# The Cyprus Composite Leading Economic Index (CCLEI)

## Methodological Report

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# The Cyprus Composite Leading Economic Index (CCLEI)

***What is a Composite Leading Economic Index (CLEI)?***
The CLEI is designed to provide early warning signals for the turning points of business cycles i.e., early evidence of the turns in economic activity. This index comprises of a number of leading economic activity variables whose changes tend to lead the changes in the overall economic activity and which are evaluated on a regular basis.

***What are the components of the Cyprus Composite Leading Economic Index (CCLEI)?***
The leading variables which have been carefully selected from a large pool of local and international leading indicators currently are: the Brent Crude oil price, the euro area Economic Sentiment Indicator, the total property sales of contracts, the tourists' arrivals, the value of visa card transactions, the retail trade sales turnover volume index, and the volume index of electricity production.

The global financial crisis and COVID-19 pandemic along uncertainty which continues to unfold globally, have revivified the interest in monitoring business cycles – contractions and expansions, and predicting their turning points. Composite Leading Economic Indices (CLEIs) implied first by Burns and Mitchell in 1946, are among the most important and common tools for tracking business cycles providing leading information of their turning points. Since then, the construction of CLEIs has been of great importance and interest at both national and international level. International organizations such as the European Central Bank (ECB), the Organization for Economic Cooperation and Development (OECD), and the Conference Board (CB), as well as most developed countries have constructed and estimated such indices to monitor systematically and anticipate both the phase of the business cycle and the short-run outlook of future economic activity. Consequently, the present study aims at estimating the corresponding monthly Composite Leading Economic Index for the Cyprus economy (CCLEI) in order to provide early warning signals for the turning points of the economic activity in Cyprus on a monthly basis.

CLEIs provide timely and relevant information on the current and future economic situation and thus provide important contribution in short-term predictions of changes in the economy (Saltelli, 2007). They combine information from multiple leading indicators in a single indicator and have the ability to yield more accurate prediction of the business cycles than a particular indicator, since there is no single verified and accepted cause of all observed business cycles. The CCLEI not only combines the information from a small number of indicators but also takes advantage of their mixed sampling frequency given that some of these indicators are available at daily, weekly or biweekly frequency and can provide more timely information. We select the leading indicators from an extensive range of economic sectors and practices following a number of statistical tests and which provide strong and stable leading correlation for the GDP in Cyprus. The selected indicators that comprise the CCLEI are: Brent Crude oil prices, Economic Sentiment Indicator in the euro area, total property sales of contracts, tourists' arrivals, the value of visa card transactions, the retail trade sales turnover volume index, and the volume index of electricity production. Monthly data frequency is used for all components of the CCLEI, except the Brent Crude oil price, the volume of electricity production and the tourist arrivals which are available at higher frequency and the GDP reference series which is available at low, quarterly frequency. All variables comprising the CCLEI are based on their most recent available data, but due to the ragged-edge structure of the data set, missing observations are filled with flash estimates based on a set of various indicators in order to improve the timeliness of the CCLEI.

The composition and estimation of the CCLEI follows a model-based approach proposed by Aruoba, Diebold, and Scotti (ADS) in 2009 – a model also applied by the Philadelphia Federal Reserve Bank for estimating the U.S. Business Conditions Index on a regular basis using various stock and flow data which are available at different and very high frequencies, such as daily and weekly. An appraisal of the statistical relationship between the CCLEI and the Cyprus GDP, shows that the CCLEI based on the ADS approach has significant predictive ability of two and three quarters with respect to the upcoming performance of the Cyprus economic activity. The Economic Sentiment Indicator in the euro area and oil series – the exogenous components, provide the highest statistically significant leading correlations with GDP relative to the rest of the domestic leading indicators. Furthermore, the Diffusion Index constructed based on the Conference Board methodology (BCI Handbook (2001)) and computed based on the components of the CCLEI shows that the components comprising the CCLEI can consistently determine turning points in the economy and thus proves their good historical performance in identifying business cycle chronologies and recessions. Consequently, the CCLEI is a reliable leading index of turning points in the Cypriot economy. The monthly performance of the CCLEI will be monitored and updated regularly as well as its leading components. The monthly bulletin of the CCLEI is published in which the index is re-estimated providing timely information of the economic activity cycles in Cyprus. All monthly bulletins and report can be found at the Economics Research Centre (ERC) official website.

**Business Cycle Chronology of the Cyprus Economy**

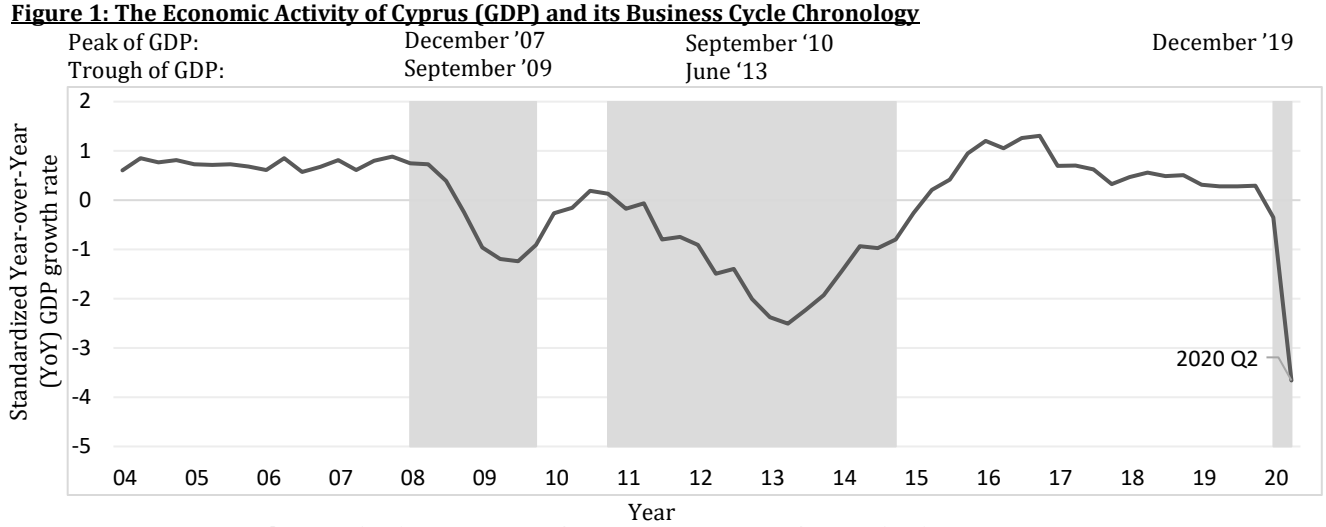
The primary challenge in developing composite indexes of leading economic indicators is defining a business cycle chronology. Determining peaks and troughs in the business cycle of an economy is vital, since there would be no other way to evaluate the performance of a leading indicator at business cycle turning points. In general, there are three classifications within the literature that provide definitions regarding the business cycle. The earliest classification, known as "classical cycle" is determined by fluctuations in the level of economic activity and captures the Burns and Mitchell (1946) notion of a common business cycle and the National Bureau of Economic Research (NBER) coincident and leading economic indicators. Economic activity in market economies is portrayed by phases of upturns followed by phases of downturns (and reversely), which is demonstrated by the cyclical behavior and co-movements of many macroeconomic variables. If co-movements are persistent and strong, then the state of the economy can by represented by an index, the reference cycle, describing the common behavior of such variables. Sargent and Sims (1977) and Geweke (1977) through their dynamic generalization of the classic factor analysis model, modelled formally, among others, the particular notion of a common business cycle initiated by Burns and Mitchell. The second classification of business cycles which is an extension of the "classical cycle" approach is the "growth cycle" or "deviation cycle" which is defined by fluctuations in the economic activity around its long-run trend. Based on this classification we can differentiate periods below and above the trend growth and tuning points are determined by changes in the strength of economic activity growth relative to trend growth. This modified approach was first applied by Mintz (1969) and later by Klein and Moore (1985), where they identified growth cycles (or cycles in deviations from trend) in the post-World War II European economies that also exhibited strong growth trends and few business cycle recessions. The Organization for Economic Cooperation and Development (OECD) System of Composite Leading Indicators concentrates mainly on this classification of business cycles, as well as most of the recent literature such as Zarnowitz and Ozyildirim (2006) and Bondt and Hahn (2014), among others. Lastly, a third classification not so frequently used is the "growth rate cycle", which concerns fluctuations of the growth rate of economic activity. Based on this definition of business cycles, turning points signify a change from an increase in the growth rate to a decrease in the growth rate and vice versa.

