



# **Monitoring the Economic Impact of COVID-19 using the new PBO Weekly Domestic Activity Tracker**

**Alison Wrynn and Jacopo Bedogni**

## **Abstract**

This note gives a description of the new PBO Domestic Economic Activity Tracker. The tracker is an attempt to provide a timelier (i.e. weekly) reading of economic developments and track the economic impacts of COVID-19. The tracker is informed by variables capturing labour market conditions, mobility, consumer activity and production. It shows a sharp decline in domestic economic activity in March and April, with a strong recovery starting in May. The tracker also indicates that despite the recovery, economic activity is still significantly lower than normal levels.

Disclaimer: This document has been prepared by the Parliamentary Budget Office (PBO) for use by the Members of the Houses of the Oireachtas and to aid them in their parliamentary duties. It is not intended to be comprehensive or definitive. The PBO may remove, vary or amend any information contained therein at any time without prior notice. The PBO accepts no responsibility for any references or links to, or the content of, any information maintained by third parties.

## Introduction

Economic assessments are usually made using official statistics such as GDP or unemployment. However, these indicators are generally produced on a monthly or quarterly basis. There is also a lag between when the quarter or month occurs and when the data is released. For example, data for Q1 2020 GDP (January to March) was released in June by the Central Statistics Office.

The COVID-19 pandemic has caused an unprecedented shock to the Irish economy. Not only did it cause a dramatic reduction in economic activity, but the speed at which it happened was unprecedented. For example, the unemployment rate increased by 23.4 percentage points in only two months, from 4.8% in February to 28.2%<sup>1</sup> in April.

The PBO has produced a weekly domestic economic activity tracker to provide a timelier way of reading economic conditions and tracking the economic impacts of COVID-19. Many high frequency data sources have become available in recent years. The PBO Domestic Economic Activity Tracker combines a number of these indicators into a single index using a technique known as Principal Component Analysis.

This new index can provide a more timely reading of economic developments in the Irish economy than those that are produced at lower frequencies. The index is updated on a weekly basis and can be found on the *PBO's data visualization webpage*. It follows a similar methodology to that of researchers at the Federal Reserve Bank of New York<sup>2</sup> and the Bundesbank<sup>3</sup> who have produced a weekly index for both the US and German economies.

## Data and Methodology

To respond to the need of having better tools that can enable a timelier assessment of economic developments, several research bodies have developed their own leading indicators. For example, the OECD has introduced a monthly composite leading indicator, which provides information of fluctuations in activity of OECD economies around long-term trends.<sup>4</sup> The Bank of Italy produces a business cycle indicator for the Italian economy called Ita-coin which provides monthly real-time estimates of economic activity in Italy.<sup>5</sup> In the Irish context, the Central Bank of Ireland<sup>6</sup> has presented a monthly business cycle indicator used to capture the current state of the Irish economy by drawing on a large set of monthly economic activity series. A similar approach was also used by the PBO to assess current trends in the domestic economy and by the Department of Finance<sup>7</sup> for the purpose of nowcasting (i.e. predicting present economic trends).

The PBO takes this research further by deriving a higher frequency index of activity which is available on weekly basis, to better inform policy makers of “real-time” economic developments and economic impacts of COVID-19. This index uses the same methodology that the Federal Reserve Bank of New York and the Bundesbank used to produce weekly trackers for the US and German economies.

To compile the activity tracker, several high frequency data series that are available on a weekly basis are used. Each series is selected to provide meaningful information on economic conditions in Ireland. These variables capture labour market conditions, mobility, consumer activity and production. The variables used in the index are presented below in Table 1.

---

<sup>1</sup> Covid-19 Adjusted Monthly Unemployment, both sexes, 15-74 years. Central Statistics Office.

<sup>2</sup> Lewis, D., K. Mertens, and J.H. Stock, 2020. “U.S. Economic Activity during the Early Weeks of the SARS-Cov-2 Outbreak,” Federal Reserve Bank of New York Staff Reports, no. 920, April.

