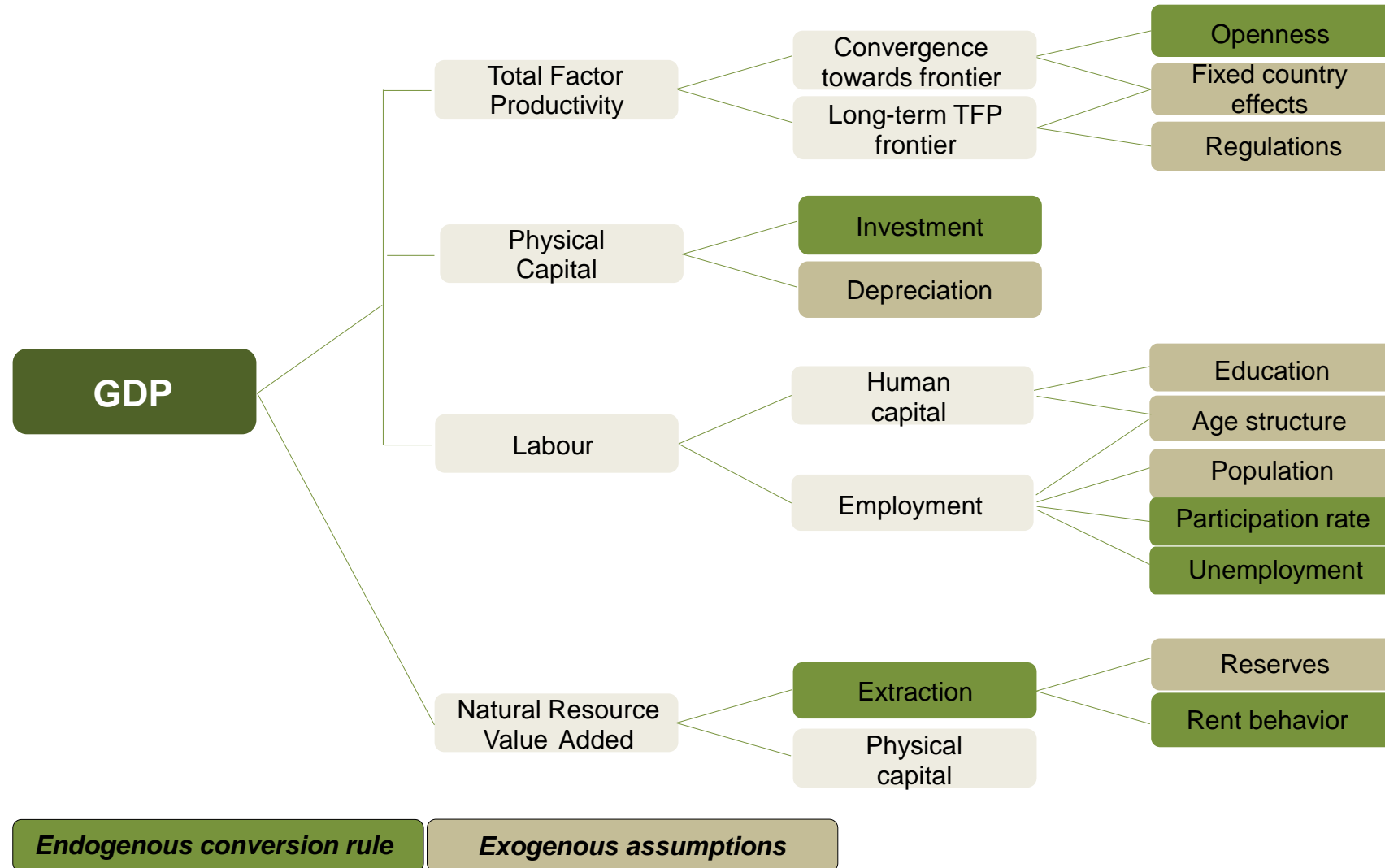
OECD
BETTER POLICIES FOR BETTER LIVES

Objectives and approach

- **Background:** between 2012 and 2023 the world has changed considerably:
  - Demographic developments
  - Volatility of resource prices
  - COVID-19 pandemic and Ukraine war as major shock
- **Objective:** update of SSP scenario projections of Gross Domestic Product (GDP)
  - Revisit underlying key assumptions, but NOT storylines
  - No major revision of the methodology
  - Update all drivers, not only GDP projections
    - e.g. updating base year data affects convergence process as price deflators and exchange rates shift
