Interpreting OECD Composite Leading Indicators (CLIs)

October 2020

The OECD's CLIs were first developed in the 1980s to provide early signals of turning points in the economic cycle. Specifically, the OECD's CLIs are designed to anticipate turning points in the difference between real GDP level and its trend, **a difference that** is referred **to as the 'GDP gap'**[1].

This note is designed to address some of the frequent questions users have about the interpretation of the CLIs. Key points include:

- CLI **levels cannot be compared across economies to infer that GDP growth in one is expected to be higher or lower than in another**. This is because CLIs are a measure of GDP (or GDP growth) relative to trend output (or trend growth) and the estimates of trend output differ across economies.

- **A CLI reading above (below) 100 is always an indication that anticipates levels of GDP above (below) long-term trend.**

- **Month-on-month increases (decreases) in the CLI generally imply an acceleration (deceleration) in anticipated GDP growth, above (below) long-term GDP growth.**

- **The monthly level of the CLI does not provide a quantifiable measure of GDP growth. The further the CLI reading from 100, the greater the degree of confidence (strength) can be attached to the CLI signal, and in particular whether GDP is expected to be above or below long-term trend.**

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[1] The GDP gap is the difference between actual (smoothed) GDP and its long-term trend. The latter can be interpreted as a statistical measure of the level of real GDP that can be sustained over the long run. Long-term trend in GDP is estimated using a statistical approach based on the Hodrick-Prescott filter. Such an approach should not be confused with the estimates of potential output, based on a production function and factor inputs, published in the OECD Economic Outlook. The GDP gap is equivalent to the notion of growth cycle or "deviation from trend" cycle. While the so-called "classical business cycle" (Burns and Mitchell approach) focuses on the fluctuations in the levels of the economic variables, the growth-cycle analyses movements in the de-trended economic time series. There exists a third approach, the growth rate cycle, which is based on growth rates of the underlying series. (For an extensive discussion on the three concepts of business cycle, see the Handbook on Cyclical Composite Indicators by the European Union and the United Nations). Hence, unless explicitly mentioned, turning points considered here are those in the "deviation from trend" and not the turning points in the classical business cycle nor growth rate cycle.

	How are CLIs constructed?
	For any given country, the CLI is constructed as a composite of a number of indicators that each provide a leading indication of the evolution of the cycle that the CLI targets. A composite indicator is used to improve reliability and accuracy. Composite indicators are constructed in such a way that they typically provide fewer false signals and missed turning points than any of their individual components. Moreover, they tend to have more stable lead-times than the individual components. The CLIs also have the capacity to react to fluctuations arising from different sectors of the economy, and, at the same time, be resilient to perturbations affecting only one of the components. OECD CLIs are designed to anticipate turning points in economic activity relative to trend six to nine months ahead. For any given country, the individual components of its CLI are selected to deliver the highest probability of detecting turning points in the "GDP gap". For further information, including the specific composite indicators used for each country, see the document "Turning Points of Reference Series and Component Series".

	Understanding the indicators
How should the CLIs be interpreted when above or below 100?	By design, a CLI for any given month provides an indication of whether GDP levels are expected to be above or below long-term trends (in levels and not growth rates of the trend of GDP, as is often mistakenly thought). Trend GDP estimates are set at 100 in the system for all economies and all months, and, so: • **a CLI above 100 anticipates that GDP <u>levels</u> will be above trend levels** in six to nine months, whilst • **a CLI below 100 anticipates that GDP <u>levels</u> will be below long trend levels** in six to nine months.
How should the levels of the CLI be interpreted?	**The level of the CLI is not a measure of how far above or below long term GDP levels a country's anticipated GDP levels are expected to be.** The CLI system is designed to detect turning points and, so, the level of the CLI only provides an indication of the <u>strength of the signal</u> that the future GDP level is expected to be higher or lower than trend.
How should month-on-month movements in CLIs be interpreted?	Over-time **movements** in CLIs provide **a dynamic assessment of economic evolution within growth cycles,** and an assessment of whether the GDP gap is expected to expand or narrow. Although it is difficult to be overly prescriptive, a useful rule of thumb is that, wherever an economy may be in its economic cycle, **there is a high probability that a month-on-month increase in the CLI anticipates <u>GDP growth</u> above <u>growth</u> in <u>GDP trend</u> six to nine months ahead**: • with GDP levels anticipated to remain below long term trend levels when the CLI is below 100, albeit with (negative) GDP gaps narrowing; or

- with GDP levels anticipated to remain above long-term trend levels when the CLI is above 100, with (positive) GDP gaps also increasing.

