

# Business Cycle Clock

Statistics Explained

*Data extracted: 4 August 2023*

*Planned article update: 15 November 2023*

This article presents the Eurostat [Business Cycle Clock](#) (BCC), a tool showing different economic cycle phases for the euro area using a clock-type graph. The clock is structured to represent the empirically observed sequence of turning points of the business, growth and acceleration cycles. Its indications are based on three synthetic indicators: the growth cycle coincident indicator (GCCI), the business cycle coincident indicator (BCCI) and the acceleration cycle coincident indicator (ACCI), which are all experimental in nature (see [Context](#) for more methodological information).

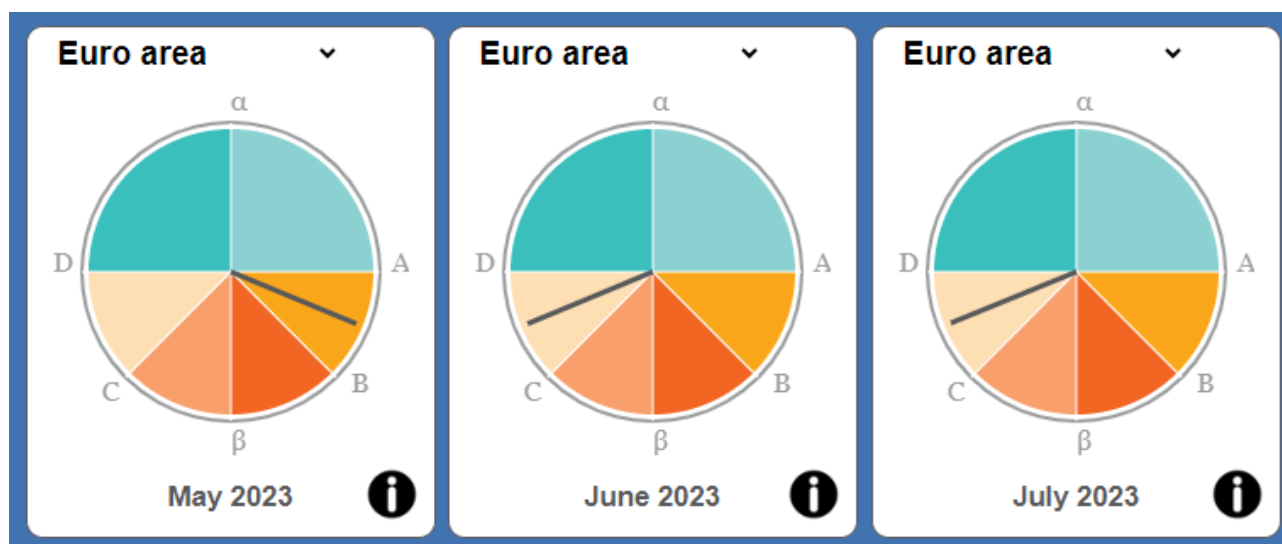
## Business Cycle Clock's indications for the euro area

According to the latest Business Cycle Clock's indications, the [euro area](#) economy remained in the slowdown phase of the growth cycle with accelerating growth in the second quarter of 2023. The position of the hand in the clock was fairly stable, indicating that the growth cycle remained in the same phase without reaching its trough (point D of the clock). An anomalous movement in the acceleration cycle coincident indicator can be observed for May.

Looking at the position of the hand in the clock, it seems as if the euro area economy is in a recovery phase. Phases in the clock reflect the most common sequence  $\alpha AB\beta CD$ , which is a business cycle fluctuation happening together with growth and acceleration cycles. Since the euro area economy did not experience a business cycle fluctuation, as confirmed by Eurostat's coincident indicators, it can be concluded that the euro area economy is experiencing a pure growth cycle fluctuation, remaining in the slowdown phase of the growth cycle.

The slowdown phase of the euro area economy together with the absence of recessionary signals has also been confirmed by the preliminary dating exercise available until the first quarter of 2023. No significant discrepancies can be observed between the cyclical indicators presented in the clock and the results of the dating exercise shown in the line chart of the BCC (see the [BCC website](#) ).