In our procedure of constructing a Composite Leading Economic Index (CCLEI) for the Cyprus economy, we have chosen to apply the most well-known and fundamental approach of classifying business cycles which has been also applied in Phillips, Vargas, and Zarnowitz (1996); the "classical cycle" definition of business cycles which focuses on fluctuations in the *level* of economic activity. In particular, our approach differs in the sense that it takes into consideration two well-known business cycle dating methodologies. The first recession definition follows the Euro Area Business Cycle Dating Committee of the Centre for Economic Policy Research (CERP), stating that a recession starts just after the economy reaches a peak and ends when it reaches a trough of activity. The CERP recession is defined as a substantial decline in the level of economic activity and it is based on the trough method also used by the Federal Reserve Economic Database (FRED) to compute NBER recession periods for the U.S. The second recession methodology follows the conventional definition of economic growth downturn according to which the economy enters a recession when at least two consecutive quarters of negative economic activity growth rate are recorded. Combining these two definitions we define the turning points of the reference series and then the peaks and troughs of the reference series will determine what indicators consistently lead the business cycle.

The reference business cycle variable, sometimes referred as the coincident index should be an indicator that captures the overall economic performance and business cycle behaviour across the economy. If GDP could be available at a monthly basis, we could not deny that it would be the best representation of the overall movement in the economy. However, it's lower frequency (i.e. quarterly) most of the times does not allow to take advantage of its importance and as a result many studies use other coincident indicators for determining turning points for a certain economy. For instance, the Conference Board has constructed a composite coincident economic index for the U.S. that consists of the industrial production, the retail trade, the employment, and the manufacturing turnover. Moreover, the OECD System of Composite Leading Indicators focuses only on total industrial production as reference series, whereas, Bondt and Hahn (2014) for the construction of the Euro Area - Wide Leading Indicator (ALI) focus only on total industrial production but excluding construction. However, although its low frequency, GDP is pondered as the most comprehensive economic indicator available, measuring the combined effects of the utilization of labor and capital and the productivity of these factors. We therefore agree with the statement of the NBER Business Cycle Committee that GDP is the single best measure of aggregate economic activity and use it as our reference series. Combining the recession definitions discussed above, the Cyprus recession periods are defined as 2008Q1-2009Q4 (24 months) and

2010Q4-2014Q4 (51 months) as shown in Figure 1. It should be stressed that a peak in the economic activity of Cyprus occurred in 2019Q4 which marks the end of the expansion that began in 2015Q1 and the beginning of a recession attributed mainly to the international outbreak of the coronovirus pandemic.

**Figure 1: The Economic Activity of Cyprus (GDP) and its Business Cycle Chronology**




*Source: Economics Research Centre (ERC) - Department of Economics, University of Cyprus (UCY).*
*Note that for comparison purposes, the quarterly YoY GDP growth rate is presented in a standardized format in the graph. Shaded areas represent recessions defined following the CERP Euro Area Business Cycle Dating Committee in combination with the conventional recession definition of at least two consecutive quarters of negative YoY GDP growth rate.*

## Selection of the Leading Components

The Cyprus Composite Leading Economic Index is designed to provide information about the future direction of the economic activity in Cyprus and it comprises a number of financial and economic indicators which have been tested for their leading ability. Following the literature (e.g. Massimiliano (2006), Aruoba and Sarikaya (2013), Stock and Watson (1989) etc.) and taking into account Cyprus's specific economic characteristics, we have considered numerous indicators reported in the table of the Appendix. The indicators cover certain categories representing the macroeconomic activity of Cyprus which combine both hard and survey data. In particular, the analysis of 113 quantitative and qualitative indicators of housing and construction, energy and production, tourism, consumption and trade, loans and new companies, Cyprus confidence indicators, foreign indicators, exchange rates, the Cyprus stock exchange, and other Cyprus macroeconomic indicators was performed for the needs of the Composite Leading Indicator. Using preliminary tests, we focus on a smaller but significant number of components to construct the CCLEI which provide strong and stable leading correlation with the Cyprus GDP - the reference series, and extensive data availability. The final CCLEI which has been extensively examined in terms of robustness, comprises of the following subset of leading variables reported in Table 1: the Brent Crude oil (OIL) price, the Economic Sentiment Indicator in the euro area (EAESI), the total sales of contracts (POL), the number of tourists' arrivals (TOURA), the value of visa card transactions (CARDS), the retail trade sales turnover volume index (RETS), and the volume index of electricity production (ELECT). It is noted that POL has replaced the number of authorized building permits (BUILD) component due to earlier release dates and more recent reference periods after an extensive evaluation of the index. Both the POL and the BUILD components belong to the same category "Housing and Building", and estimation results were found to remain robust when substituting the number of authorized building permits with the total sales of contracts.

**Table 1: Components of the Cyprus Composite Leading Economic Index (CCLEI)**

| Ordering | Frequency | Acronym | Description |
|---|---|---|---|
| 1 | Weekly | OIL | Brent Crude Oil (€) - Commodity Prices |
| 2 | Monthly | EAESI | Euro Area Economic Sentiment Indicator |
| 3 | Monthly | POL | Total Sales of Contracts |
| 4 | Biweekly | TOURA | Tourists' Arrivals |
| 5 | Monthly | CARDS | Value of Visa Card Transactions |
| 6 | Monthly | RETS | Retail Trade, except of motor vehicles Turnover Volume Index |
| 7 | Daily | ELECT | Volume Index of Electricity Production |

*Source: Economics Research Centre (ERC) - Department of Economics, University of Cyprus (UCY).*

The literature shows that most of these variables have been utilized in a variety of studies for the construction of composite leading indicators across many countries. For example, the Economic Sentiment Indicator (ESI) is included as component of the recent Euro Area-wide Leading Indicator (ALI) (Bondt and Hahn (2014)) and the Conference Board Leading Economic Index™ for the Euro Area. The ESI and its components have been generally used in many studies as leading indicators since ESI can be considered a statistically significant indicator of GDP development which might be also used to construct model relationships for flash estimates of GDP (Ján Haluška, 2006). One of the biggest advantages of using "soft data" is that they are available much earlier than the classic "hard data" coming from national accounts or output of the economy and thus survey data have been extensively used for forecasting GDP all over the world (Garnitz, Lehmann, and Wohlrabe (2019)). The consumer confidence indicator is the component of ESI that has been used more than any other component for the composition of leading indicators (see for example the Conference Board Leading Economic Index for Germany and the UK). In addition, some of the domestic series such as electricity production and retail trade volume feature in the OECD leading indicators for most of the European countries. Moreover, data regarding credit cards and oil prices were used in Bruno Eklund (2007) for the construction of a leading indicator for the economy of Iceland, while data regarding contracts were used in Phillips, Vargas, and Zarnowitz (1996) for analyzing the Mexican economy. Finally, we have considered data regarding tourism since tourism is a vital economic sector of Cyprus; it accounts for more than 25% of total employment.

