Aggregation Notes

This note explains the components of the regional aggregates as well as how the aggregate variables are calculated.

Regional Aggregates

Europe: EU-27, Iceland, Norway, Switzerland

Other Mature Economies: Australia, Canada, Hong Kong, Israel, New Zealand, Singapore, South Korea, Taiwan

Other Developing Asia: Bangladesh, Cambodia, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam

Latin America: Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Jamaica, Mexico, Peru, St. Lucia, Trinidad & Tobago, Uruguay, Venezuela

Middle East: Bahrain, Iran, Iraq, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen

Africa: Algeria, Angola, Burkina Faso, Cameroon, Cote d'Ivoire, DR Congo, Egypt, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Mali, Morocco, Mozambique, Niger, Nigeria, Senegal, South Africa, Sudan, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe

Russia, Central Asia and Southeast Europe: Albania, Armenia, Azerbaijan, Belarus, Bosnia Herzegovina, Croatia, Georgia, Kazakhstan, Kyrgyz Republic, Macedonia, Moldova, Russian Federation, Serbia & Montenegro, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan

EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom

EU-12: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia

EU-27: EU-15 and EU-12

Euro Area: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovak Republic, Slovenia, Spain

OECD: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

Aggregation of Growth Rates

Growth rate for individual country is calculated using the log difference. This is necessary in order to facilitate aggregation as well as decomposition of the growth for individual countries and components. With regard to the aggregation to country groups, the following formulas are used for GDP (Y), labor input (L) and labor productivity (y) growth respectively:

(1) $\Delta \ln Y_{region} = \sum_i \overline{w_i}\, \Delta \ln Y_i$
(2) $\Delta \ln L_{region} = \Delta \ln \sum_i L_i$
(3) $\Delta \ln y_{region} = \sum_i \overline{w_i}\, \Delta \ln y_i + (\sum_i \overline{w_i}\, \Delta \ln L_i - \Delta \ln \sum_i L_i) = \sum_i \overline{w_i}\, \Delta \ln y_i + R$

with w_i as the country share in PPP adjusted nominal GDP of the region for each year and a bar denoting the two-period average. Hence aggregate GDP growth is the weighted sum of the country GDP growth. Growth in labor quantity (employment or hours) is simply the log difference of summed total labor quantity of all the countries in one region. The aggregate labor productivity growth is the weighted sum of country productivity growth plus a reallocation term R. The reallocation term is positive if employment shifts from low productivity countries towards high productivity countries.

Aggregate Total Factor Productivity (A) growth rates for various country groups are calculated using following steps.

1. Aggregate labor input growth rates and aggregate capital services (K) growth rates are calculated by taking the weighted average of individual country growth rates. The weights used are two period averages of the country shares in PPP-adjusted nominal GDP of the group for each year.

2. Aggregate labor compensation share for each year is obtained by summing up the labor compensation (PPP adjusted) of individual countries and then dividing this sum by total nominal GDP (PPP adjusted) of the group.

3. TFP growth rates are calculated using

(4) $\Delta \ln A_{region} = \Delta \ln Y_{region} - \overline{\alpha}_{region}\ \Delta \ln L_{region} - \left(1 - \overline{\alpha}_{region}\right) \Delta \ln K_{region}$

where $\overline{\alpha}_{Region}$ is the two period average of the regional labor compensation shares, and $\Delta \ln Y_{region}$ is defined in equation (1).