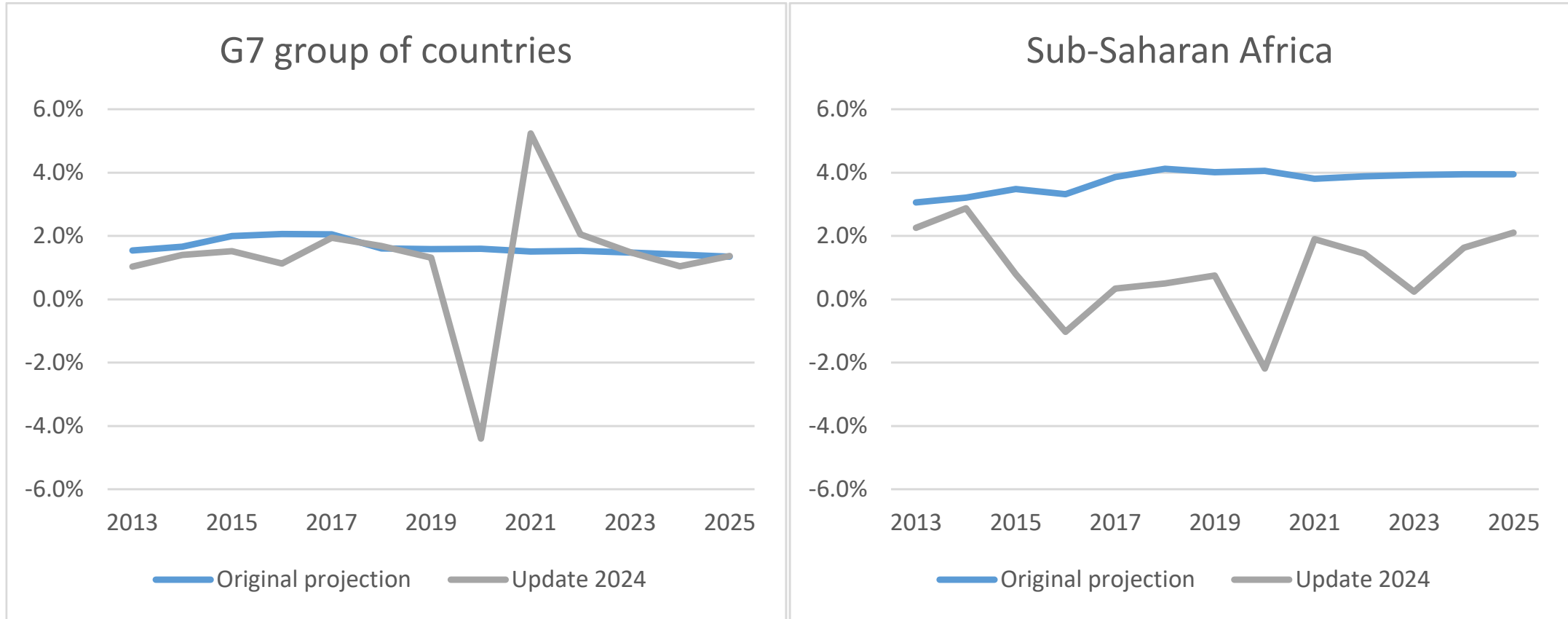
The OECD ENV-Growth model

GDP

- Total Factor Productivity
  - Convergence towards frontier
    - Openness
    - Fixed country effects
  - Long-term TFP frontier
    - Fixed country effects
    - Regulations
- Physical Capital
  - Investment
  - Depreciation
- Labour
  - Human capital
    - Education
    - Age structure
  - Employment
    - Population
    - Participation rate
    - Unemployment
- Natural Resource Value Added
  - Extraction
    - Reserves
    - Rent behavior
  - Physical capital

