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The Eurostat business cycle clock and the pandemics: some preliminary considerations

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Abstract:

Using dashboards of indicators to monitor various aspects of given phenomena is rather common, in particular in relation to policy decision making. In the European Union there are numerous dashboards in use, for example the Principal European Economic Indicators which describe the overall macro-economic situation of a country/area in relation to economic and monetary policy.

However, it can be hard to extract key signals from dashboards containing numerous indicators. It is also important to consider how to summarising dashboard information to provide users with concise messages.

We will present the [Business Cycle Clock \(BCC\)](#), the Eurostat online tool which represents the recent cyclical situation of the economy. Fluctuations of the economy between periods of expansion and contraction have long been studied by business cycle analysts. However, detecting turning points in the economic evolution is not an easy task, and it becomes more difficult during exceptional times. We will introduce some considerations on the impact of the COVID-19 pandemic on the BCC tool and its challenges - statistical production has been challenged by new conditions to collect, or impossibility to do it, data. Furthermore, the impact on some indicators has produced values several standard deviations away from the usual ones, a challenging condition for any model specification. When looking at the euro area, a further factor contributes to adding complexity: the lockdown measures taken at national level to combat the pandemic have not been implemented in a synchronised way. We will first introduce the three cycles monitored by the BCC - business, growth and acceleration cycles - and the methodological context, and then focus on the recent output of the BCC tool during the pandemic. Looking at the euro area, in the first quarter of 2021 the hand of the BCC was moving between the peak of the acceleration cycle and the peak of the growth cycle, a sector corresponding to an expansion phase with a decelerating growth. The BCC indicates that the euro area exited a recessionary phase in August 2020. However, the current signals of the clock have to be taken with some caution because of a higher uncertainty of data with possible revisions in the upcoming months which could affect the results. We conclude that although the positive outlook has been confirmed by other organisations, we will look forward to future values, and possible revisions to past ones, to confirm the current signals.

Keywords:

Business cycle analysis; Markov switching models; PEEIs; turning points detection

Disclaimer:

The information and views set out in this article are those of the author and do not necessarily reflect the official opinion of the European Commission.

1. Introduction

The economy is subject to cycles with expansion and contraction phases, and understanding in which phase we are, and if there are signs of a change of phase, or being close to a turning point, is one of the main issues tackled by econometric researchers.

Eurostat has a long experience in the construction of turning point coincident indicators based on multivariate Markov Switching models. The Eurostat BCC is able to represent several aspects of cycles in a unique, visual context.

The idea at the base of the BCC is looking at the business, growth and acceleration cycles and represent the six possible states obtained by combining those three cycles in a unique image, a clock, which is at the same time familiar to the reader and conveying an intuition of cycles. The BCC tool is based on three coincident probabilistic indicators for the business, growth and acceleration cycles, called Business Coincident Cyclical Indicator (BCCI), Growth Coincident Cyclical Indicator (GCCCI) and Acceleration Coincident Cyclical Indicator (ACCI). The values of these three indicators have been combined to arrive to a unique clock hand position.

The three cyclical indicators are computed by using Markov switching models. The BCCI and the GCCCI are simultaneously computed in a multi variate model taking in input the industrial production index, the unemployment rate and two variables from the business and consumer surveys run by the Directorate-General for Economic and Financial Affairs of the European Commission: the manufacturing employment expectations for the months ahead, and the financial situation of consumers over the last 12 months. The ACCI has been computed by a univariate Markov switching model based on the Economic Sentiment Indicator, an indicator that is part of the Business and Consumer Surveys too. You can find more information on the BCC tool and on its methodological framework in [1-2-3]; the online tool is available on the Eurostat website.

2. Impact of the pandemic on the BCC: some preliminary considerations

In this section we will look at how the pandemic has influenced the indicators feeding the BCC: the industrial production index, the unemployment rate, and the three variables which originate from the business and consumer surveys.

Despite concerns in the beginning of the pandemic in 2020, the statistical production has shown to be resilient to effects of the pandemic. All official statistical indicators for European aggregates were released on time. The impact of the pandemic on the indicators feeding the BCC is, however, manifold.

Looking at the industrial production index, enterprises have reacted to the pandemic by temporary closing, diminishing production or even changing their economic activity. Closed enterprises did not send any data, and the collection of administrative data was sometimes delayed, so that one of the statistical challenge was the estimation of missing data in a completely new situation, unrelated with the past evolution.

Moreover, the Industrial production index is a seasonally adjusted indicator. One of the impacts of COVID on time series has been to broken the seasonal pattern and to open the question on how to treat outliers in the seasonal adjustment process. Although this concerned the end of the time series, how to model an outlier at the end of a time series requires additional observations to decide the nature of the outlier, which could correspond to a temporary effect or to a definitive change in the level of the time series. As the *Guidance on time series treatment in the context of the COVID-19* crisis mentions, changing the outlier type can have an impact on the series revisions while the choice of the type of outlier can influence turning point identification. An indirect effect of this last point, is that seasonally

adjusted data could be subject to higher revisions than usual, due to the adaptation of the seasonal choices to the availability of new data (see 4 for more an example of seasonal adjustment during pandemic).

