Are indicators of business survey useful to anticipate the Lebanese economy?

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In view of the growing importance of qualitative statistics obtained from different sentiment surveys and the lack of timely macroeconomic data to anticipate economic activity, this paper focuses on the business survey conducted by the Banque du Liban since 1996 and the possibility to explore its results to construct an accurate Composite Leading indicator. It describes the various steps used to build the best performing leading indicator for the Lebanese economy using the OECD system of composite leading indicators, recognized among useful tools for policy making to predict cycles.

Keywords: Composite Leading indicators, business survey**,** qualitative statistics, turning points.

1. Introduction

Composite Leading indicators (CLI) have been developed by the OECD in the eighties and they are recognized among useful tools for policy making to predict cycles. In Anglo-Saxon countries, three groups of composite business cycle indicators are distinguished: leading indicators predict turning points in economic growth rate, coincident indicators move in conjunction with the economic activity and lagging indicators lag behind economic activity. In other countries, sentiment surveys indicators are used for conjunctural analysis. The Banque du Liban (BDL) is using both approaches for short term forecast. The monthly BDL composite coincident indicator, built in1993 and the quarterly BDL Business survey, conducted since 1996, are published and monitored on a regular basis to assess Lebanese economic activity.

The main objective of this study is to focus on the BDL business survey and the possibility to explore its results to construct an accurate Leading indicator for the Lebanese economy. Concerning the construction of such indicators, it could be different between countries but the selection process is the same by choosing indicators which fit a number of criteria: economic significance, conformity to the business cycles, consistency of timing, statistical adequacy, smoothness and frequency.CLIs are usually built by integrating various leading individual components into a single composite indicator that anticipates the movement and the turning points in the business cycle. However, it's worth noting that leading indicators, which perform well in one country, may not work well in another because of differences in economic and statistical systems and other exogenous factors like political and security considerations. This should be taken into consideration while monitoring and assessing the leading indicator throughout the studied period.

This paper firstly describes briefly the business survey and the BDL Coincident indicator methodologies, two useful tools for the construction of the leading indicator. The second part provides a detailed description of the various steps, inspired by the OECD system of CLIs, to construct the best performing CLI for the Lebanese economy.

2. Main tools to construct a leading indicator

Most institutes conducting Business surveys select a set of survey series and combine them into a single composite indicator. The latter could be coincident, Lagging or leading with the economic activity.

Concerning composite indicators with a leading nature, they are usually built to reduce the risk of false signals, and to provide a cyclical indicator with better forecasting and tracking qualities than any of its individual components. They are constructed generally from economic time series that fit a number of economic and statistics criteria and precede a reference series (usually the GDP or the Industrial Index Production (IIP)) reflecting business cycles.

In the case of Lebanon, and in the lack of official national accounts statistics, leading indicators could be constructed around whether the Coincident indicator (monthly proxy of the GDP) or a qualitative business composite indicator computed from the business survey main coincident variables. The leading indicators will be tested around both series to choose the adequate ones.
The approach adopted for the construction of these reference indicators a well as the methodology related to the BDL Business survey are presented briefly in the first part of the study.

2.1 BDL Business survey methodology

The BDL Business Survey is a qualitative survey consisting of gathering the opinions and expectations of enterprise managers on the evolution of their businesses on a quarterly basis. The survey was launched in 1996 covering the main sectors of the economy: industry, commerce, construction and tourism. The BDL has followed international knowledge and experience by adopting similar methods to those undertaken by the INSEE and Banque de France. Its methodology is in line with the harmonized business tendency surveys implemented by the OECD, thus allowing comparison of the results across various countries. The BDL Business survey can be also defined as a business cycle analysis of conjunctural developments. The survey is easily completed and the questions are simple and of a qualitative nature. Questionnaires are filled out every quarter by senior managers, as they are better capable of answering questions without referring to accounts, and able to transmit anticipation of business evolution. The questionnaires have been formulated according to the one used in France by the INSEE, taking into consideration the specificities of the Lebanese economy. The information requested relate to judgments on past trends, on current situation and on expectations for short-term developments of the main economic variables (i.e Production, Demand, Investments, Inventories, Registered Orders, Prices, Sales, Construction…). The questionnaires contain questions with three possible answers (for instance, ↗ for an increasing trend, → for a constant trend and ↘ for a decreasing trend). Answers are weighted according to the size of the enterprise (measured by its annual turnover in millions of US dollars). They are then used to calculate a balance of opinion that gives a measure of the difference between the proportion of enterprises estimating that there has been an improvement in trend, and those who think that there has been deterioration in the said variable. The evolution of successive balances of opinion will reflect the trend of each economic variable. Some of the business survey variables are advanced indicators that can depict future turning points in the economic activity. These individual indicators with a leading nature are selected in the second part of the study to construct the various CLIs .