Monthly data frequency is used for all components of the CCLEI, except the Brent Crude oil price, the volume of electricity production and the tourist arrivals which are available at higher frequency and the GDP reference series which is available at low, quarterly frequency. All variables comprising the CCLEI are based on their most recent available data, but due to the ragged-edge structure of the data set, missing observations are filled with flash estimates based on a set of various indicators in order to improve the timeliness of the CCLEI. McGuckin, Ozyildirim, and Zarnowitz (2007) showed that although using actual data avoids any errors inevitably associated with forecasting, a more timely leading indicator offers substantial gains. The data for all series are adjusted for seasonal effects and potential outliers before composing the index, where outlier observations are adjusted to the median value of the data series. For the seasonal adjustment of the series, the following approaches have been considered: the conventional seasonal dummy approach, the X-13 approach using the X-11 ARIMA method, the X-13 approach using the TRAMO/SEATS ARIMA method, and the Season-trend Decomposition (STL) approach. All approaches were found to provide similar estimation results with highly correlated seasonally adjusted series and thus we have chosen to apply the classical standard dummy approach for seasonal adjustment. Data sources of all the series considered in the analysis can be found in the Appendix.

**Composite Indicators**

In general, composite indicators can be constructed using either model-based approaches (e.g. Aruoba, Diebold and Scotti (ADS) developed in 2009, Stock and Watson (1989), and Massimiliano (2006)) or aggregation schemes (e.g. Conference Board (CB) developed in 1995, and the OECD system developed in 1970). In the case of simple aggregation techniques, composite indicators can be constructed using different accumulation methods and weighting schemes which can subsequently produce different patterns of the composed indicators. In the case of model-based approaches, there are three main categorizations of methods; methodologies based on linear models, on non-linear models and on pooling techniques. Bearing in mind linear models, Dynamic Factor Models (DFM) have appeared to be the foremost approach for the construction of composite indicators. When considering non-linear models, binary regressions such as LOGIT and PROBIT, non-linear time series models, and neural networks techniques (see Jagric 2003) have been the most extensively used. Lastly, pooling techniques suggest combining a set of competing composite indicators so as to improve the quality and performance of each single composite indicator.

One of the most well-known aggregation scheme techniques is the Conference Board (CB) approach developed in 1995 by the Bureau of Economic Analysis of the U.S. Department of Commerce (BCI Handbook (2001)). Within the NBER and the Conference Board (CB) approach, composite coincident, leading, and lagging indexes are constructed as equally weighted averages of the components' symmetric monthly changes. Components monthly growth rates are first volatility adjusted using inverse standard deviations of the monthly symmetric changes in the components (the inverse standard deviations are further normalized to sum to one). Symmetric monthly changes are essentially growth rates, equivalent to taking log differences of the variables. The monthly growth rate of the index obtained in the previous step is cumulated to obtain levels of the index and this is then re-based to a fixed base year so that the average of the index values in the base year equal 100. As stated in the Handbook on Cyclical Composite Indicators for business cycle analysis of Eurostat in 2017, the use of these composite indexes is consistent with the "cyclical cycle" developed by Burns and Mitchell, in which they can reveal common turning point patterns in a set of economic data in a clearer and more convincing manner than the behaviour of any individual component.

The broader range of cyclical indicators for the "classical cycle" and the "growth cycle" is put forward by the Conference Board and the OECD, respectively. The OECD system of Composite Leading Indicators (CLIs) was first developed in the 1970's as a consequence of the 1969-1970 recession in most of the developed economies. In fact, the deeper and even more global recession that followed in the mid-70s armor-plated the need for a tool that provides early warning signals of turning points in the economy. OECD CLIs were constructed to predict cycles in a reference series chosen as a proxy for economic activity, where fluctuations in economic activity are measured as the variation in economic output relative to its long tern potential level (OECD system of composite leading indicators, 2012). One of the main advantages of the CB and the OECD composite indicators is that they allow for a comprehensive cross-country comparison since they are based on the same methodology. Similar approach with the OECD is applied in Bondt and Hahn (2014) for the construction of the Euro Area - Wide Leading Indicator (ALI) but using different filter for detrending the series. The Hodrick-Prescott (1997) (HP) filter is used by the OECD in 2012, while the Christiano and Fitzgerald (2003) is used for de-trending the series in the construction of the ALI indicator. Furthermore, composite coincident and leading indicators for a variety of countries using simple aggregation schemes are provided by the Economic Cycle Research Institute (ECRI).

Within the model-based procedures, dynamic factor linear models have been widely used for composing economic indicators. In particular, Stock and Watson (1989, 1991, and 1992) used a dynamic factor model in order to extract coincident and leading indicators. Their approach underlines the Burns and Mitchell (1946) concept that business cycles represent co-movements in a set of series, since it establishes that all the coincident/leading indicators are driven by a common force, the composite indicator, and by idiosyncratic components that are either uncorrelated across the variables or in any case common to only a limited subset of them. Their construction of a leading economic index deal with an estimate of the growth rate of the coincident index aiming to confirm the original NBER view according to which an economic leading indicator should provide a measure with the feature to anticipate the reference cycle by several months. However, a major difference among them is that Stock and Watson' view is based on measures of growth rates, whereas the NBER approach is based on measures in terms of levels. Furthermore, in contrast to Stock and Watson (1989), Hamilton (1989) Markov switching model allowed for the growth rate of the variables to be contingent with the status of the business cycle instead of using a constant parameter model. The two modelling approaches thus encapsulate two complementary and basic features of business cycles; the co-movements across many series and the asymmetric behaviour of some indicators during expansions and recessions.

A point worthy to be mentioned is that the number of indicators used to compose the leading indicator has been constantly on the debate over the past years causing thus the methodologies to be split into two categories determined by the size of the pool of explanatory predictors taken into consideration. For instance, Stock and Watson (1991), Aruoba, Diebold and Scotti (2009), and Aruoba and Diebold (2010) are among the studies that have considered a small number of sensibly selected explanatory predictors. Within their approach, small scale dynamic (or static) factor models are used under the assumption of non-cross correlated idiosyncratic errors. On the other hand, Stock and Watson (1998, 2002) used a large number of estimated predictors for the forecasting of macroeconomic time series, where the predictors were constructed using a small number of indexes by Principal Component Analysis (PCA). Their estimated forecasts were found to outperform the benchmark forecasts such as small vector autoregressions, univariate autoregressions, leading indicator models, as well as the unemployment-based Philips curve model for inflation. However, a more recent study by Bai and Ng (2008) provides the forecasting improvements attained when using "targeted predictors". More specifically, Bai and Ng in their work extended the linear principal components analysis by facilitating a more flexible factor structure, in which only significantly informative predictors are considered. More precisely, they set as their primary objective the reduction of predictors that were not considered as informative using 'hard' and 'soft' thresholding; they applied the corresponding method of principal components to 'targeted predictors' selected using hard and soft thresholding rules. The main findings of their research were the forecasting improvement when using targeted predictors conditional on both soft and hard thresholding compared to the no-targeting predictors. Consequently, we choose to apply the proposed framework by Aruoba, Diebold and Scotti (ADS) in 2009 using the small but nevertheless statistically significant set of leading predictors reported in Table 1 for constructing a Composite Leading Economic Index for the Cyprus economy (CCLEI).

