AidData Exchange Rates and Deflators

Contents

Purpose

Values are converted and deflated so that they are comparable across currencies and years. AidData's methodology follows after the OECD, whose documentation is available here: http://www.oecd.org/dac/aidstatistics/informationnoteonthedacdeflators.htm.

Exchange Rates

Methodology

Before deflation, all values are expressed in nominal (current) U.S. dollars (USD). This is done with an LCU per USD exchange rate, applied by:

(original value) / (LCU per USD) = (new value)

For example:

100 EU / .7 = 142.57 USD

Sources

OECD countries: OECD -- http://stats.oecd.org/Index.aspx?DatasetCode=SNA_TABLE4

Taiwan: Central Bank of the Republic of China (Taiwan) -- http://www.cbc.gov.tw/content.asp?CuItem=1879

All others: World Bank -- http://data.worldbank.org/indicator/PA.NUS.FCRF/countries

Implementation

AidData's historical exchange rates are seen on sheet "A1 (Ex Rate, LCU per USD)." In Eurozone countries, pre-Euro currencies were converted to Euros according to the last official exchange rate. These values are highlighted in orange. This was done for the later step of measuring change in buying power between a given country's currency and the USD. In three cases, pre-Euro currencies were preserved because AidData's records were originally given in those currencies: Cypurs, Slovenia, and Slovakia. In Israel's case, Old Shekel values are preserved in 1961 to 1984. These values are highlighted in blue. This did not affect AidData's calculations as there are no project records for those years.

Deflators

Deflators control for two changes over time: inflation in the donor country and change in buying power in the donor country relative to the United States.

Inflation

Methodology

Inflation is measured as relative to a given base year. AidData 2.0 used the base year of 2009. Percentages were then generated using:

$$\text{Percentage}_{\text{Year}} = \text{Percentage}_{\text{Previous Year}} + (\text{Percentage}_{\text{Previous Year}} * \text{Inflation}_{\text{Year}})$$

For example, in 2009, Colombia's GDP inflation was 4.2%. Taking 2009 as the base year, the percentage for 2009 is 100%. So, to calculate the percentage for 2008, using 2009 as the start year:

$$\underset{P_{year}}{100} = \underset{}{P_{previous}} + \underset{I_{year}}{(P_{previous} * .04)}$$

This yields 96% as Colombia's percentage for 2008. (Decimals have been rounded for this example, but were not rounded for AidData's deflator table.) In 2008, Colombia's GDP inflation was 8%. Then, to calculate 2007, 2008 is the start year:

$$\underset{P_{year}}{96} = \underset{}{P_{previous}} + \underset{I_{year}}{(P_{previous} * .08)}$$

This yields 89% as Colmbia's percentage for 2007.

Sources

OECD countries: OECD -- http://stats.oecd.org/Index.aspx?QueryId=27220[1]

Taiwan: Council for Economic Planning and Development -- http://www.cepd.gov.tw/encontent/m1.aspx?sNo=0001453

Kuwait: For some years, World Bank data was not available. For 1990 to 1990, AidData used World Bank "High income: nonOECD" GDP inflation and for 2008 to 2010, AidData used Kuwait's CPI inflation from the World Economic Outlook.

All others: World Bank GDP Inflation -- http://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG

Implementation

Annual inflation figures are stored in sheet "B1 (Defl, Annual %)". They were used to generate relative percentages, which are stored in sheet "B2 (Defl, % from 2009 (linked))". Please note that these sheets are linked; changing a value on B1 will change the related values in B2. Clicking a cell in B2 will also reveal the formula which was applied to generate the relative percentage.

Change in Buying Power

Methodology

Change in buying power is taken from the LCU per USD rate and expressed as:

$$\text{Exchange Rate}_{\text{Base Year}} / \text{ Exchange Rate}_{\text{Transaction Year}} = \text{Change in Buying Power}$$

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1 These numbers combine both steps (inflation and change in buying power). They are used for publishing. However, while implementing this methodology, AidData generated deflators for DAC countries using World Bank data. AidData-generated deflators were compared to OECD-provided deflators to assess accuracy. The difference was <.01%.

For example, the Korean Won to USD rate was 1273.9 in 2009 and 804.4 in 1996. The subsequent change in buying power is:

$$1273.9 / \ 804.4 \ = 1.58$$

Note that this methodology yields a ratio of 1 for all currencies pegged to the USD.

Sources

These figures are generated from the historical exchange rates described above. See the source section.

Implementation

AidData-generated changes in buying power are stored in sheet “C1 (Ex Rate, from 2009(linked))”. Note that this sheet is linked to sheet A1. Any changes made on sheet A1 will be reflected on sheet C1. Also, clicking a cell on sheet C1 will reveal the formula used to generate the ratio relative to 2009.

Finalized Deflators

Methodology

The GDP inflation and change in buying power numbers are combined to create annual deflators for donor countries:

Inflation * Change in Buying Power = Deflator

Sources

These figures are built on inflation and change in buying power, described above. See the source section there.

Implementation

AidData-generated deflators are stored in sheet “D1 (Prelim Deflator (linked))”. Note that this sheet is linked to all other previously mentioned sheets, so changes there will affect this sheet. Also, clicking a cell will reveal the formula used to generate the value.

For publishing, AidData used OECD-provided deflators for DAC countries, which are stored in sheet “D2 (OECD defl). Sheet “E1 (Final Deflators (linked))” contains OECD-provided deflators for DAC countries and AidData-generated deflators for non-DAC countries. Some donor-years are missing. Deflators were not generated for those donor-years because AidData does not have projects in those years and the data was not readily available.

Validity and Accuracy Checks

To be sure that the methodology, sources and implementation were sound, AidData used DAC countries as reference. AidData generated deflators for DAC countries using World Bank data and then compared those deflators to the ones provide by OECD. The results of those comparisons are found in sheet “E2 (OECD-

AidData % diff)". This sheet is also linked, so changes to other sheets will change this sheet and clicking on a cell will reveal the formula used to generate the value.

The average percent difference between AidData-generated deflator and OECD-provided deflator is less than .05%. Because the process was so highly accurate for DAC countries, it is assumed that the process is also accurate for non-DAC countries.

How to Use GDP Deflators

Amounts in LCU should be converted to nominal USD, using the LCU per USD exchange rates found in sheet A1. Then, the values should be *divided by* the percentages in sheet "E1". For example, in 1975, Kuwait funded an electrification project in Bangladesh worth 6,400,000 *KD1975* (AidData ID 2427051). To convert this amount to USD 2009, first, convert it to USD 1975:

6,400,000 *KD 1975* / (.29003 *KD/USD 1975*) = 22,066,505.30 *USD 1975*

Next, divide it by the AidData deflator:

22,066,505.30 *USD 1975* / 20.83% = 105,936,175.20 *USD 2009*

Note that amounts that are *already reported in USD* do not need to be converted. They only need to be deflated (divided by the appropriate deflator).