Endogenous conversion rule   *Exogenous assumptions*

The old SSP2 projections fared better for some regions than for others

G7 group of countries

Sub-Saharan Africa

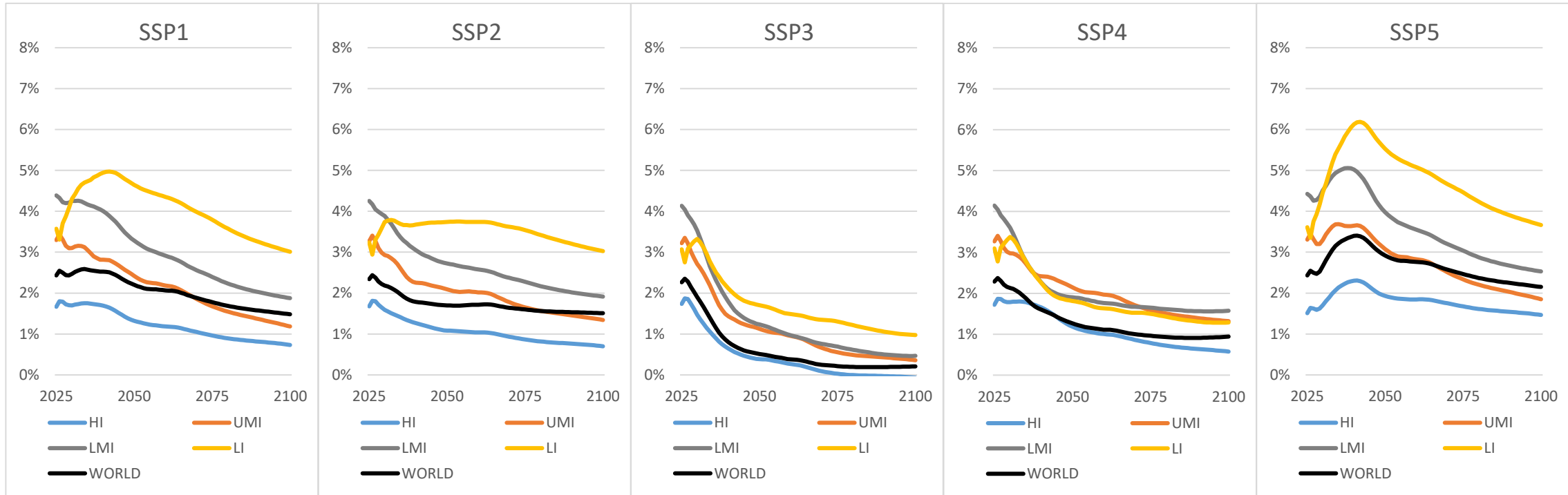N.B. Graphs use fixed country grouping regardless of income growth

Key data sources

- **Currently 192 countries (economic data available for >200 countries)**
  - Missing countries: Afghanistan, Curacao, Syria, Venezuela, French overseas territories
- **Population and education**
  - IIASA SSP-specific projections (as presented today)
- **Purchasing Power Parity (PPP) exchange rates updated to 2017**
- **Short-term GDP forecasts to 2028**
  - OECD Economic Outlook (Fall 2023), IMF World Economic Outlook (Fall 2023) – incl. forecast of economic effects of geopolitical events until Q3 2023