The economic situation continues to be characterised by a high degree of uncertainty due to several factors, including persistent high inflation, ongoing international geopolitical tensions and restrictive monetary policy adopted by the European Central Bank.



**Figure 1: Business Cycle Clock's indications for the euro area Source: Eurostat (BCC)**

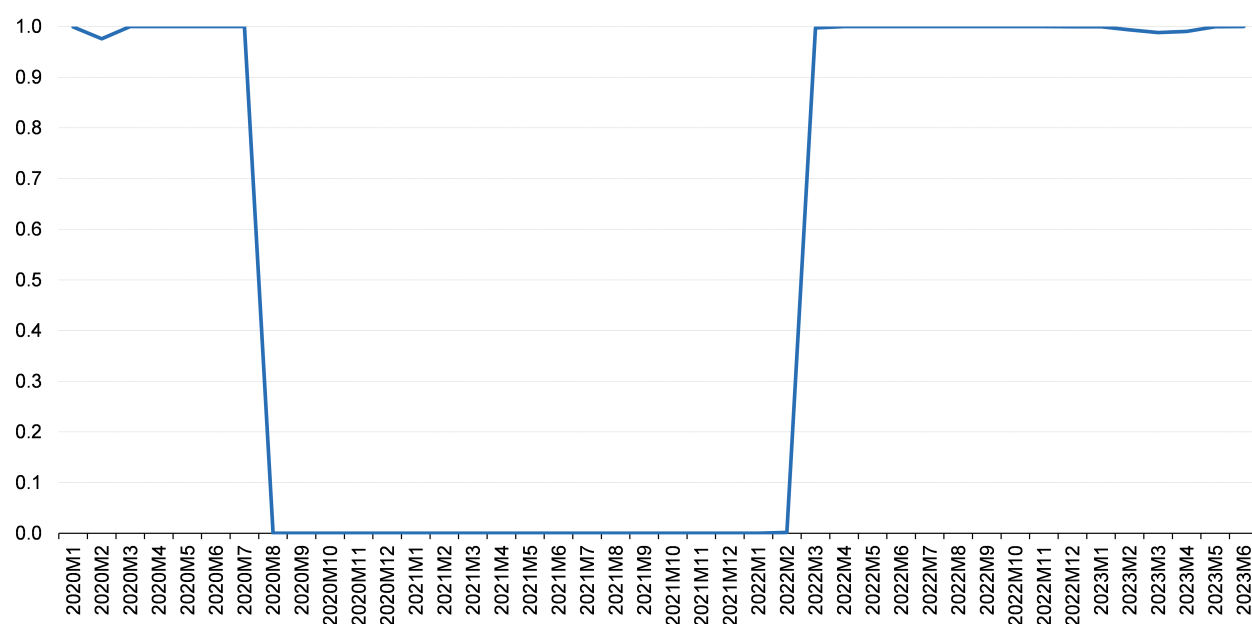
The BCC tool signal shown in Figure 1 is based on three coincident cyclical indicators: the growth cycle coincident indicator (GCCl), the business cycle coincident indicator (BCCI) and the acceleration cycle coincident indicator (ACCI). They are estimated in the detecting exercise (see [Context](#) for more methodological information).

### Growth cycle coincident indicator

During the second quarter of 2023, the growth cycle coincident indicator (GCCl) remained stable around 1.0 showing that the euro area economy has continued to be in a slowdown phase.