**A Composite Leading Economic Index for the Cyprus Economy - Aruoba, Diebold, and Scotti (ADS) Approach**

The Aruoba, Diebold, and Scotti (ADS) (2009) methodology has been used by the Philadelphia Fed for estimating the U.S. Business Conditions Index on a regular basis using various stock and flow data which are available at different and very high frequencies, such as daily and weekly. This methodology assumes that the index is a function of a small-data dynamic factor model stating that the business cycle does not portray a single indicator but depicts the dynamics and co-movements of many variables. The model recognizes the ability of the business conditions indicators to arrive

at a diversity of frequencies, encompasses them, and thus allows them to provide unremittingly-updated high frequency information. Moreover, it extracts and forecasts latent business conditions using linear yet statistically optimal techniques, which are model-based and involve no approximations. Since this methodology is founded on the basis of a dynamic model, it is necessary to assume a particular ordering of the variables (see Table 1) based on the date of the data releases and frequencies. All seasonally and outlier adjusted variables considered in the model are initially converted to annualized weekly/monthly growth rates except of the euro area Economic Sentiment Indicator (EAESI) which is just divided by 100. The transformations of the source input data for the ADS index reflect two important considerations; stationarity and scale. For reasons of stationarity, we transform all variables, except EAESI, to annualized period-over-period growth rates (expressed in percentage points, not percent). However, we divide EAESI by 100 so that all variables, EAESI and growth rates, have a similar scale prior to estimating the parameters of the state-space representation. Estimation in these models can be difficult, often characterized by non-convergence, when the source data have radically different scales. Finally, the Kalman filter and smoother is used to obtain optimal extractions of the monthly CCLEI.

**The Aruoba, Diebold, and Scotti (ADS) (2009) Modelling Framework**

The ADS approach of constructing composite indices is based on a dynamic factor model of stock and flow variables at very high frequency, i.e. daily. Let $x_t$ denote business conditions at day t, which evolve daily with AR(p) dynamics:

$$x_t = \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + \cdots + \alpha_\rho x_{t-\rho} + e_t, \tag{1}$$

where, $e_t$ is a white noise innovation with unit variance, and $x_t$ is a scalar since we use a single-factor model. Let $y_t^i$ denote the *i*th daily economic or financial variable at day *t*, which depends linearly on $x_t$ and possibly also on various exogenous variables and lags of $y_t^i$:

$$y_t^i = c_i + \beta_i x_t + \delta_{i1} w_t^1 + \cdots + \delta_{ik} w_t^k + \gamma_{i1} y_{t-D_i}^i + \cdots + \gamma_{in} y_{t-nD_i}^i + u_t^i, \tag{2}$$

where the $w_t$ are exogenous variables and the $u_t^i$ are contemporaneously and serially uncorrelated innovations. The lags of the dependent variable $y_t^i$ are introduced in multiples of $D_i$, where $D_i > 1$ is a number linked to the frequency of the observed $y_t^i$. However, because most variables, although *evolving* daily, are not actually *observed* daily, let $\tilde{y}_t^i$ denote the same variable observed at a lower frequency (call it the "tilde frequency"). The relationship between $\tilde{y}_t^i$ and $y_t^i$ depends crucially on whether $y_t^i$ a stock or flow variable. If $y_t^i$ is a stock variable measured at a nondaily tilde frequency, then the appropriate treatment is straightforward, because stock variables are simply point-in-time snapshots. At any time t, either $y_t^i$ is observed, in which case $\tilde{y}_t^i = y_t^i$, or it is not, in which case $\tilde{y}_t^i = NA$, where *NA* denotes missing data ("not available"). Hence the stock variable measurement equation is:

$$\tilde{y}_t^i = \begin{cases} c_i + \beta_i x_t + \delta_{i1} w_t^1 + \cdots + \delta_{ik} w_t^k + \gamma_{i1} y_{t-D_i}^i + \cdots + \gamma_{in} y_{t-nD_i}^i + u_t^i, & if\ y_t^i\ is\ observed \\ NA\ otherwise. \end{cases} \tag{3}$$

Now consider flow variables. Flow variables observed at nondaily tilde frequencies are intraperiod sums of the corresponding daily values,

$$\tilde{y}_t^i = \begin{cases} \sum_{j=0}^{D_i-1} y_{t-j}^i, & if\ y_t^i\ is\ observed \\ NA \quad otherwise, \end{cases} \tag{4}$$

where, $D_i$ is the number of days per observational period (e.g., $D_i = 7$ if $y_t^i$ is measured weekly). Combining this fact with Equation (2), the flow variable measurement equation is:

$$\tilde{y}_t^i = \begin{cases} \sum_{j=0}^{D_i-1} c_i + \beta_i \sum_{j=0}^{D_i-1} x_{t-j}^i + \delta_{i1} \sum_{j=0}^{D_i-1} w_{t-j}^1 + \cdots + \delta_{ik} \sum_{j=0}^{D_i-1} w_{t-j}^k + \gamma_{i1} \sum_{j=0}^{D_i-1} y_{t-D_i-j}^i \\ \qquad + \cdots + \gamma_{in} \sum_{j=0}^{D_i-1} y_{t-nD_i-j}^i + u_t^{*i}, \qquad if\ y_t^i\ is\ observed \\ NA\ otherwise, \end{cases} \tag{5}$$

where, $\sum_{j=0}^{D_i-1} y_{t-D_i-j}^i$ is by definition the observed flow variable one period ago ($\tilde{y}_{t-D_i}^i$), and $u_t^{*i}$ is the sum of the $u_t^i$ over the tilde period. Note that in general $D_i$ is time varying, as, for example, some months have 28 days, some have 29, some have 30, and some have 31. To simplify the notation above, $D_i$ is assumed to be fixed. Additionally, note that although $u_t^{*i}$ follows a moving average process of order $D_i - 1$ at the daily frequency, it nevertheless remains white noise when observed at the tilde frequency, due to the $(D_i - 1)$-dependence of an $MA(D_i - 1)$ process. Hence $u_t^{*i}$ is appropriately treated as white noise in what follows, where $var(u_t^{*i}) = D_i \cdot var(u_t^i)$.

The exogenous variables $w_t$ are the key to handling trend. In particular, in the important special case where the $w_t$ are simply deterministic polynomial trend terms [$w_{t-j}^1 = t - j$, $w_{t-j}^2 = (t - j)^2$ and so on] we have that

$$\sum_{j=0}^{D_i-1}[c_i + \delta_{i1}(t-j) + \cdots + \delta_{ik}(t-j)^k] \equiv c_i^* + \delta_{i1}^* t + \cdots + \delta_{ik}^* t^k. \tag{6}$$

Assembling the results, the stock variable measurement equation is

$$\tilde{y}_t^i = \begin{cases} c_i^* + \beta_i x_t^i + \delta_{i1}^* t + \cdots + \delta_{ik}^* t^k + \gamma_{i1}\tilde{y}_{t-D_i}^i + \cdots + \gamma_{in}\tilde{y}_{t-nD_i}^i + u_t^{*i}, & if\ y_t^i\ is\ observed \\ NA\ otherwise, \end{cases} \tag{7}$$

and the flow variable measurement equation,

$$\tilde{y}_t^i = \begin{cases} c_i^* + \beta_i \sum_{j=0}^{D_i-1} x_{t-j}^i + \delta_{i1}^* t + \cdots + \delta_{ik}^* t^k + \\ \qquad \gamma_{i1}\tilde{y}_{t-D_i}^i + \cdots + \gamma_{in}\tilde{y}_{t-nD_i}^i + u_t^{*i}, \quad if\ y_t^i\ is\ observed \\ NA\ otherwise, \end{cases} \tag{8}$$

which completes the specification of the model and has a natural state-space form.