- **Methodology largely consistent with original SSP calculations, but investment convergence rule improved**
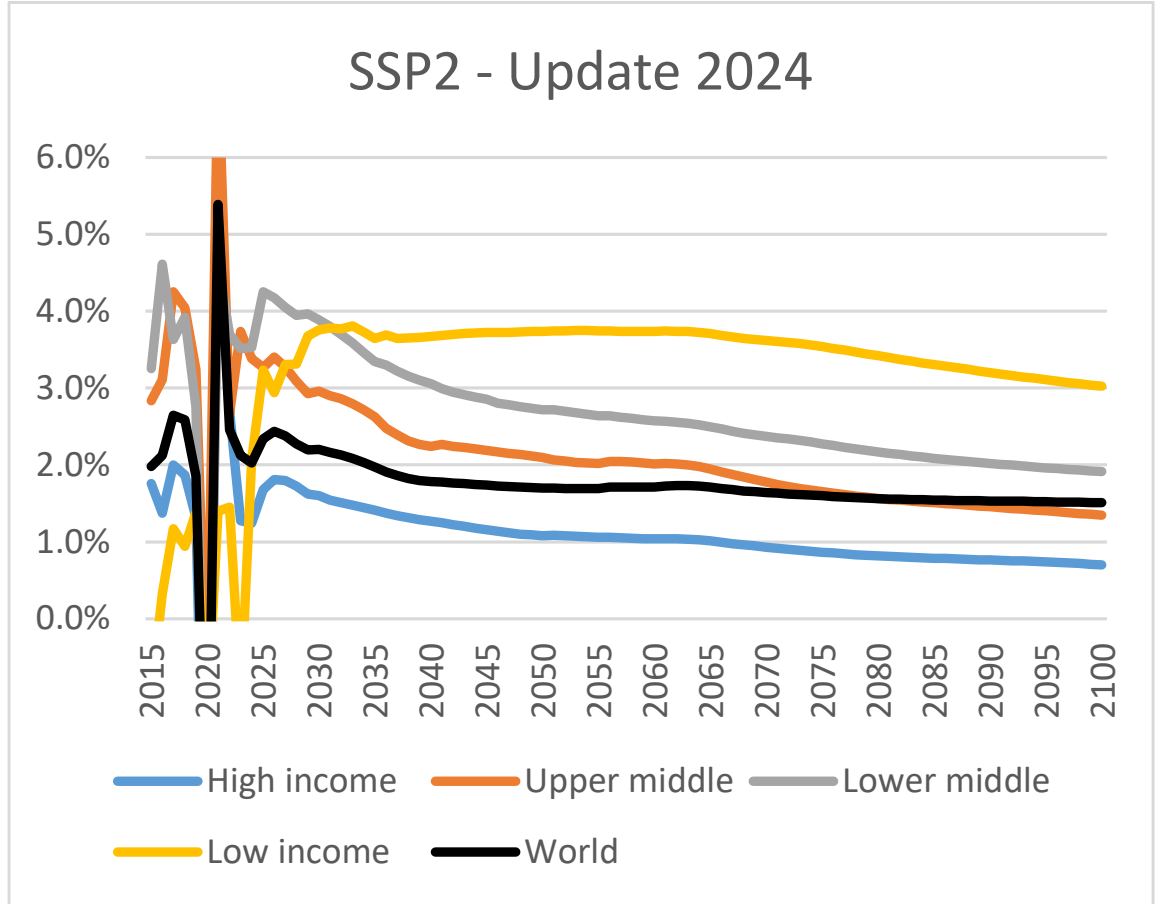