## Growth cycle coincident indicator for the euro area

(probabilities for slowdown)



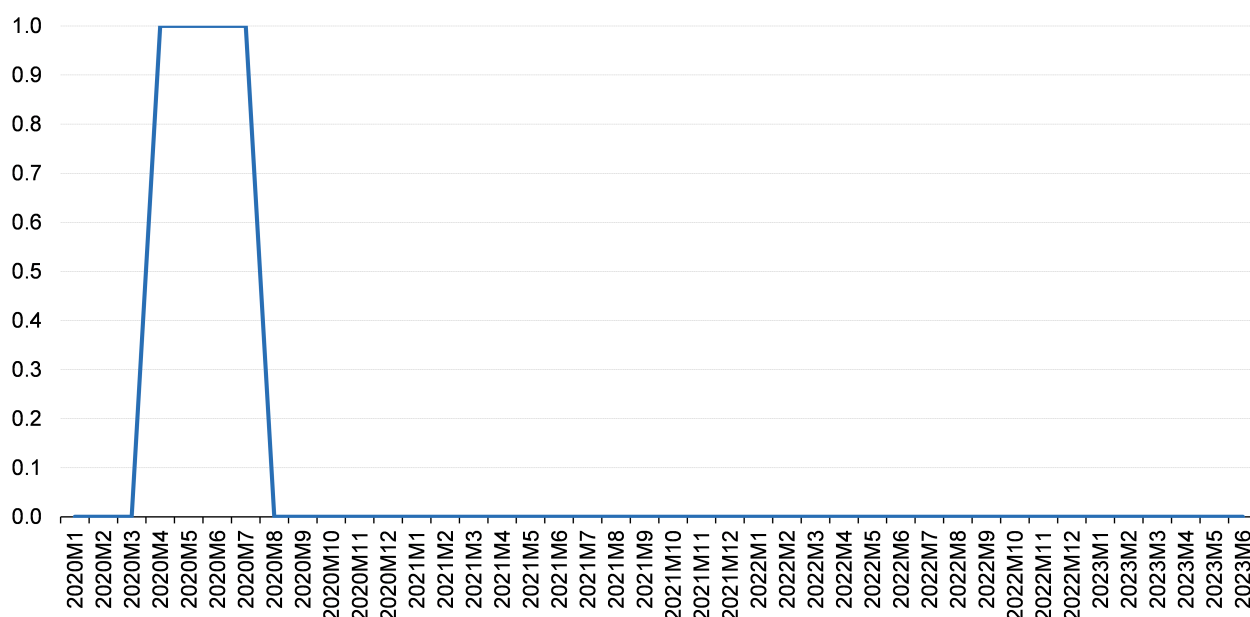
Source: Eurostat (own calculations)

**Figure 2: Growth cycle coincident indicator for the euro area (probabilities for slowdown)** Source: Eurostat (own calculations)

## Business cycle coincident indicator

The business cycle coincident indicator (BCCI) remained stable at 0.00 in the second quarter of 2023, confirming the absence of any recessionary signals.