**The Leading Behaviour of the CCLEI and its Components**

To determine the statistical relationship between the CCLEI and the GDP, Pearson's correlation coefficient test with backward and forward shifts has been used (Tkacova, Gavurova, and Behun (2017)). Correlation coefficients are calculated between quarterly standardized Year-over-Year (YoY) changes in the GDP and past and future quarterly standardized YoY changes in the component series and the CCLEI. A statistically significant correlation between differences in the component of the CCLEI or the CCLEI and differences in the GDP at a zero lag provides signal that the component of the CCLEI or the CCLEI is consistent with changes in GDP. Similarly, statistical significance at lead (lag) quarters provides evidence of business cycle obedience with a leading (lagging) relationship. The CCLEI is found to be statistically significant for up to five lead quarters, while the highest statistically significant correlation values occur at two and three lead quarters. The conformity analysis for the components shows that the highest statistically significant correlation value for OIL series occurs at seven lead quarters, for EAESI series at three lead quarters, and for POL, TOURA, CARDS, RETS, and ELECT series at one lead quarter. While the Pearson's coefficient shows the association between the GDP and the CCLEI and its components for each lead/lag length separately, we also evaluated their relative statistical relationship. In particular, we estimated the following Distributed Lag (DL) models with maximum number of lead quarters up to three years (12 quarters) where the dependent variable is the quarterly standardized YoY GDP growth rate, and the independent variables are leads of the quarterly standardized YoY CCLEI growth rate:

$$GDP_t = \alpha_0 + \sum_{j=1}^{p} \gamma_j CCLEI_{t-j} + \varepsilon_t, \qquad p = 1,2,\ldots 12.$$

The optimal number of lead quarters ($p^*$) for each leading index is based on minimizing the Akaike information criterion (AIC) over all lead quarters, $p = 1,2,\ldots 12$. The estimated coefficients based on the Distributed Lag (DL) models chosen by the AIC criterion for the CCLEI represent the cross-correlation value, where the precondition for cyclical indicators is the position of the highest statistically significant cross-correlation value at time *t-1* to *t-p*$^*$. The AIC criterion yields the lowest value for the DL model with five lead quarters for the CCLEI indicating its ability to predict five quarters in advance the GDP growth. The results are in line with the Pearson correlation coefficient results which have also showed predictive abilities of up to five quarters for the CCLEI. Moreover, by considering the precondition for cyclical indicators as the position of the highest statistically significant cross-correlation value at time *t-1* to *t-5,* the predictive abilities for the CCLEI would have been three quarters with cross-correlation value 0.842. The results are again in line with the Pearson correlation coefficient results which have also showed that the highest statistically significant correlation values occur at two and three lead quarters.

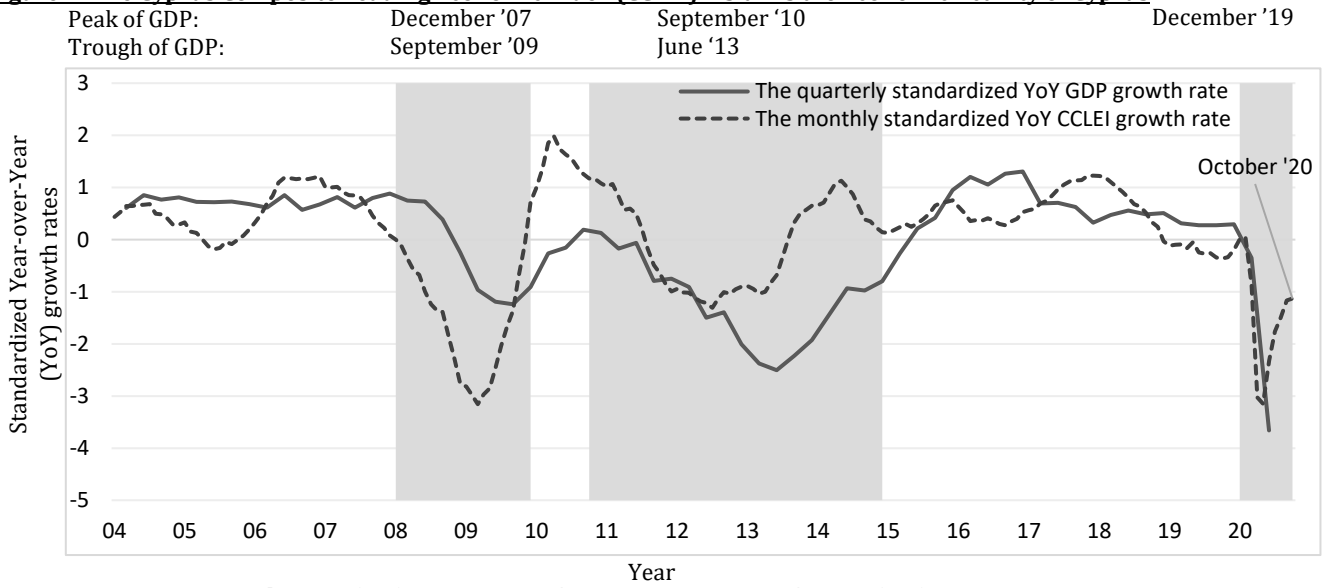
To provide a comparison analysis between model-based and simple aggregation methodologies of constructing a composite leading index, DL models have been also estimated for the CCLEI constructed based on the Conference Board (CB) approach. The AIC criterion yields the lowest value for the DL model with seven lead quarters for the CCLEI based on the Conference Board approach (CCLEI_CB) indicating its ability to predict seven quarters in advance the GDP growth. However, by considering the precondition for cyclical indicators as the position of the highest statistically significant cross-correlation value at time *t-1* to *t-7,* the predictive abilities for the CCLEI_CB would have been two quarters with cross-correlation value 0.305. Hence, the CCLEI based on the Aruoba, Diebold and Scotti method (CCLEI_ADS) is *significantly* able to predict three quarters in advance the GDP growth rate, while, the CCLEI based on the Conference Board method (CCLEI_CB) is *significantly* able to predict two quarters in advance and the impact of the CCLEI_CB on the GDP growth is not as big as the impact of the CCLEI_ADS (0.842 is approximately more than twice as 0.305). Therefore, the CCLEI based on the ADS approach is a relatively earlier and more reliable leading indicator of turning points in the economy.

Furthermore, to check the robustness of our results, additional models that control for the dynamics of GDP growth rate have been estimated. Therefore, we estimated the following Autoregressive Distributed Lag (ADL) models with maximum number of lead quarters up to three years (12 quarters) where the dependent variable is the quarterly standardized YoY GDP growth rate, and the independent variables are leads of the quarterly standardized YoY GDP growth rate and the quarterly standardized YoY CCLEI growth:

$$GDP_t = \alpha_0 + \sum_{i=1}^{p} \beta_j GDP_{t-i} + \sum_{j=1}^{p} \gamma_j CCLEI_{t-j} + \varepsilon_t, \qquad p = 1,2, \dots 12.$$

It should be pointed out that, for both the Distributed Lag (DL) model and the Autoregressive Distributed Lag (ADL) model, we specify a Quadratic-Spectral Kernel based HAC covariance estimation using prewhitened residuals, while the kernel bandwidth is determined automatically using the Andrews AR(1) method (1993). The optimal number of lead quarters, $p^*$, is once more based on the Akaike information criterion (AIC) which provides the lowest value for the ADL model with six lead quarters when considering the CCLEI_ADS and three lead quarters when considering the CCLEI_CB. By regressing the ADL($p^*$) models, the estimated coefficients of the Composite Leading Economic Indices (CLEIs) found to be statistically significant in the DL($p^*$) models remain statistically significant proving the robustness of our results. It is noteworthy to state that, the monthly performance and leading ability of our Composite Leading Economic Index should be studied over long periods of time in order to be evaluated accurately. To this extent, we will be producing and monitoring a corresponding set of Cyprus Composite Leading Economic Indices, along with their components. By taking into consideration the model-based approach proposed by Aruoba, Diebold, and Scotti (ADS) in 2009, the Cyprus Composite Leading Economic Index (CCLEI) has the following scheme as presented in Figure 2 (based on the latest publication of the CCLEI by 2nd of November 2020):