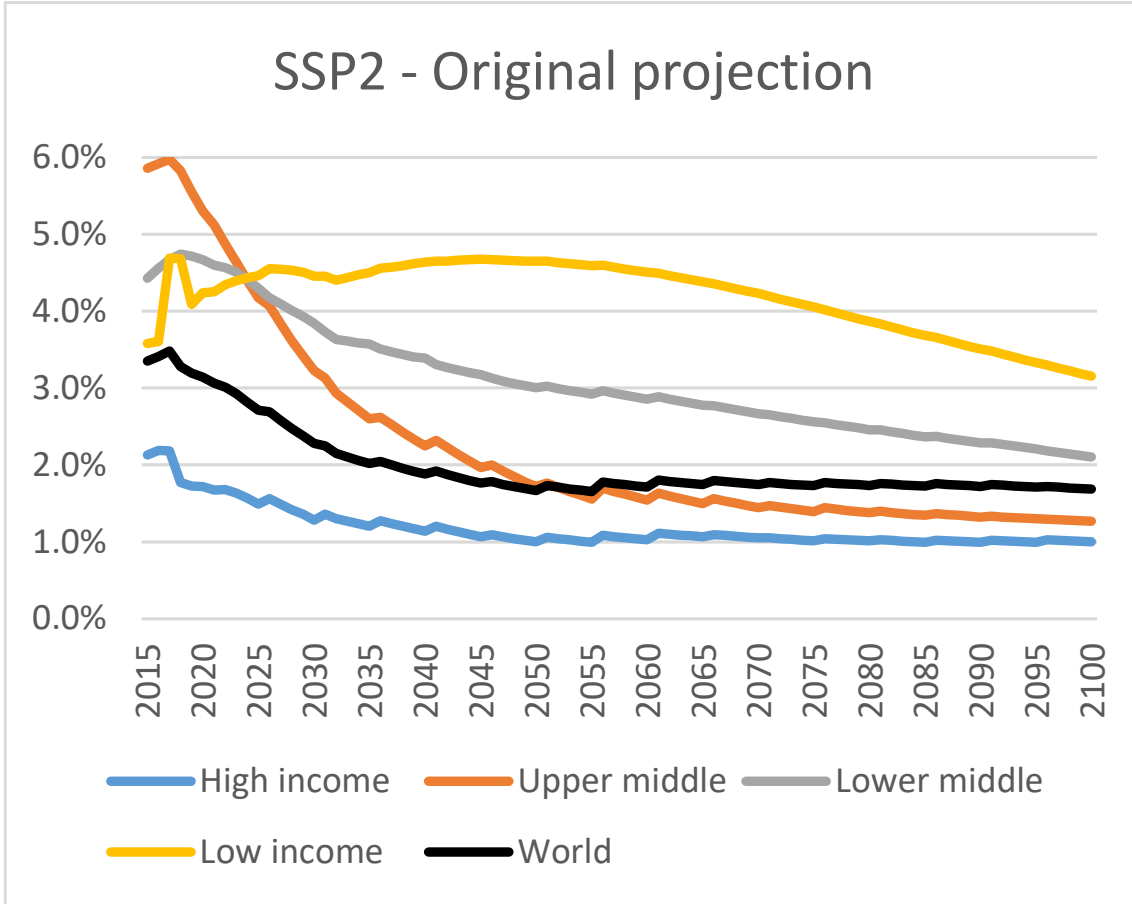
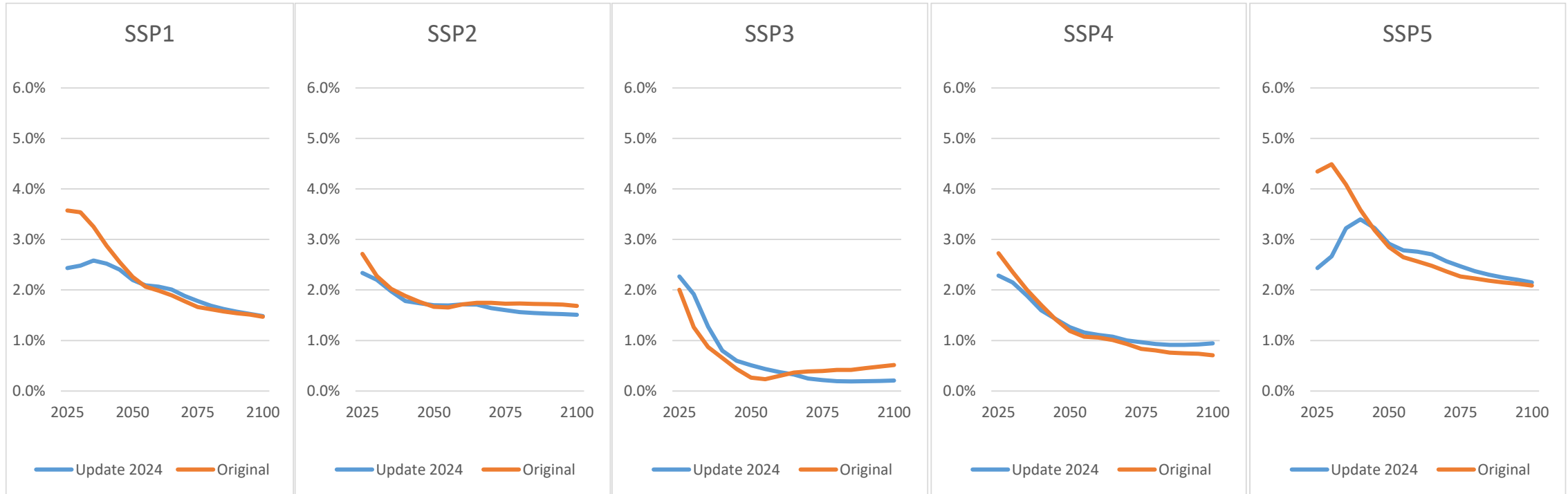# Regional income growth rates across SSPs