## Business cycle coincident indicator for the euro area (probabilities for recession)

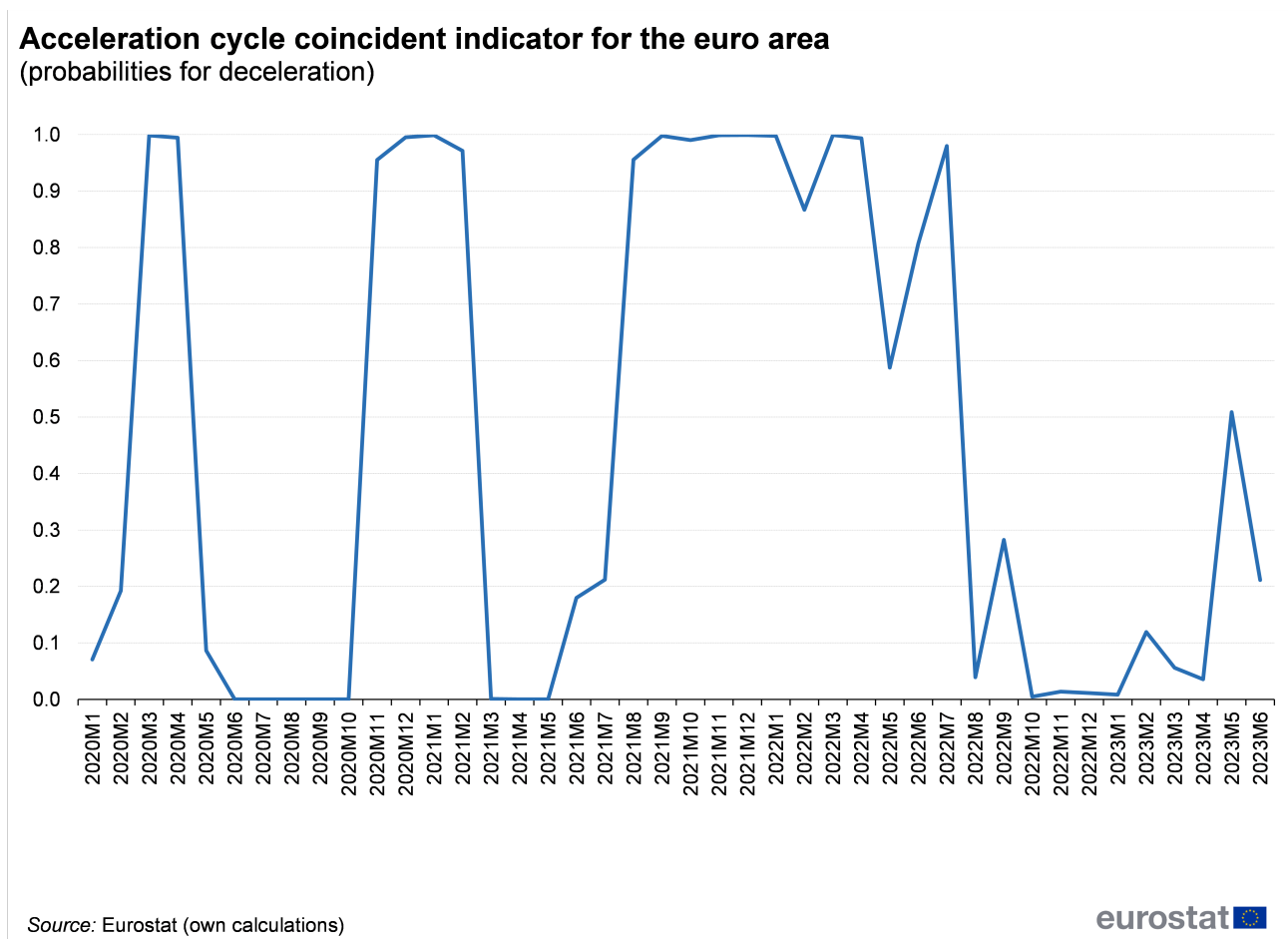


Source: Eurostat (own calculations)

**Figure 3: Business cycle coincident indicator for the euro area (probabilities for recession)** Source: Eurostat (own calculations)

## Acceleration cycle coincident indicator

The acceleration cycle coincident indicator (ACCI) remained below 0.5 in April and June, while in May it was above. In the context of an accelerating growth phase, the May value can be interpreted as anomalous.



**Figure 4: Acceleration cycle coincident indicator for the euro area (probabilities for deceleration of the growth rate of economic activity)** Source: Eurostat (own calculations)

## Source data for tables and graphs

- [Download Excel file](#)

## Data sources

The GCCI and BCCI are estimated using the following input variables:

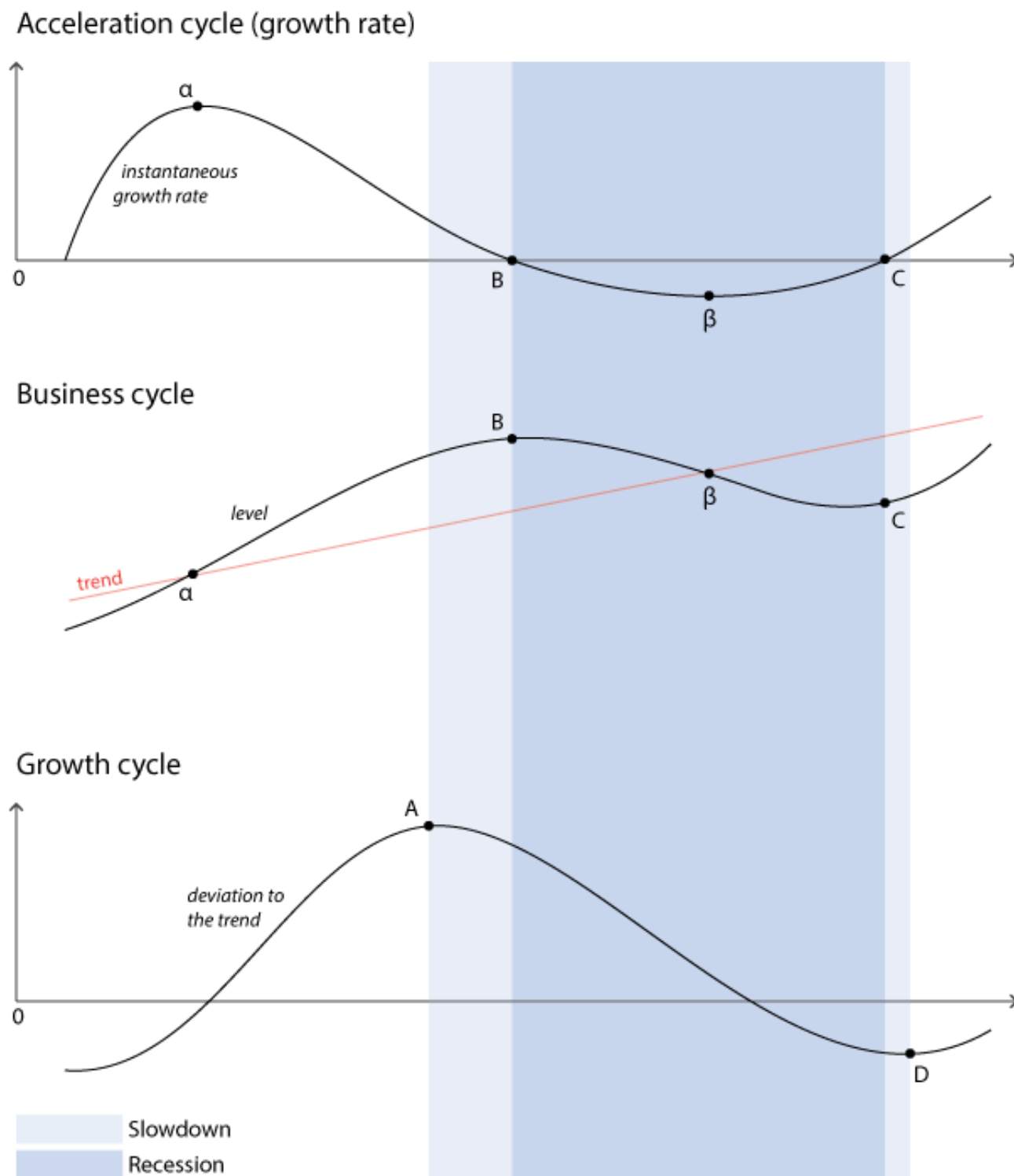
- [industrial production index \(IPI\)](#) ,
- [unemployment rate](#) ,
- [manufacturing employment expectations for the months ahead](#) ,
- [financial situation of consumers over the last 12 months](#) .

The last two variables are from the [Business and consumer surveys](#) (BCS) conducted by the European Commission's Directorate-General for Economic and Financial Affairs. The ACCI is estimated using the [Economic Sentiment Indicator](#) , a synthetic indicator from the BCS.

## Context

The main purpose of the Business Cycle Clock (BCC) is to complement the information contained in the [euro indicators dashboard](#) by extracting signals on the state of the economy. The BCC tool depicts in a visually appealing and intuitively understandable way cyclical developments in the euro area economy. The clock is