**Figure 2: The Cyprus Composite Leading Economic Index (CCLEI) vis-à-vis the Economic Activity of Cyprus**



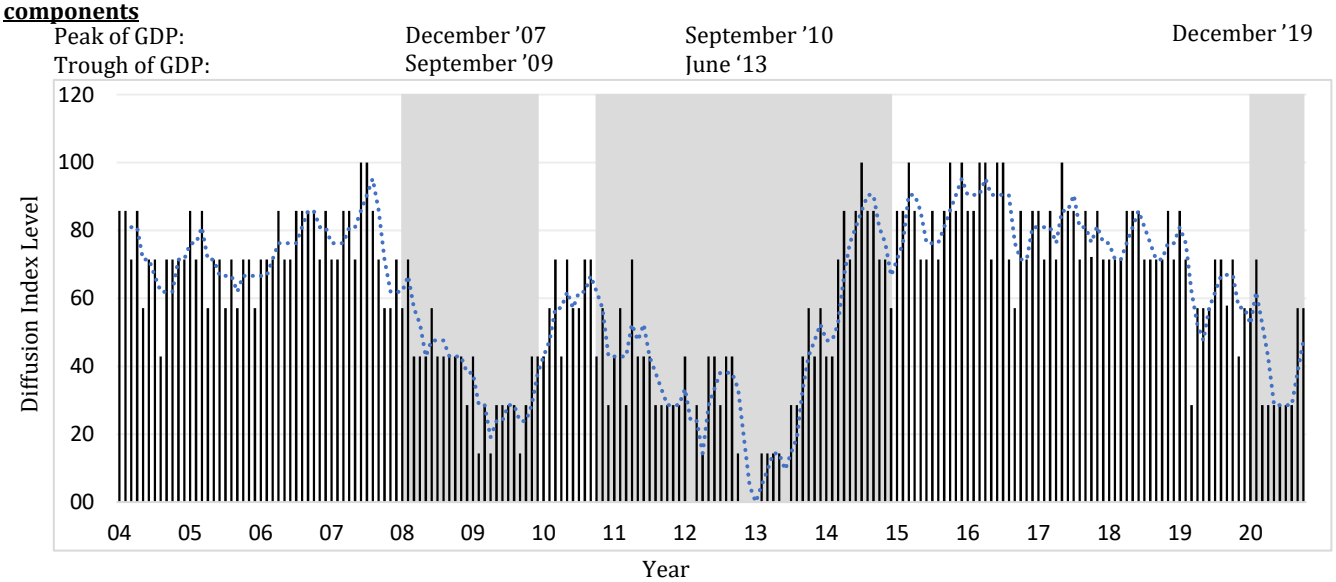

*Source: Economics Research Centre (ERC) - Department of Economics, University of Cyprus (UCY).*
*Note that for comparison purposes, the quarterly YoY GDP growth rate vis-à-vis the monthly YoY CCLEI growth rate are presented in a standardized format in the graph. Shaded areas represent recessions defined following the CERP Euro Area Business Cycle Dating Committee in combination with the conventional recession definition of at least two consecutive quarters of negative YoY GDP growth rate.*

**Turning Points based on Individual Components of the CCLEI**

Turning points determine the time at which the economy turns from recession to recovery or from growth to recession. Many tools have been developed for computing the turning points in economic activity, such as the *Diffusion Indices* (e.g. Stock and Watson (1998, 2002)) which measure the proportion of the *component series* that contribute positively to the index. In particular, Stock and Watson used a large number of estimated predictors for the forecasting of macroeconomic time series, where the predictors were constructed using a small number of indexes by Principal Component Analysis (PCA). The approximate dynamic factor model for the estimation of the indexes and construction of the forecasts was based on the Diffusion Indexes developed by the NBER business cycle framework for measuring the comovement in a set of macroeconomic variables. Following the Conference Board methodology (BCI Handbook (2001)), a raise of more than 0.05% in the components, a change of less than 0.05%, and a drop of more than 0.05% attributes to the components a value of 1, 0.5, and 0, respectively. The corresponding monthly changes are changes calculated by comparing months with the same months of the previous year. The components of our constructed Composite Leading Economic Index contribute all positively to the GDP growth rate except of the Brent Crude Oil (€) price series and thus opposite values are assigned to them. Thereby, a value of "1" is assigned to the oil series within the computation of the Diffusion Index instead of "0" when the oil price declines for a specific month. As a final step, the Diffusion Index is computed as the average of the values of the CCLEI' components for each month, multiplied by the number 100.

The Diffusion index complements the turning points methodology by focusing on the behaviour of the individual components/indicators that comprise the CCLEI. Following the diffusion index methodology, if the index is above 50, then this is a sign that the economy is probably expanding, or at least moving in that direction and if the index is below 50, then this suggests that the economy is probably in a recession, or at least moving in that direction. The Diffusion Index calculated based on Year-over-Year (YoY) monthly changes of the components of the CCLEI reached a peak in June 2007 (100, i.e. all components exhibited positive YoY monthly changes) and then started decreasing sharply signalling downward pressures of economic growth and thus portending the beginning of the Global Financial Crisis of 2008-2009. On the other hand, after it dropped to its lowest value in September 2009, it started rising gradually indicating that the economy would emerge from the crisis soon (see Figure 3). Similar conclusions can be derived from the recent financial crisis started in October 2010, as well as the current economic crisis that occurred in the midst of the international coronavirus pandemic. These results show that the Diffusion Index computed based on YoY monthly changes of the components of our CCLEI can consistently determine turning points in the economy and thus proves the good historical performance of the components chosen to comprise our leading index in identifying business cycle chronologies and recessions.

**Figure 3: The Diffusion Index Level (and its 3-period moving average) based on YoY monthly changes of the CCLEI's components**




*Source: Economics Research Centre (ERC) - Department of Economics, University of Cyprus (UCY).*
*Shaded areas represent recessions defined following the CERP Euro Area Business Cycle Dating Committee in combination with the conventional recession definition of at least two consecutive quarters of negative YoY GDP growth rate.*

**Summary**

The recent global economic crisis and the worldwide outbreak of the coronavirus pandemic, as well as the uncertainty which continues to unfold globally, has rejuvenated the interest in analyzing business cycles and predicting their turning points. Within this context, the present study establishes a monthly Composite Leading Economic Index for the Cyprus economy (CCLEI) in order to provide early warning signals for the turning points of the economic activity in Cyprus on a monthly basis. The CCLEI is constructed on the basis of a model-based approach proposed by the Aruoba, Diebold and Scotti (ADS) in 2009. The leading indicators comprising the CCLEI are selected from an extensive range of domestic and international economic sectors and practices and provide strong and stable leading correlation for the GDP in Cyprus following a number of statistical tests. The leading components of the CCLEI which are evaluated on a regular basis are: the Brent Crude oil price, the euro area Economic Sentiment Indicator, the total sales of contracts, the number of tourist arrivals, the value of visa card transactions, the retail trade sales turnover volume index, and the volume index of electricity production.

