

Rebasing the OECD Weekly Tracker to be the difference relative to a COVID-free counterfactual

The **OECD Weekly Tracker** (T_w) is an annual GDP growth rate which is conceptually defined by:

$$[1] \quad T_w = \frac{y_w}{y_{w-52}} - 1, \text{ where } y_w \text{ is a proxy measure of weekly GDP.}$$

The exercise here describes a new version of the Tracker: a **Counterfactual Tracker** (CFT_w) measuring the % difference in GDP relative to a pandemic-free counterfactual projection in the same period:

$$[2] \quad CFT_w = \frac{y_w}{x_w} - 1, \text{ where } x_w \text{ is weekly GDP in a counterfactual pandemic-free projection built using pre-pandemic OECD forecasts.}$$

In practice, calculating CFT_w directly from [2] is not possible because: (i) the Tracker is originally computed as a growth rate and does not provide direct information on the weekly level of GDP; (ii) counterfactual projections are only available at a quarterly frequency. To overcome these problems [2] is re-written as:

$$[3] \quad CFT_w + 1 = \frac{y_w}{x_w} = \frac{y_w}{x_w} \cdot \frac{y_{w-52}}{y_{w-52}} \cdot \frac{x_{w-52}}{x_{w-52}} = \frac{y_w}{y_{w-52}} \cdot \frac{y_{w-52}}{x_{w-52}} \cdot \frac{x_{w-52}}{x_w} = \frac{(T_w+1)}{x_w/x_{w-52}} \cdot \frac{y_{w-52}}{x_{w-52}}$$

If there is only quarterly data for the counterfactual, x_q , then because the counterfactual is likely to be relatively smooth and fluctuations in growth rates modest (especially in relation to the period of the pandemic), the following approximation should be valid:

$$[4] \quad x_w/x_{w-52} \approx x_q/x_{q-4}, \text{ where } q \text{ corresponds to the quarter in which week } w \text{ appears.}$$

For the first year of the counterfactual $\frac{y_{w-52}}{x_{w-52}}$ should be equal to one, since both numerator and denominator correspond to the same realised historical data (assuming no data revisions). However, after the first year, the two diverge, so, given that in the second year, $x_{w-104} = y_{w-104}$, an approximation for the second year can be derived as:

$$[5] \quad \frac{y_{w-52}}{x_{w-52}} = \frac{y_{w-52}}{x_{w-52}} \cdot \frac{x_{w-104}}{y_{w-104}} = \frac{y_{w-52}/y_{w-104}}{x_{w-52}/x_{w-104}} \approx \frac{y_{w-52}/y_{w-104}}{x_{q-4}/x_{w-8}}$$

Substituting [4] and [5] into [3] and re-arranging gives:

$$[6] \quad CFT_w + 1 = \frac{(T_w+1)}{x_q/x_{q-4}} \cdot \frac{y_{w-52}/y_{w-104}}{x_{q-4}/x_{w-8}} = \frac{(T_w+1)}{x_q/x_{q-4}} \cdot \frac{y_{w-52}/y_{w-104}}{x_{q-4}/x_{w-8}} = \frac{(T_w+1)}{x_q/x_{q-4}} \cdot \frac{(T_{w-52}+1)}{x_{q-4}/x_{w-8}}$$

$$\Rightarrow [7] \quad CFT_w = \frac{(T_w+1)}{x_q/x_{q-4}} \cdot \frac{(T_{w-52}+1)}{x_{q-4}/x_{w-8}} - 1.$$

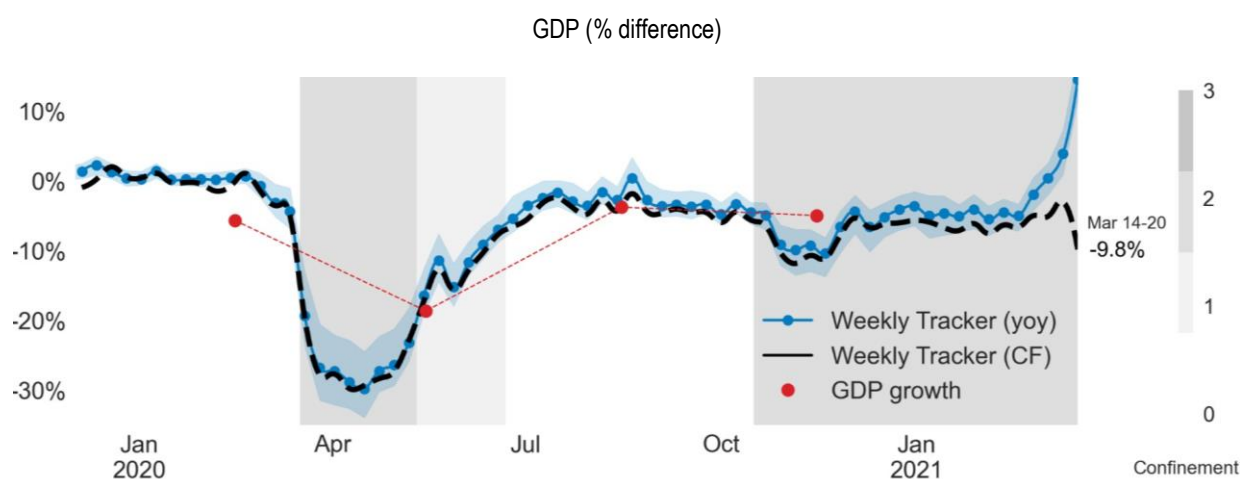
Where the second term in the product is superfluous during the first year of the counterfactual, but is likely important in the second year, particularly after the anniversary of the first impact of the pandemic.

An illustrative example: France

The following example applied to France shows what these adjustments do to the profile of the Weekly Tracker using the quarterly GDP projections published in the December 2019 *OECD Economic Outlook* (no. 106) as the basis for the pandemic-free counterfactual projections (Figure 1):

- Over the course of 2020, the Counterfactual Tracker (black dashed line) is more negative than the Weekly Tracker (blue solid line), but the difference is relatively modest. The Counterfactual version of the Tracker is more negative because in the pandemic-free counterfactual some positive growth was expected, whereas the original Tracker is measuring differences relative to 2019. The difference is modest, typically 1-2%, because growth in the counterfactual was only expected to be modest, particularly in comparison with the scale of the massive falls in GDP that were experienced at the start of the pandemic.
- Much bigger differences are apparent in 2021 after the anniversary of the first impact of the pandemic on activity: the Weekly Tracker exhibits a strong upturn in March, whereas the Counterfactual Tracker exhibits no such upturn and, indeed, is rather showing signs of weakening. This is because the Weekly Tracker in early March 2021 is measuring GDP relative to the level of GDP in early March 2020 when GDP had already started to fall in reaction to the pandemic.

Figure 1. France: Comparing the Tracker and Counterfactual Tracker



Note: The blue confidence band shows 95% confidence intervals. The Weekly Tracker is the % difference in GDP between a week and the same week a year earlier. The Counterfactual Tracker is the % difference in GDP for the same period in a pandemic-free counterfactual represented by the December 2019 OECD Economic Outlook forecasts. The darkness of the grey background reflects stay-at-home confinement requirement based on the Oxford Blavatnik database (0 - no measures, 1 - recommend not leaving house, 2 - require not leaving house with exceptions, 3 - require not leaving house with minimal exceptions).

Source: OECD Weekly Tracker, OECD Economic Outlook, and Oxford COVID-19 Government Response Tracker