<sup>3</sup> Eraslan, S. and T. Götz, Weekly activity index for the German economy, Deutsche Bundesbank, available for download at <https://www.bundesbank.de/wai>

<sup>4</sup> More information on the OECD leading indicators is available at <https://www.oecd.org/sdd/leading-indicators/>

<sup>5</sup> Aprigliano, V. and L. Bencivelli, 2013. “Ita-coin: a new coincident indicator for the Italian economy,” Economic working papers 935, Bank of Italy, Economic Research and International Relations Area.

<sup>6</sup> Conefrey, T. and G. Walsh, 2020. “Measuring Economic Activity in Real Time during COVID-19” Central Bank of Ireland Economic Letter, Vol. 7, 2020. Conefrey, T. and G. Walsh, 2018. “A Monthly Indicator of Economic Activity for Ireland” Central Bank of Ireland Economic Letter, Vol. 14, 2018.

<sup>7</sup> Daly, L. and L. Rehill, 2020. “Where are we now? Examining Irish Economic Developments in Real-Time.” Department of Finance Paper.

**Table 1. Economic series feeding into the PBO Domestic Economic Activity Tracker**

<b>VARIABLE</b>	<b>SOURCE</b>
<b>Card spending and ATM withdrawals (€)</b>	<b>Central Bank of Ireland</b>
<b>Live register numbers (including people on the Pandemic Unemployment Payment (PUP))</b>	<b>Department of Employment and Social Protection and CSO</b>
<b>Traffic Volumes (peak AM)</b>	<b>National Roads Authority</b>
<b>Air quality in Dublin</b>	<b>European Environmental Agency</b>
<b>Google search term “Unemployment”</b>	<b>Google trends</b>
<b>Google search term “Social Welfare”</b>	<b>Google trends</b>

Each series also undergoes a transformation. The aim is to achieve the required statistical properties for carrying out the principal component analysis (i.e. stationarity of the data (using year-on-year changes) and comparability of the different indicators by way of *z score* standardisation). By undergoing these transformations, the value of each series is centred around zero and can be interpreted as deviations from their historical average.

We derive the weekly activity index by applying a method called Principal Component Analysis (PCA). PCA allows us to summarize in a single indicator the common information content in a set of economic activity series. This can facilitate data analysis and visualisation.