An appraisal of the statistical relationship between the CCLEI and the Cyprus GDP, shows that the CCLEI based on the ADS approach has significant predictive ability of two and three quarters with respect to the upcoming performance of the economic activity in Cyprus. Additionally, the Economic Sentiment Indicator in the euro area and oil series provide the highest statistically significant leading correlations with GDP relative to the rest of the domestic leading indicators. Furthermore, the Diffusion Index computed based on the components of the CCLEI shows that the components comprising the CCLEI can consistently determine turning points in the economy and thus proves their good historical performance in identifying business cycle chronologies and recessions. Consequently, the CCLEI is a reliable leading index of turning points in the Cypriot economy. The monthly performance of the CCLEI will be monitored and updated regularly as well as its leading components. The monthly bulletin of the CCLEI is published in which the index and its flash estimate are re-estimated providing timely information of the economic activity cycles in Cyprus. This project is funded by the Hellenic Bank and the bulletin is published since 12 of December 2019. All monthly bulletins and report can be found at the Economics Research Centre (ERC) official website: http://www.ucy.ac.cy/erc/el/publications/cyprus-composite-leading-economic-index-cclei and the corresponding release calendar of the CCLEI is as follows:

| | | |
|---|---|---|
| Thursday, December 12, 2019 | For October 2019 | Published |
| Monday, January 20, 2020 | For November 2019 | Published |
| Tuesday, February 04, 2020 | For December 2019 | Published |
| Friday, February 28, 2020 | For January 2020 | Published |
| Tuesday, March 31, 2020 | For February 2020 | Published |
| Thursday, April 30, 2020 | For March 2020 | Published |
| Monday, June 01, 2020 | For April 2020 | Published |
| Wednesday, July 01, 2020 | For May 2020 | Published |
| Monday, August 03, 2020 | For June 2020 | Published |
| Tuesday, September 01, 2020 | For July 2020 | Published |
| Wednesday, September 30, 2020 | For August 2020 | Published |
| Friday, November 02, 2020 | For September 2020 | Published |
| Monday, November 30, 2020 | For October 2020 | Preliminary |
| Thursday, December 31, 2020 | For November 2020 | Preliminary |

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## Appendix: Description of Economic Leading Indicators

| | Frequency | Acronym | Description | Data Source |
|---|---|---|---|---|
| **Category 1: Housing and Building** | | | | |
| 1 | Monthly | BUILD | Number of Authorized Building Permits | CyStat |
| 2 | Monthly | BUILD (€000's) | Value of Authorized Building Permits | CyStat |
| 3 | Monthly | BUILD (area m2) | Area of Authorized Building Permits | CyStat |
| 4 | Monthly | POL | Total Sales of Contracts | Cyprus Department of lands and surveys (CDLS) |
| 5 | Monthly | POL_buyers | Sales Contracts (Foreigners) Number of buyers | CDLS |
| 6 | Monthly | POL_foreign | Sales Contracts (Foreigners) Pancyprian | CDLS |
| 7 | Monthly | POL_local | Sales Contracts (Locals) Pancyprian | CDLS |
| 8 | Monthly | POL_EU | Sales Contracts Aggregate Pancyprian EU | CDLS |
| 9 | Monthly | POL_nonEU | Sales Contracts Aggregate Pancyprian non-EU | CDLS |
| 10 | Monthly | CEM | Total Local Sales of Cement | CyStat |
| 11 | Quarterly | HOUS | Residential Property Price Index | Central Bank of Cyprus (CBC) |
| **Category 2: Energy and Production** | | | | |
| 1 | Monthly | PETROL | Total sales of Petroleum Products | CyStat |
| 2 | Monthly | ELECT | Volume Index of Electricity Production | CyStat |
| 3 | Monthly | MANUF | Volume Index of Manufacturing Production | CyStat |
| 4 | Monthly | IP | Volume Index of Industrial Production | CyStat |
| 5 | Monthly | MANUF_turn | Manufacturing Turnover Index | CyStat |
| 6 | Monthly | IP_turn | Industrial Turnover Index | CyStat |
| 7 | Monthly | ELECT_prices | Electricity Output Prices Index | CyStat |
| 8 | Monthly | MANUF_prices | Manufacturing Output Prices Index | CyStat |
| 9 | Monthly | IP_prices | Industrial Output Prices Index | CyStat |
| **Category 3: Tourists** | | | | |
| 1 | Monthly | TOURA | Tourists' Arrivals | CyStat |
| 2 | Monthly | TOURR | Tourists' Revenues | CyStat |
| **Category 4: Consumption and Trade** | | | | |
| 1 | Monthly | MOTOR | Registration of Motor Vehicles | CyStat |
| 2 | Monthly | SALOON | Registration of Passenger Saloon Cars | CyStat |
| 3 | Monthly | CARDS | Value of Visa Card Transactions of Cypriots in Cyprus | ICC |
| 4 | Monthly | abroadcardsvalue | Value of Visa Card Transactions of Cypriots abroad | ICC |
| 5 | Monthly | touristcardsvalue | Value of Visa Card Transactions of Tourists in Cyprus | ICC |
| 6 | Monthly | RETS_value | Retail trade, except of motor vehicles turnover value index | CyStat |
| 7 | Monthly | RETS | Retail trade, except of motor vehicles turnover volume index | CyStat |
| 8 | Monthly | importeur | Total Imports/Arrivals (c.i.f.) | CyStat |
| 9 | Monthly | exporteur | Total Exports/Dispatches (f.o.b.) | CyStat |
| 10 | Quarterly | VAT | VAT Receivable | CyStat |