Another indicator used as input in the BCC is the unemployment rate. The labour market has been strongly hit by the COVID-19 pandemic, although the national support schemes launched by many member states have mitigated the effect on the working population. However, the difficult conditions under the pandemic were reflected also in the “status” of people, who have also changed from being unemployed to being outside the labour force because of not being anymore able to seek for work or to accept a work during lock down measures. This brings some concerns on the information content of the unemployment rate, whose analysis has been complemented by other indicators such as the labour market slack. Although there is no visible impact in the values used in the BCC tool, a cautious approach in looking at future values has to be considered in relation to how the unemployment rate evolves during an economic crisis. Furthermore, uncertainty in this moment is linked to the end of the supporting national schemes and the consequent impact on unemployment. Negative effects could be compensated by the large investment by the European Union to support employment in the context of the recovery and resilience plans and the NextGenerationEU instrument. All in all, is rather difficult in this moment to have a clear understanding of the evolution of the unemployment rate, and it will be necessary to wait to understand how those different factors will influence the labour market and the BCC tool.

Looking at the Business and consumer surveys and the ESI indicator, although they are free from the mentioned impact of seasonal adjustment due to a specific adjustment procedure, they were impacted by the issue of no response and, as a consequence, estimation techniques to compute European aggregates had to be applied.

The main issue was however the higher volatility of the industrial production index and of the Economic sentiment indicator. The uncertain conditions during the pandemic have produced values several standard deviations away from the usual ones, a challenging condition for any model specification. To make an example, in April 2020 the Economic Sentiment Indicator went down by 27.2 points in the euro area, the strongest monthly decline in the ESI since 1985. In order to improve the stability of the signals the model for the ACCI indicator needed to be re-specified (see 5 for more details) and the results are quite satisfying.

Moreover, to better monitor the BCC in the challenging time of the pandemic, we have introduced new performance measures to asses our models (see 5 for more information), namely: precision, recall and F1 Score. We combine those measures in a performance matrix which permits an immediate assessment of how the three models are performing.

Finally, we also analysed how the three cyclical indicators were revised in the last six months, to assess the robustness of the signals.

3. Recent results

Looking at the euro area, in the first quarter of 2021 the hand of the BCC was moving between the peak of the acceleration cycle and the peak of the growth cycle, a sector corresponding to an expansion phase with a decelerating growth. The BCC indicates that the euro area exited a recessionary phase in August 2020. However, the current signals of the clock have to be taken with some caution because of a higher uncertainty of data with possible revisions in the upcoming months which could affect the results.

Moreover, for the first quarter of 2021, the growth cycle coincident indicator (GCCl) shows slowdown probabilities equal to zero, signalling an expansionary phase for the euro area. Also the BCCI indicator shows a positive signal, with a total absence of recessionary signals for the euro area. Looking at the ACCI indicator, signals of entering a phase of deceleration of the growth are visible, although it is a well-known fact that the acceleration cycle is characterised by the highest number of fluctuations and a high degree of volatility; moreover, a deceleration of the growth rate does not necessarily lead to a recession.

4. Discussion and Conclusion

Understanding large sets of macroeconomic indicators is not always straightforward; the Eurostat business cycle clock is a tool based on a robust and transparent methodology, giving synthetic signals on the state of the economy. It also enables to go deeper into the details of all phases of the cycles due to the joint analysis based on acceleration, growth and business cycles. The effect of the pandemic on the tool have been manifold, with the main one being the high volatility of the variables feeding the BCC. We discussed some of those effects, together with how we adapted to better monitor our results in this challenging situation.

References:

1. Ruggeri-Cannata R. (2021), The Eurostat Business Cycle Clock: a complete overview of the tool, *Statistical Journal of the IAOS* vol. 37, no. 1, 309–323
2. Anas J, Carati L, Billio M, Ferrara L, Mazzi GL. Composite cyclical indicators detecting turning points within the ABCD framework. In: *Handbook on Cyclical Composite indicators*, Eurostat and United Nations, editors; 2017. p. 357-398
3. Billio M., Ferrara L., Mazzi G.L., Ruggeri-Cannata R. (2016), Probabilistic coincident indicators of the classical and growth cycles, Eurostat statistical working papers.
4. Foley, P. (2021), Seasonal adjustment of Irish official statistics during the COVID-19 crisis, *Statistical Journal of the IAOS* vol. 37, 57–66
5. Mazzi G.L., Billio M., Carati, L., Vlachou, H. (2021) Towards the improvement of Eurostat's turning points coincident indicators, presented at the NTTS 2021