Similarly, **month-on-month decreases in CLIs nearly always provide signals that <u>GDP growth</u> is anticipated to be <u>slower than trend growth</u> six to nine months ahead**:

- with GDP levels anticipated to remain below long term trend levels when the CLI is below 100, with (negative) GDP gaps widening; or
- with GDP levels anticipated to remain above long-term trend levels when the CLI is above 100, with (positive) GDP gaps narrowing.

Table 1 CLI growth rate vs CLI below/above 100

		CLI is below/above 100	
		Below	Above
Change in month-on-month CLI	Up	Real **GDP levels remaining below long-term trend** *Negative GDP-gap narrowing* Real GDP growth anticipated above long-term growth	Real **GDP levels remaining above long-term trend** *Positive GDP-gap widening* Real GDP growth anticipated above long-term growth
	Down	Real **GDP levels remaining below long-term trend** *Negative GDP-gap widening* Real GDP growth anticipated below long-term growth	Real **GDP levels remaining above long-term trend** *Positive GDP-gap narrowing* Real GDP growth anticipated below long-term growth

How can CLIs be compared over time and economic phases and cycles?	As noted above, care should be taken in interpreting levels of CLIs. For example, a reading of 110 only provides a stronger signal that GDP is expected to be above long term trend GDP than a reading of 101, but provides no indication of how much higher trend GDP is expected to be. However, for a given country, and for a given (upward or downward) phase in the growth cycle, comparisons of CLI levels across months (within that phase) can provide an indication of whether: (a) **growth is expected to be above or below long term trend** (following the rule of thumb described above); and (b) **the pace of growth is likely to accelerate or slow**. For example, a series of CLIs that monotonically increase by the same amount each month (e.g. 1 point) would all point to growth above long term trend growth (following the rule of thumb) but because the relative increase in each CLI decreases each month in turn, the anticipated month-on-month growth is likely to moderate (albeit in an unquantifiable manner). Note that immediately before a turning point (e.g. a peak) in the GDP-gap cycle, GDP growth is likely to have already passed its own peak, despite the CLI still showing a month-on-month increase[2] (and so is an important exception to the rule of thumb depicted in Table 1).

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[2] For example, when the growth cycle reaches a peak before the growth rate cycle reaches its own peak

	The charts included as an appendix to this note provide an indication of the standardised messaging used to describe CLIs.

Finally, it should be noted that **it is not possible to compare CLI levels for a given month in <u>one particular phase</u> of the cycle with a given month <u>in any another phase</u> of current or past cycles.** In other words, it is not possible to infer any messages from the direction or potential size of economic growth through comparisons of CLIs in different growth phases. These messages can only be inferred from month-on-month comparisons or comparisons of levels in periods when the CLI is monotonically increasing or decreasing (the phases of the cycle). |
| *How robust are the messages from one month's CLI?* | In the system of CLIs, messaging around where economies are likely to be in the cycle in 6-9 months (see also the accompanying appendix) reflects an assessment of patterns that emerge over a sequence of continuous months. Breaks in these patterns may, of course, signal a transition to a different stage in the economic cycle. In the first two months where these breaks begin to be observed, or in the first month but with a signal that is especially strong (i.e. the level of the CLI is markedly different from the previous month), these events are flagged up in our assessment with a qualification that the signal is 'tentative', reflecting the fact that some care is always needed in determining patterns/shifts from one-month's data. |