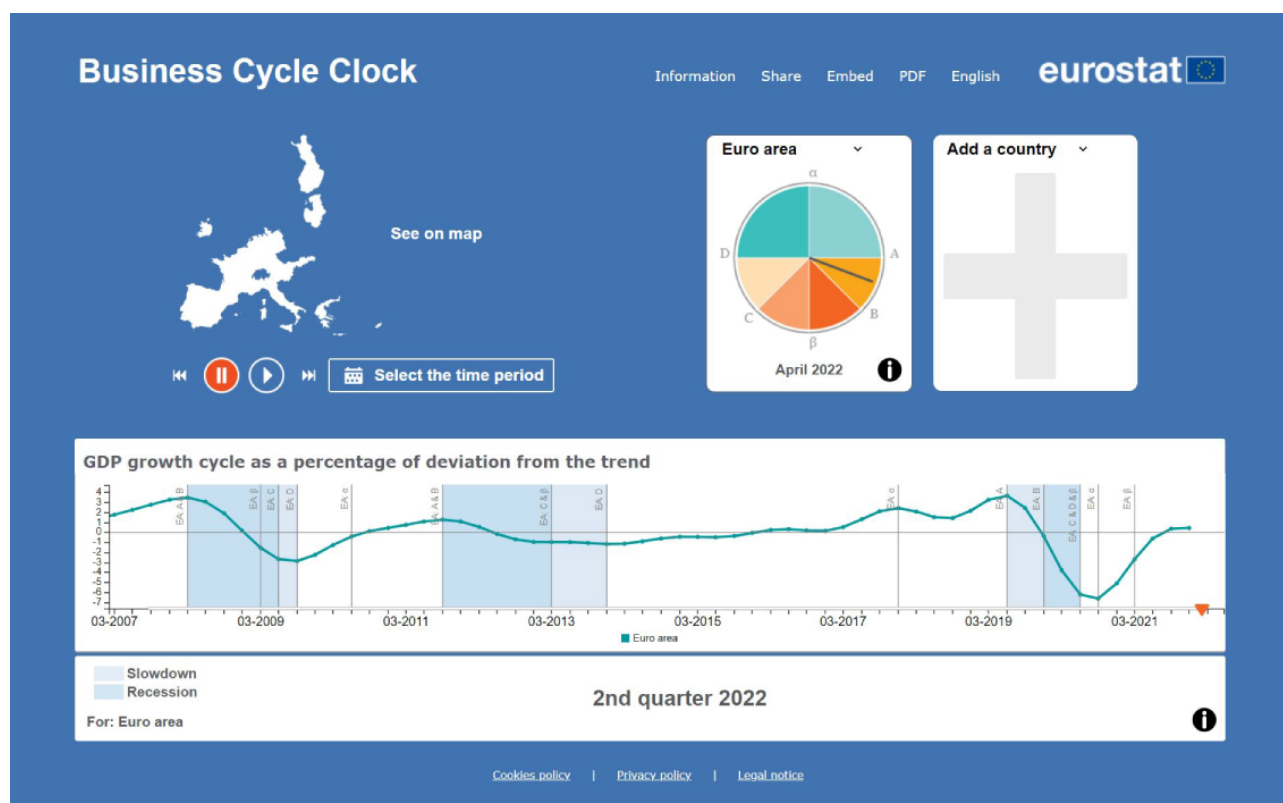
structured according to the so-called  $\alpha AB\beta CD$  approach, which is based on an empirically observed sequence of turning points of the acceleration, business and growth cycles (see Figure 5).



**Figure 5: Acceleration, business and growth cycles**

The *business cycle* is meant to reproduce the cycle of the global level of activity of an economy. The turning points of this cycle, named B for peaks and C for troughs, separate periods of negative growth (recessions) from periods of positive growth (expansions). The *growth cycle* can be defined as the deviation of the reference series (GDP for example) to the trend. The growth cycle has turning points named A for peaks and D for troughs. Peak A is reached when the growth rate decreases below the trend growth rate. Symmetrically, trough D is reached when the growth

rate overpasses it again. The *acceleration cycle*, also called the growth rate cycle, relating to increases and decreases in the growth rate of the economic activity. The peak, turning point  $\alpha$ , represents a local maximum of the growth rate. On the contrary, the trough (turning point  $\beta$ ) indicates a local minimum of the growth rate. The acceleration cycle is characterised by the highest number of fluctuations and a high degree of volatility. The BCC tool is based on two complementary exercises: the dating system with the results shown in the line chart in the lower part of the tool and the detecting system with the results appearing in the clocks in the upper part of the tool (see Figure 6).



