Data

How are aggregate growth rates computed for National Accounts series?

← Data Compilation Methodology

Our country data are collected in local currency units (LCU), and the original base year for the constant price series varies by country. To produce constant price GDP aggregates, we first convert each country's constant local price GDP into constant 2010 U.S. dollars, and then sum by year along with implicit gap-filling of missing values.

When we convert the constant price data to U.S. dollars, we preserve the growth rates observed in the local price series. That is, we convert the constant LCU series to an index by dividing each year by the 2010 value (so 2010=1), and then multiply each year's result by the 2010 current price value converted to U.S. dollars using the 2010 period average official exchange rate.

Because of missing data, aggregates should be treated as approximations of unknown totals or average values. Missing data are imputed based on the relationship of the sum of available data to the total in the year of the previous estimate. The imputation process works forward and backward from 2010. Missing values in 2010 are imputed using one of several proxy variables for which complete data for all countries are available (or estimated) in that year. The imputed value is calculated so that it (or its proxy) bears the same relationship to the total of available data. Imputed values are usually not calculated if missing data account for more than a third of the total in the benchmark year. The proxy variable for the GDP calculation is GNI in US dollars.

When we show GDP aggregate growth rates over a period (e.g., 1990-2004), they are derived using the least-squares method on the constant dollar series. Least-squares growth rates are used wherever there is a sufficiently long time series to permit a reliable calculation. No growth rate is calculated if more than half the observations in a period are missing. The least-squares growth rate, r, is estimated by fitting a linear regression trend line to the logarithmic annual values of the variable in the relevant period. The regression equation takes the form:

$\ln X_t = a + bt,$

which is equivalent to the logarithmic transformation of the compound growth equation,

$X_t = X_o (1 + r)^t.$

In this equation X is the variable, t is time, and $a = \ln X_o$ and $b = \ln (1 + r)$ are parameters to be estimated. If b* is the least-squares estimate of b, the average annual growth rate, r, is obtained as - 1 and is multiplied by 100 for expression as a percentage (least-squares calculation can be done in Excel using the LOGEST function). The calculated growth rate is an average rate that is representative of the available observations over the entire period. It does not necessarily match the actual growth rate between any two periods. Note that sometimes the least-squares method will give counterintuitive results when comparing the growth rates of individual members, or comparing the rates of sub-groups, against the rate of the group as a whole.