	Additional questions
CLI vs GDP growth rates	As stressed above, CLIs cannot provide a quantifiable measure of GDP growth rates. A very high or low CLI, for example, cannot be interpreted as an indication of future very high or low growth rate in economic activity. It merely provides a strong signal of the cyclical phase that an economy is likely to be in, in the near future. In the same way, a large increase in the CLI should not be interpreted as anticipating an increase of similar magnitude in future quarterly GDP growth rates. Users often mistakenly interpret higher peaks and lower troughs as stronger/weaker growth. Such conclusions are misplaced. Whilst there is a reasonable correlation between the various CLI phases and growth rates, it does not necessarily follow that a higher peak (lower trough) necessarily means stronger (weaker) growth relative to lower peaks (higher troughs). The appropriate interpretation of the numeric values of the CLI relates to the degree of confidence one can attach to the CLI outlook - the further a peak or trough is from the long-term trend (set at 100), the greater the confidence that can be attached to the CLI outlook.
	An exogenous shock such as the one caused by the COVID-19 pandemic and subsequent lockdown measures, has the potential to affect, almost simultaneously, most economic variables. Under these circumstances the CLI's ability to predict future movements in the business cycle can be severely curtailed with CLI estimates instead providing coincident rather than leading signals (as was acknowledged and highlighted in the April 2020 CLI press release). The predictive, and forward-looking, ability of the CLI does, however, return as the impact of the initial shock is gradually absorbed by economic agents.
Why does the CLI focus on the growth cycle?	The growth cycle, defined as the difference between actual (smoothed) GDP and its long-term trend (deviation from trend), removes the impact of long-term fluctuations to provide timely measures that focus on short-term movements. *For completeness, and in order to fulfil specific user preferences, the OECD also estimates and disseminates the CLIs in the form of "classical business-cycle" and "growth rate cycle"[3]. It is important to note, however, that the leading indicators used to calculate the CLIs are selected to optimise the anticipation of upcoming turning points in the deviation from trend measures. Therefore, although the business-cycle variants still perform relatively well, they are sub-optimal in this context.*
How do the OECD CLIs compare to OECD GDP and output-gap projections?	The OECD CLIs are published monthly by the OECD Statistics and Data Directorate, while GDP projections are published four times per year by the OECD Economics Department. Both refer to the evolution of economic activity in the near future but they differ in many aspects. The OECD GDP projections refer to a precise time-horizon and give a numerical value of the growth rate of GDP at that horizon. In the literature, this is referred to as a point estimate of growth. These projections are judgemental, incorporating all available information, including planned policy changes and assumptions about commodity prices and exchange rates. The OECD CLIs, on the other hand, are a signal of future events, where the projected event is the turning point in economic activity as measured by the de-trended (and smoothed, monthly) GDP. CLIs do not explicitly incorporate the interaction between economies and are based solely on historical statistical data.

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[3] See footnote **Error! Bookmark not defined.**

Appendix

To better interpret the standardised messages used in the OECD CLI's press release, the charts below present common CLI scenarios alongside the standard message used to convey them and the corresponding position the economy is expected to be in the near future. The set of scenarios represent a subset of a much large variety of scenarios that can actually manifest in real time.

To assist in that understanding the tables below provides a simple illustration of CLI interpretations that can be made according to four simple growth phases of the cycle that differentiate between whether CLIs exhibit an increase or slowdown as well as whether CLIs are above or below trend [4]. For ease of exposition, the four phases are described, in turn, as: expansion, downturn, slowdown and recovery, with the relevant characteristics of the GDP in that phase shaded in blue in the tables that follow.

I.   Expansion (shaded blue).

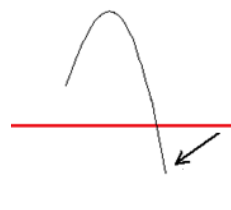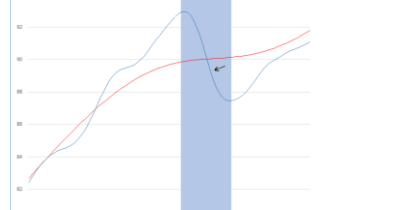|		CLI is below/above 100	
		Below	Above
Change in month-on-month CLI	**Up**	**Real GDP levels remaining below long-term trend** *Negative GDP-gap expected to narrow* Real GDP growth anticipated above long-term growth	**Real GDP levels remaining above long-term trend** *Positive GDP-gap expected to widen* Real GDP growth anticipated above long-term growth
	Down	**Real GDP levels remaining below long-term trend** *Negative GDP-gap expected to widen* Real GDP growth anticipated below long-term growth	**Real GDP levels remaining above long-term trend** *Positive GDP-gap expected to narrow* Real GDP growth anticipated below long-term growth

Standardised message used in the Press Release and related assessment	Position of the CLI	Likely position of the economy in the cycle
Text for the Press Release: **Accelerating growth momentum** **Assessment:** • Pace of growth expected to accelerate.		
Text for the Press Release: **Slowing growth momentum** **Assessment:** • Positive GDP-gap continues to widen but at a slower pace. • Growth expected to expand at a slower pace.		

For particularly sharp accellerations in the CLI the **Text for the Press Release** would be adapted to **Sharp accelleration in growth momentum**

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[4] Please note that turning points of the three cycles (namely the classical business cycle, GDP-gap and the growth rate cycle) occur at different moment in time, with GDP-Gap typically anticipating those of the classical cycle. As CLIs are designed to anticipate the GDP gap, the correspondence shown in table 1 between the CLI cycle and the three GDP cycles should be considered with care around the CLI switch from on phase to the next as the boundaries are blurred for the classical (levels) and growth rate cycle).