Global income growth rates impacts of update

SSP2 - Original projection

SSP2 - Update 2024

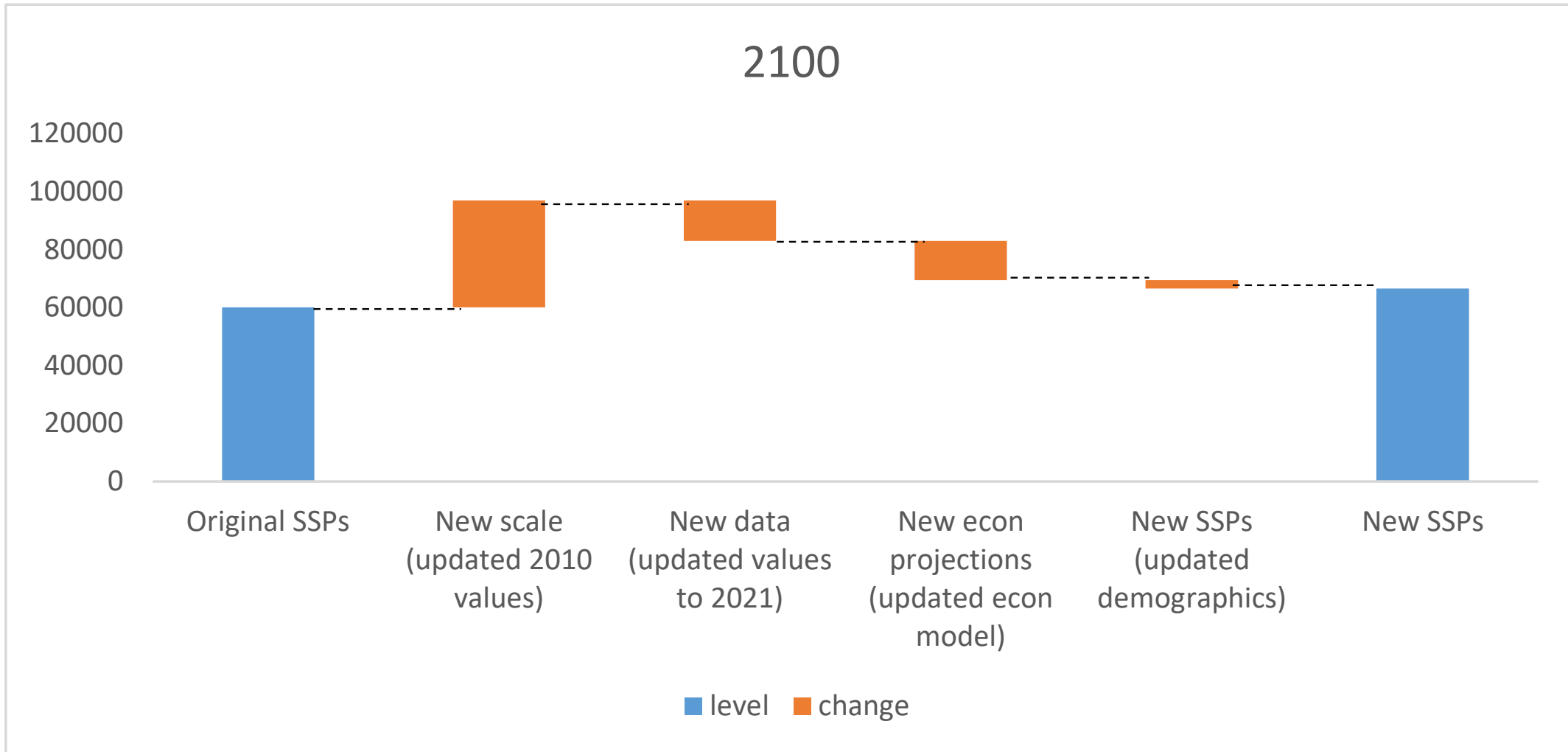Legend: High income, Upper middle, Lower middle, Low income, World

Global income growth rates impacts of update

Updating exchange rates, data and projections: global income level in SSP2

Income in USD per capita

References

- J. Chateau, R. Dellink, L. Atarody, R. Bibas and E. Lanzi, "Long-term projections of economic growth for climate change assessments: an economic implementation of the Shared Socioeconomic Pathways ", OECD Working Paper Series, forthcoming.

- R. Dellink, J. Chateau, L. Atarody, R. Bibas and E. Lanzi, "Updating economic growth in the SSPs: Integrating observed history with original storylines ", forthcoming journal article.

THANK YOU!