**Figure 6: Business Cycle Clock – upper and lower parts**

The dating exercise is designed to identify past turning points simultaneously in the acceleration, business and growth cycles having the  $\alpha\beta\gamma\delta$  framework as reference. The turning points are identified by means of a non-parametric dating rule very similar to the one proposed by Harding and Pagan (2002)<sup>1</sup>. The main reference series for the dating exercise is the quarterly GDP in volume, complemented by the industrial production index (IPI). The dating exercise is carried out on a quarterly basis. The turning points identified in the last three years are considered provisional and are then subject to revisions.

The detecting exercise is based on a purely parametric approach using the Markov switching models as the main modelling methodology. Three coincident cycle indicators are estimated: the business cycle coincident indicator (BCCI), the growth cycle coincident indicator (GCCCI) and the acceleration cycle coincident indicator (ACCI). The business cycle coincident indicator (BCCI) provides the probability of a recession and signals the peaks and troughs of the business cycle. The growth cycle coincident indicator (GCCCI) provides the probability of a slowdown in the economy and signals the peaks and troughs of the growth cycle. The acceleration cycle coincident indicator (ACCI) provides the probability of a deceleration in the growth rate and signals the peaks and troughs of the growth rate cycle.

A multivariate Markov switching model is used to simultaneously estimate turning points for the growth and the business cycles. Turning points of the acceleration cycle are estimated independently by using a univariate Markov switching model. These estimations are carried out on a monthly basis. The location of the hand in the BCC tool is

<sup>1</sup>Harding D., Pagan A. (2002), Dissecting the cycle: A methodological investigation, *Journal of Monetary Economics*, 49, 365-381 .

based on the values of the three cyclical coincident indicators for the acceleration, business and growth cycles, in particular on their positioning with respect to the 0.5 threshold (see Table 1).

## How the clock hand position is computed

		ACCI			
		<0.5		>0.5	
		BCCI		BCCI	
		<0.5	>0.5	<0.5	>0.5
GCCCI	<0.5	Sector 6		Sector 1	
	>0.5	Sector 5	Sector 4	Sector 2	Sector 3



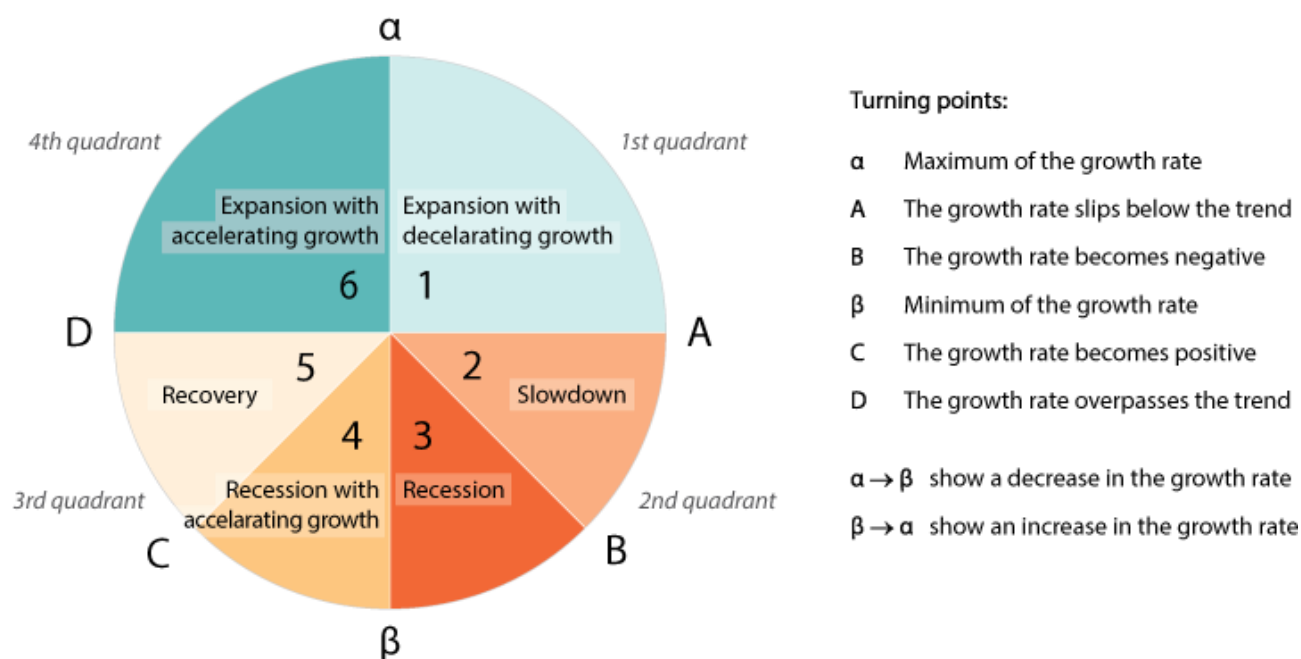
**Table 1: How the clock hand position is computed**