| | | | | |
|---|---|---|---|---|
| **Category 5: Loans and new companies** | | | | |
| 1 | Monthly | loanres | Loans to non-MFIs (outstanding amounts), domestic residents (T4c) | CBC |
| 2 | Monthly | loantotal | Loans to non-MFIs (outstanding amounts), total (T4f) | CBC |
| 3 | Monthly | depres | Deposits of non-MFIs held with MFIs (outstanding amounts), domestic residents (T1c) | CBC |
| 4 | Monthly | deptotal | Deposits of non-MFIs held with MFIs (outstanding amounts), total (T1f) | CBC |
| 5 | Monthly | depggov | Deposits of non-MFIs held with MFIs (outstanding amounts), general government (T3c) | CBC |
| 6 | Monthly | loanggov | Loans to non-MFIs (outstanding amounts), general government (T6c) | CBC |
| 7 | Monthly | loancorp | Loans to non-MFIs (outstanding amounts), Non-financial corporations (T6f) | CBC |
| 8 | Monthly | loanconcr | Loans to non-MFIs (outstanding amounts), households (T6g) | CBC |
| 9 | Monthly | loanhous | Loans to non-MFIs (outstanding amounts), households-housing loans (T6i) | CBC |
| 10 | Monthly | COMP | Registration of New Companies | Department of the Registrar of Companies and Official Receiver of the Republic of Cyprus (DRCORRC) |
| **Category 6: Main Cyprus Indicators (ESI; EEI; confidence indicators)** | | | | |
| 1 | Monthly | CYINDU | Cyprus Industry Confidence Indicator | European Commission (ECFIN) |
| 2 | Monthly | CYSERV | Cyprus Services Confidence Indicator | ECFIN |
| 3 | Monthly | CYCONS | Cyprus Consumption Confidence Indicator | ECFIN |
| 4 | Monthly | CYRETS | Cyprus Retails Confidence Indicator | ECFIN |
| 5 | Monthly | CYBUILD | Cyprus Building Confidence Indicator | ECFIN |
| 6 | Monthly | CYESI | Cyprus Economic Sentiment Indicator | ECFIN |
| 7 | Monthly | CYEEI | Cyprus Employment Expectations Indicator | ECFIN |
| **Category 7: Cyprus Industry Survey Indicators** | | | | |
| 1 | Monthly | INDU.CY.TOT.1.BS.M | Cyprus Production trend observed in recent months | ECFIN |
| 2 | Monthly | INDU.CY.TOT.2.BS.M | Cyprus Assessment of order-book levels | ECFIN |
| 3 | Monthly | INDU.CY.TOT.3.BS.M | Cyprus Assessment of export order-book levels | ECFIN |
| 4 | Monthly | INDU.CY.TOT.4.BS.M | Cyprus Assessment of stocks of finished products | ECFIN |
| 5 | Monthly | INDU.CY.TOT.5.BS.M | Cyprus Production expectations for the months ahead | ECFIN |
| 6 | Monthly | INDU.CY.TOT.6.BS.M | Cyprus Selling price expectations for the months ahead | ECFIN |
| 7 | Monthly | INDU.CY.TOT.7.BS.M | Cyprus Employment expectations for the months ahead | ECFIN |
| **Category 8: Cyprus Services Survey Indicators** | | | | |
| 1 | Monthly | SERV.CY.TOT.1.BS.M | Cyprus Business situation development over the past 3 months | ECFIN |
| 2 | Monthly | SERV.CY.TOT.2.BS.M | Cyprus Evolution of the demand over the past 3 months | ECFIN |
| 3 | Monthly | SERV.CY.TOT.3.BS.M | Cyprus Expectation of the demand over the next 3 months | ECFIN |
| 4 | Monthly | SERV.CY.TOT.4.BS.M | Cyprus Evolution of the employment over the past 3 months | ECFIN |
| 5 | Monthly | SERV.CY.TOT.5.BS.M | Cyprus Expectations of the employment over the next 3 months | ECFIN |
| 6 | Monthly | SERV.CY.TOT.6.BS.M | Cyprus Expectations of the prices over the next 3 months | ECFIN |
| **Category 9: Cyprus Consumption Survey Indicators** | | | | |
| 1 | Monthly | CONS.CY.TOT.1.BS.M | Cyprus Financial situation over last 12 months | ECFIN |
| 2 | Monthly | CONS.CY.TOT.2.BS.M | Cyprus Financial situation over next 12 months | ECFIN |
| 3 | Monthly | CONS.CY.TOT.3.BS.M | Cyprus General economic situation over last 12 months | ECFIN |
| 4 | Monthly | CONS.CY.TOT.4.BS.M | Cyprus General economic situation over next 12 months | ECFIN |
| 5 | Monthly | CONS.CY.TOT.5.BS.M | Cyprus Price trends over last 12 months | ECFIN |
| 6 | Monthly | CONS.CY.TOT.6.BS.M | Cyprus Price trends over next 12 months | ECFIN |
| 7 | Monthly | CONS.CY.TOT.7.BS.M | Cyprus Unemployment expectations over next 12 months | ECFIN |
| 8 | Monthly | CONS.CY.TOT.8.BS.M | Cyprus Major purchases at present | ECFIN |
| 9 | Monthly | CONS.CY.TOT.9.BS.M | Cyprus Major purchases over next 12 months | ECFIN |
| 10 | Monthly | CONS.CY.TOT.10.BS.M | Cyprus Savings at present | ECFIN |
| 11 | Monthly | CONS.CY.TOT.11.BS.M | Cyprus Savings over next 12 months | ECFIN |
| 12 | Monthly | CONS.CY.TOT.12.BS.M | Cyprus Statement on financial situation of household | ECFIN |

| | | | | |
|---|---|---|---|---|
| **Category 10: Cyprus Retail trade Survey Indicators** | | | | |
| 1 | Monthly | RETA.CY.TOT.1.BS.M | Cyprus Business activity (sales) development over the past 3 months | ECFIN |
| 2 | Monthly | RETA.CY.TOT.2.BS.M | Cyprus Volume of stock currently hold | ECFIN |
| 3 | Monthly | RETA.CY.TOT.3.BS.M | Cyprus Orders expectations over the next 3 months | ECFIN |
| 4 | Monthly | RETA.CY.TOT.4.BS.M | Cyprus Business activity expectations over the next 3 months | ECFIN |
| 5 | Monthly | RETA.CY.TOT.5.BS.M | Cyprus Employment expectations over the next 3 months | ECFIN |
| 6 | Monthly | RETA.CY.TOT.6.BS.M | Cyprus Prices expectations over the next 3 months | ECFIN |
| **Category 11: Cyprus Construction Survey Indicators** | | | | |
| 1 | Monthly | BUIL.CY.TOT.1.BS.M | Cyprus Building activity development over the past 3 months | ECFIN |
| 2 | Monthly | BUIL.CY.TOT.3.BS.M | Cyprus Evolution of your current overall order books | ECFIN |
| 3 | Monthly | BUIL.CY.TOT.4.BS.M | Cyprus Employment expectations over the next 3 months | ECFIN |
| 4 | Monthly | BUIL.CY.TOT.5.BS.M | Cyprus Prices expectations over the next 3 months | ECFIN |
| **Category 12: Foreign Economic and Sentiment Indicators** | | | | |
| 1 | Weekly | OIL | Brent Crude Oil (€) - Commodity Prices | Global Financial Database (GFD) |
| 2 | Monthly | EAESI | Euro Area Economic Sentiment Indicator | ECFIN |
| 3 | Monthly | EAEEI | Euro Area Employment Expectations Indicator | ECFIN |
| 4 | Monthly | EUESI | European Union (current composition) Economic Sentiment Indicator | ECFIN |
| 5 | Monthly | EUEEI | European Union (current composition) Employment Expectations Indicator | ECFIN |
| 6 | Monthly | BCI | Euro area Business Climate Indicator | ECFIN |
| 7 | Monthly | UKESI | United Kingdom Economic Sentiment Indicator | ECFIN |
| 8 | Monthly | UKEEI | United Kingdom Employment Expectations Indicator | ECFIN |
| 9 | Monthly | EA_HCPI | EA Harmonised Consumer Price Index (EA, base 2015) | Eurostat |
| 10 | Monthly | EASTOXX50 | Euro area (changing composition), Euro, Dow Jones Euro Stoxx 50 Price Index | ECB |
| 11 | Monthly | EASTOXX | Euro area (changing composition), Euro, Dow Jones Euro Stoxx Price Index | ECB |
| **Category 13: Exchange Rates against Euro** | | | | |
| 1 | Monthly | fxyeneur | YENEUR exchange rates against the euro | Eurostat |
| 2 | Monthly | fxusdeur | USEUR exchange rates against the euro | Eurostat |
| 3 | Monthly | fxgbpeur | UKEUR exchange rates against the euro | Global Financial Database (GFD) |
| 4 | Monthly | fxchfeur | SWEUR exchange rates against the euro | Eurostat |
| 5 | Monthly | fxcadeur | CANEUR exchange rates against the euro | Eurostat |
| 6 | Monthly | fxrubeur | RUBEUR exchange rates against the euro | Eurostat |
| **Category 14: Cyprus Stock Exchange (CSE)** | | | | |
| 1 | Monthly | CSE | CSE All Share Composite | XAK |
| 2 | Monthly | FTSE/SE-20 | FTSE/SE-20 | XAK |
| 3 | Monthly | SE_HOTELS | SE Hotels Index | XAK |
| 4 | Monthly | SE_INVEST | SE Investment Companies | XAK |
| **Category 15: Cyprus Macroeconomic Indicators** | | | | |
| 1 | Monthly | MaaCY | Maastricht Cyprus (EMU convergence criterion) | Eurostat |
| 2 | Monthly | CY_HCPI | Harmonized Consumer Price Index (base2015) | Eurostat |
| 3 | Monthly | CY_CPI | CPI Cyprus (base 2015) | CyStat |
| 4 | Monthly | CY_CPI_elect | CPI-Housing water electricity and gas (2015=100) | CyStat |
| 5 | Monthly | UNEMP | Total Registered Unemployed (act number) | CyStat |
| 6 | Monthly | UnmRatCY | Cyprus Unemployment Rate | Eurostat |
| 7 | Quarterly | EMP_nu | Total Number of People Employed | CyStat |
| 8 | Quarterly | EMP_hours | Total hours worked | CyStat |
| 9 | Quarterly | GDP | Gross Domestic Product | CyStat |