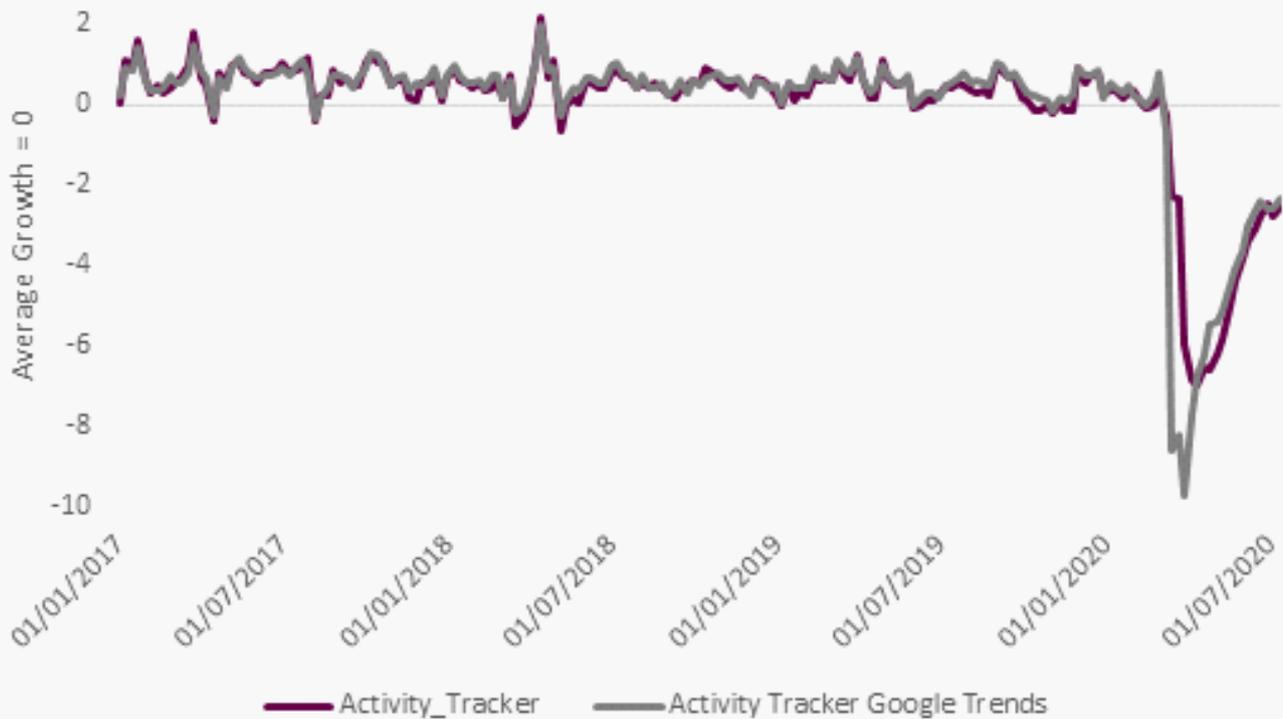
PCA produces a number (N) of uncorrelated and orthogonal “principal components” (Z), which are linear combinations of the weighted observed series (X). The variables are weighted using weights (w) determined statistically. Taken together the principal components explain all of the variation in the dataset, however, a small number of them capture most of the variation (i.e. retain the most valuable information). The first principal component (Z<sub>1</sub> see equation below) is the most important factor as it accounts for most of the variance, and it is used to derive the activity index.

$$Z_1 = w_{11} X_1 + w_{12} X_2 + \dots + w_{1N} X_N \tag{1}$$

## Results

The data used covers the sample period from January 2017-July 2020. Figure 1 presents two versions of the index. One includes data on google searches for unemployment and social welfare while the other omits these variables. Both indices show a sharp drop in economic activity in March 2020, but the index incorporating google searches shows a faster response. If google searches are included, the low point of the recession happens in March 2020 with the recovery beginning in April. In this case the indicator is insightful in capturing the emergence of turning points in the economy. However, if google searches are excluded, the economy reaches a low point in April with the economy recovering as the main restrictions are lifted in May. This is more likely to be the most realistic representation of the economy, so this indicator is used.