For more information:

rob.dellink@oecd.org
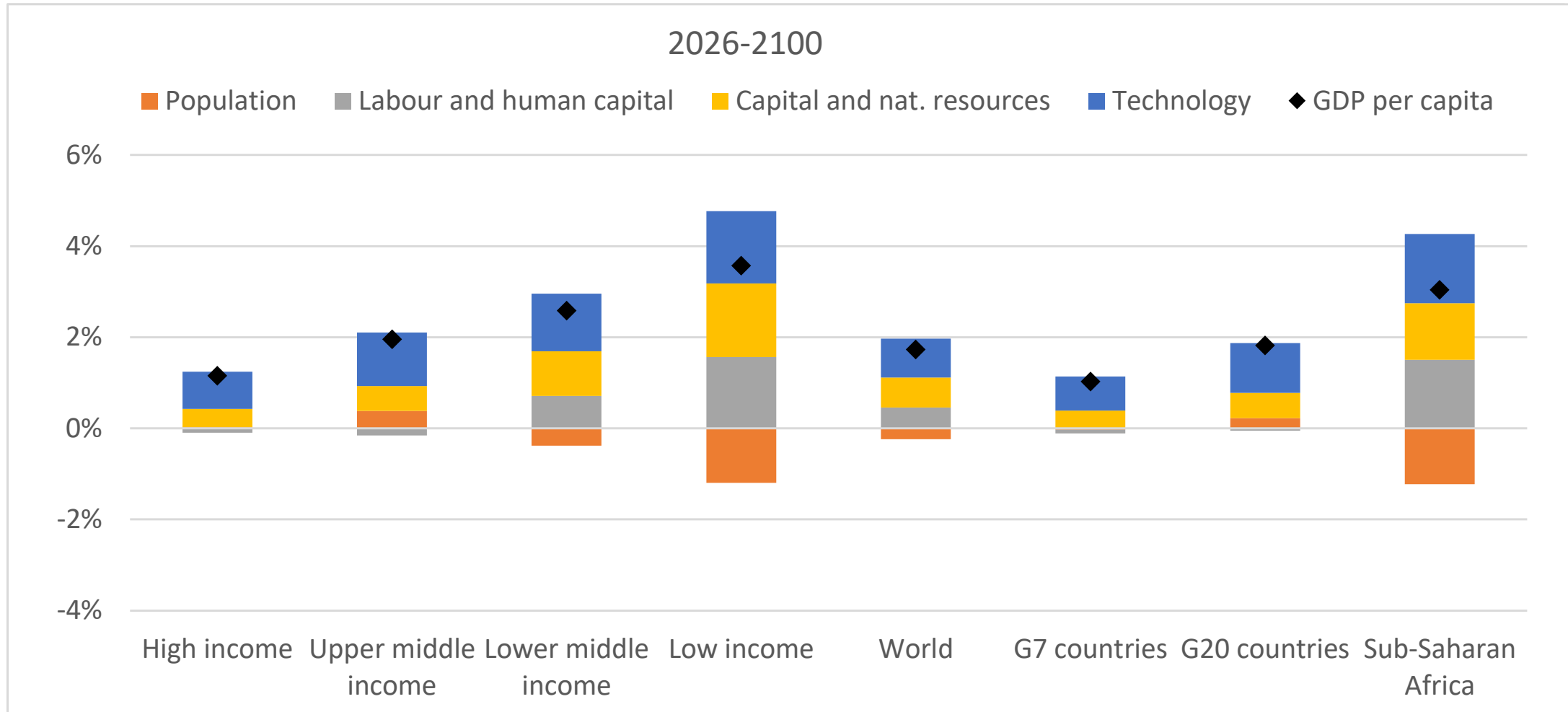
www.oecd.org/environment/modelling.htm