II. Downturn (shaded blue).

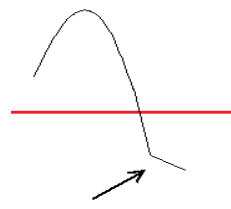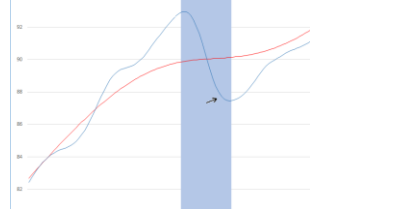|		CLI is below/above 100	
		Below	Above
Change in month-on-month CLI	Up	Real **GDP levels remaining below long-term trend** *Negative GDP-gap expected to narrow* Real GDP growth anticipated above long-term growth	Real **GDP levels remaining above long-term trend** *Positive GDP-gap expected to widen* Real GDP growth anticipated above long-term growth
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Text for the Press Release: **Growth losing momentum** **Assessment:** Possible peak detected.		
Text for the Press Release: **Easing growth momentum** **Assessment:** Growth expected to decelerate		

For sharp decelerations in the CLI the Press release heading would be adapted to **Sharp moderation in growth momentum**

For a a CLI that is flattening towards the trend, with the economy approaching a steady-state, with the GDP-gap expected to narrow but at a stabilising pace, the text for the Press Release would be adapted to: **Growth momentum stabilising above trend**
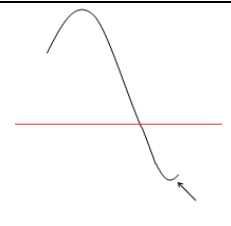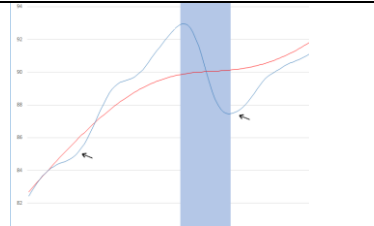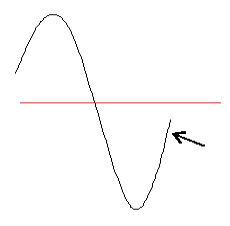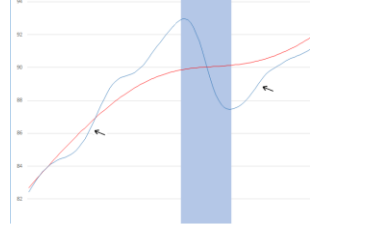
III. Slowdown (shaded blue).

		CLI is below/above 100	
		Below	Above
Change in month-on-month CLI	Up	Real **GDP levels remaining below long-term trend** *Negative GDP-gap expected to narrow* Real GDP growth anticipated above long-term growth	Real **GDP levels remaining above long-term trend** *Positive GDP-gap expected to widen* Real GDP growth anticipated above long-term growth
	Down	Real **GDP levels remaining below long-term trend** *Negative GDP-gap expected to widen* Real GDP growth anticipated below long-term growth	Real **GDP levels remaining above long-term trend** *Positive GDP-gap expected to narrow* Real GDP growth anticipated below long-term growth

Text for the Press Release: **Deteriorating outlook** **Assessment:** • Growth continues to contract.		
Text for the Press Release: **Growth momentum stabilising below trend** **Assessment:** • Deterioration in pace of growth expected to ease.		

For sharp deteriorations in the CLI pace of growth, below trend, the Text for the Press Release would be adapted to**: Sharp slowdown in growth momentum**

IV.   Recovery (shaded blue).

		CLI is below/above 100	
		Below	Above
Change in month-on-month CLI	Up	Real **GDP levels remaining below long-term trend** *Negative GDP-gap expected to narrow* Real GDP growth anticipated above long-term growth	Real **GDP levels remaining above long-term trend** *Positive GDP-gap expected to widen* Real GDP growth anticipated above long-term growth
	Down	Real **GDP levels remaining below long-term trend** *Negative GDP-gap expected to widen* Real GDP growth anticipated below long-term growth	Real **GDP levels remaining above long-term trend** *Positive GDP-gap expected to narrow* Real GDP growth anticipated below long-term growth

Text for the Press Release: **Tentative signs of recovery from slowdown** **Assessment:** • Signs of trough/recovery • Signs of pick-up in pace of growth.		
Text for the Press Release: **Recovering growth momentum** **Assessment:** • Pick-up in pace of growth expected.		

When the the CLI pace of expansion slows and especially when approaching trend, the text for the Press Release would be amended to **Stabilising/moderating or stable growth momentum below trend**