**Figure 1: Weekly Economic Activity Tracker**

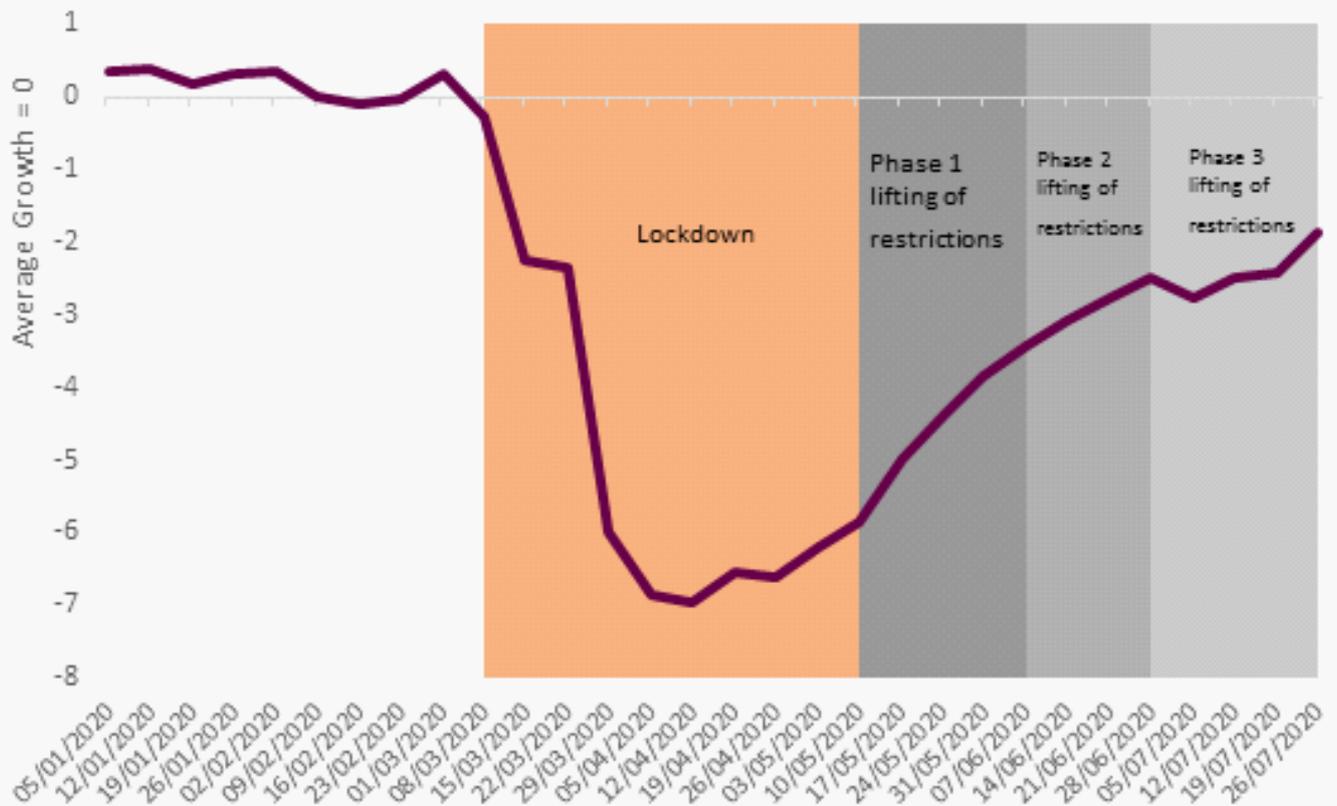


**Notes:** The tracker incorporates information up to the week starting on the 26th of July 2020. Values above 0 indicate periods of above average economic growth, while values below 0 suggest that the economy is operating below average growth. Including google searches, the tracker (first principal component) explains 57% of the total variance in the dataset, while it retains 66% of the variation when google trends are excluded.

## **Weekly Economic Activity Tracker and COVID-19**

Figure 2 shows the impact of the pandemic on the domestic economy using the tracker. The weekly activity tracker shows that there was a sharp decline in economic activity from the week commencing on the 8th of March. This was when the first lockdown measures were implemented. Economic activity continued to decline until the 12th of April. This was when consumer spending and traffic volumes reached their lowest levels, and the number of people claiming the PUP payment reached 533,000 (although a peak of 598,000 was reached at the beginning of May). While activity then made a slight improvement, it remained at suppressed levels until the 10th of May when the first phase of restrictions were lifted. Once restrictions were lifted, activity levels improved dramatically. This is somewhat expected given the pent up demand in the economy as restrictions meant that certain activities and spending could not take place.

**Figure 2: Weekly economic activity tracker and Covid-19**



Source: Authors' analysis

Despite this strong recovery, activity is still significantly lower than normal levels. Due to the nature of the lockdown one would expect that growth would be strong in the first few weeks as restrictions are lifted as certain business activities can reopen. However, after this initial stage, growth could stall and increase at a slower rate as certain social distancing measures remain in place and it takes longer for the economy to recover from structural damage (e.g. businesses that have closed on a permanent basis) that the pandemic has caused.

In comparison to May and June, the tracker suggests that growth in activity has eased in July. While the recovery is likely to continue, this will largely be dependent on the occurrence of a second wave and the re-imposition of restrictions. Certain restrictions due to be eased in late July and August have been postponed and regional restrictions were recently put in place for Kildare, Laois and Offaly. The PBO will continue monitor the economic impacts of COVID-19 and report on the weekly tracker again in September.