OECD
BETTER POLICIES FOR BETTER LIVES

Drivers of regional economic growth in SSP2

Average annual income growth rate

2026-2100

Legend: Population · Labour and human capital · Capital and nat. resources · Technology · GDP per capita
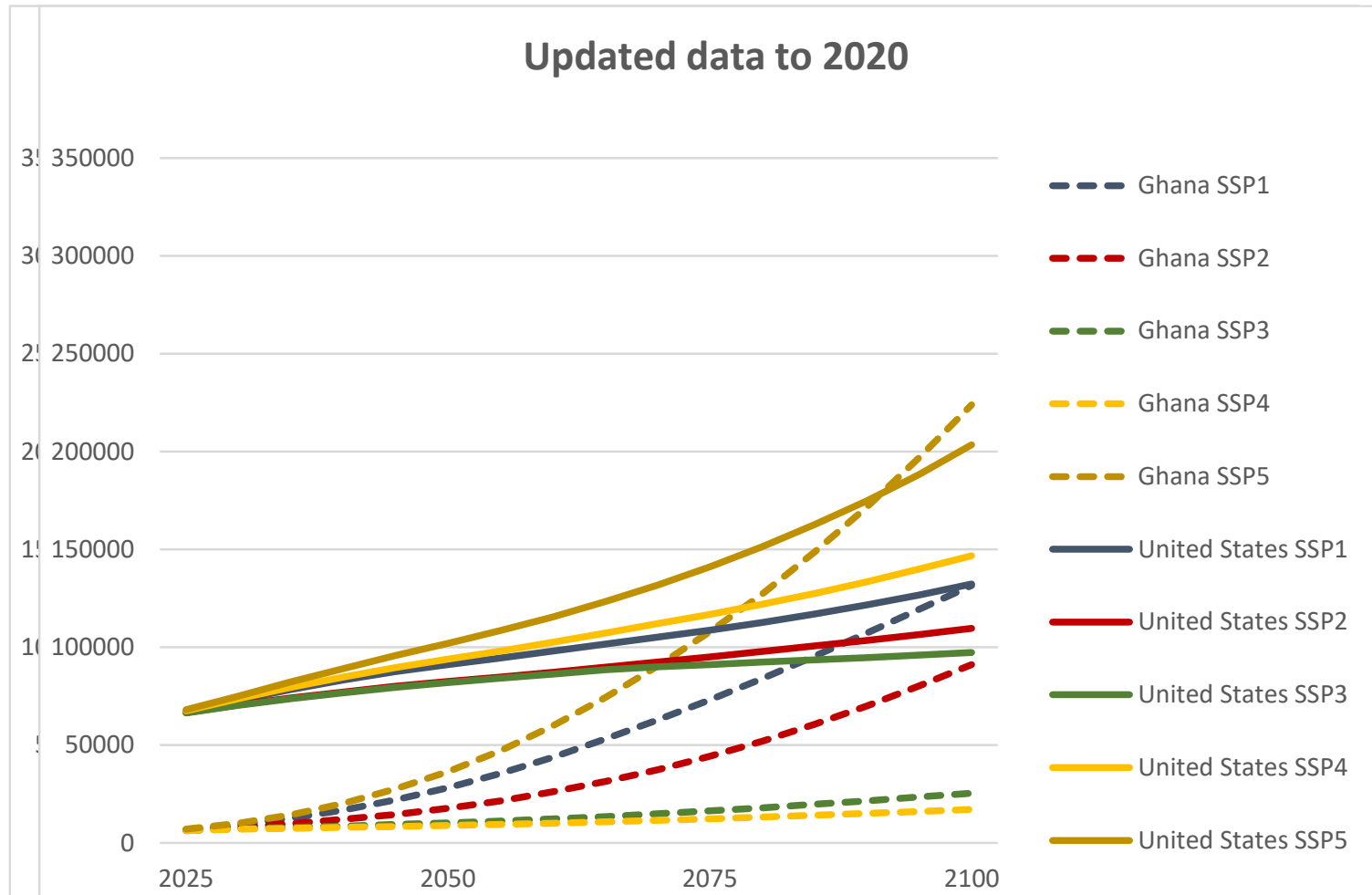
Updating projections requires all steps – updating data alone is not enough

Income in USD per capita

Thanks to Johannes Koch and Marian Leimbach (PIK) for inspiration for this slide

Total Factor Productivity Framework

▶ Conditional convergence framework

  ▶ Technology frontiers differ across countries

  ▶ Countries grow faster if they are further from their country-specific frontier

  ▶ The frontier itself moves over time

▶ Technically: $$TFP_{(r,t)} = TFP_{(r,t-1)} \bullet \left(\frac{T_{LT(r,t-1)}}{TFP_{(r,t-1)}} \right)^{\rho(r,t)}$$

  ▶ "T_{LT}" is the structural TFP. It is region specific and its rate of growth too : sum of a common growth rate (g) plus influence of specific "product markets regulation" indicator (pmr(r,t)). (plus a country fixed effect that disappear in time to avoid jump between historical and structural trends)

  ▶ The speed of convergence "$\rho_{(r,t)}$" has a common component ($\rho0$) but is also function an openness indicator (open(r,t)). This long-run openness indicator is itself function of various elements: size of the country, gdp per capita relative to its trade partners, ...

Global income growth rates 2026-2100 across SSPs

Preliminary – not to be cited or quoted!