The clock has six sectors (see Figure 7), which can be interpreted as follows:

- In the upper and lower right quadrants of the clock, sectors 1, 2 and 3 indicate a decrease in the growth rate. In the first quadrant, the growth rate is still above the trend growth rate. At point A, the growth rate slips below the trend growth rate. In the second quadrant, the growth rate is below the trend growth rate. At point B, it becomes negative and at point  $\beta$ , the growth rate reaches a minimum.
- In the lower and upper left quadrants of the clock, sectors 4, 5 and 6 indicate an increase in the growth rate. In the third quadrant, the growth rate is still below the trend. At point C, it becomes positive and at point D, it overpasses the trend growth rate.

The names of the sectors are included in Figure 7.





**Figure 7: Cyclical phases indicated by the Business Cycle Clock in quadrants and sectors**

The BCC and the cycle coincident indicators are presented in more details in several chapters of the [Handbook on Cyclical Composite Indicators](#) and Eurostat's [Business Cycle Clock – A user's guide](#) (see also Billio, Ferrara, Mazzi, Moauro (2016)<sup>2</sup>, Billio, Ferrara, Mazzi, Ruggeri-Cannata (2016)<sup>3</sup>, and Mazzi (2015)<sup>4</sup>). An overview of the methodology is also available in [The Eurostat Business Cycle Clock: a complete overview of the tool](#) (Ruggeri-Cannata (2021)<sup>5</sup>). Information on how the tool has been performing during the pandemic can be found in [The Eurostat business cycle clock and the pandemic: Some considerations](#) (Ruggeri-Cannata, Ronkowski (2022)<sup>6</sup>).

## See also

- [Industrial production statistics](#)
- [Unemployment statistics](#)

## Visualisations

- [Business Cycle Clock](#)

<sup>2</sup>Billio M., Ferrara L., Mazzi G.L., Moauro F. (2016), [A multivariate system for turning point detection in the euro area](#), Eurostat statistical working papers.

<sup>3</sup>Billio M., Ferrara L., Mazzi G.L., Ruggeri-Cannata R. (2016), [Probabilistic coincident indicators of the classical and growth cycles](#), Eurostat statistical working papers.

<sup>4</sup>Mazzi G.L (2015), [Complementing scoreboards with composite indicators: the new business cycle clock](#), EURONA, Eurostat.

<sup>5</sup>Ruggeri-Cannata R. (2021), [The Eurostat Business Cycle Clock: a complete overview of the tool](#), Statistical Journal of the IAOS vol. 37, no. 1, pp. 309–323, 2022.

<sup>6</sup>Ruggeri-Cannata R., Ronkowski P. (2022), [The Eurostat business cycle clock and the pandemic: Some considerations](#), Statistical Journal of the IAOS vol. 38 pp. 577–590, 2022, DOI 10.3233/SJI-220011.

## External links

- [OECD's Business Cycle Clock](#)
- [Statistics Netherlands' Business cycle tracer](#)

## Notes