2.2 BDL coincident indicator and Business composite indicator: two possible reference series

The BDL coincident indicator was adopted by the Banque du Liban in 1994 as a composite indicator and a monthly estimate of the Gross Domestic Product (GDP) in Lebanon. Eight quantitative variables reflecting the Lebanese economic activity were selected for possible use in the composite coincident indicator (Electricity production, Petroleum derivatives imports, Cement deliveries, Money stocks, Cleared checks, Imports, Exports and Passenger flows). Unlike the BDL business survey, the coincident indicator is computed on a monthly basis from the total of these quantitative variables, as weighed according to their importance in the GDP and has consequently a similar performance to the economic activity. The BDL coincident indicator is de-trended and transformed into quarterly series in order to compare its evolution with the quarterly business survey results. This is done by taking the arithmetic mean of the three months in the quarter and calculating the year-on-year growth. The reliability of the coincident indicator results had been proven by comparing the evolution of this indicator with the Lebanese national accounts where a strong coherence and correlation were found (coefficient of correlation 0.7%):

Another coincident indicator is constructed from the business survey individual indicators: the Business Composite Indicator (BCI). This composite indicator is qualitative and built by selecting and combining the appropriate coincident variable with economic activity from each sector. It's the arithmetic average of the answers (Balance of opinion) to the questions on current industrial production, commercial sales and construction activity (three coincident components with the economic activity). It is interpreted as a measurement for the global conjunctural climate as seen by surveyed managers. The BCI is coincident with economic fluctuations and has a strong correlation coefficient (0.8%) with the BDL coincident indicator.

Table 2. BCI components:

Components	***Sector***	***timing***	***Cross-correlation with BDL-Coincident indicator***
Production	***Industry***	***Coincident***	***0.8***
Sales	***Commerce***	***Coincident***	***0.8***
General activity	***Construction***	***Coincident***	***0.7***
BCI equally weighed: (Production+ Sales+ General activity)/3	***Industry, Commerce, Construction***	***Coincident***	***0.8***

The BDL coincident indicator and the BCI are both coincident with Lebanese economic activity and could be used as a reference series for the construction of the leading indicator. Yet, the BCI will be retained as the main reference series in this study as it covers the main coincident variables from the Business survey and it is strongly correlated with the quantitative BDL Coincident indicator. The second part of the paper lays out the various steps preceding the construction of the final CLI: Component Pre-selection, data filtering, evaluation and computation.

3. BDL Composite leading indicator: Selection and production process:

Based on the OECD CLI selection and production process, below are the four pre-requested steps required and used to build an accurate CLI:

3.1 Candidate variables:

The first step is the pre-selection of the single components. The components series are selected for inclusion in the CLI on the basis of the following criteria:

a- Economic relevance*:* An economic justification is needed before the potential series can be accepted as a leading indicator. In terms of economic significance and cyclical behavior, variables which measure the early stage of production, respond rapidly to changes in economic activity and measure market expectations could give advance warnings of changes in the direction of economic activity.

Among single leading indicators that respond to the above criteria, five variables covering all sectors have been selected:

Expected production and sales reflect business confidence, which gives early information about changes in business behavior and consequently in economic activity and cyclical developments. It's widely recognized that business people's subjective individual expectations play a key role in economic developments and short-term forecasting. As business confidence and optimism rises we typically see similar increases in investments, production, consumption and economic growth.

Registered orders and portfolio of projects can also be significant leading indicators in the

industrial and construction sectors: increases in orders lead to increases in production, drops in orders are followed by a build-up of inventories and, eventually, a decline in production.
As for the portfolio of projects, it is, in essence, the result of savings, but particularly a sign of entrepreneurs' confidence in the durability of growth. As the saying goes: "*When the building trade is doing well, everything is doing well*"; this sector, and particularly this variable, is a driving force for the whole economy. It creates job opportunities and thus impacts on final consumption and then on economic growth. Portfolio of projects are usually undertaken within one or two quarters unlike other comparable variables such as construction permits with a delay between obtaining the permit and beginning the works; it varies throughout several years which prevents us from predicting accurately the future activity.
Concerning ***Industrial Investment***, it is considered as well an important leading indicator in the economy. A new investment in machinery and equipment, reflect an optimism and confidence in the sector and therefore anticipating a promising economic activity.

b Practical considerations: Business survey series fit practical and statistical considerations like the frequency of publication (every quarter), timeliness and availability of a long time series (1996-2017) which is relatively smooth with no breaks. The smoothness of the series is partly explained by the fact that Business survey qualitative data are less sensitive to disruptive events and exogenous shocks that could affect quantitative statistics (unusual weather conditions, war…).

3.2 Data Filtering

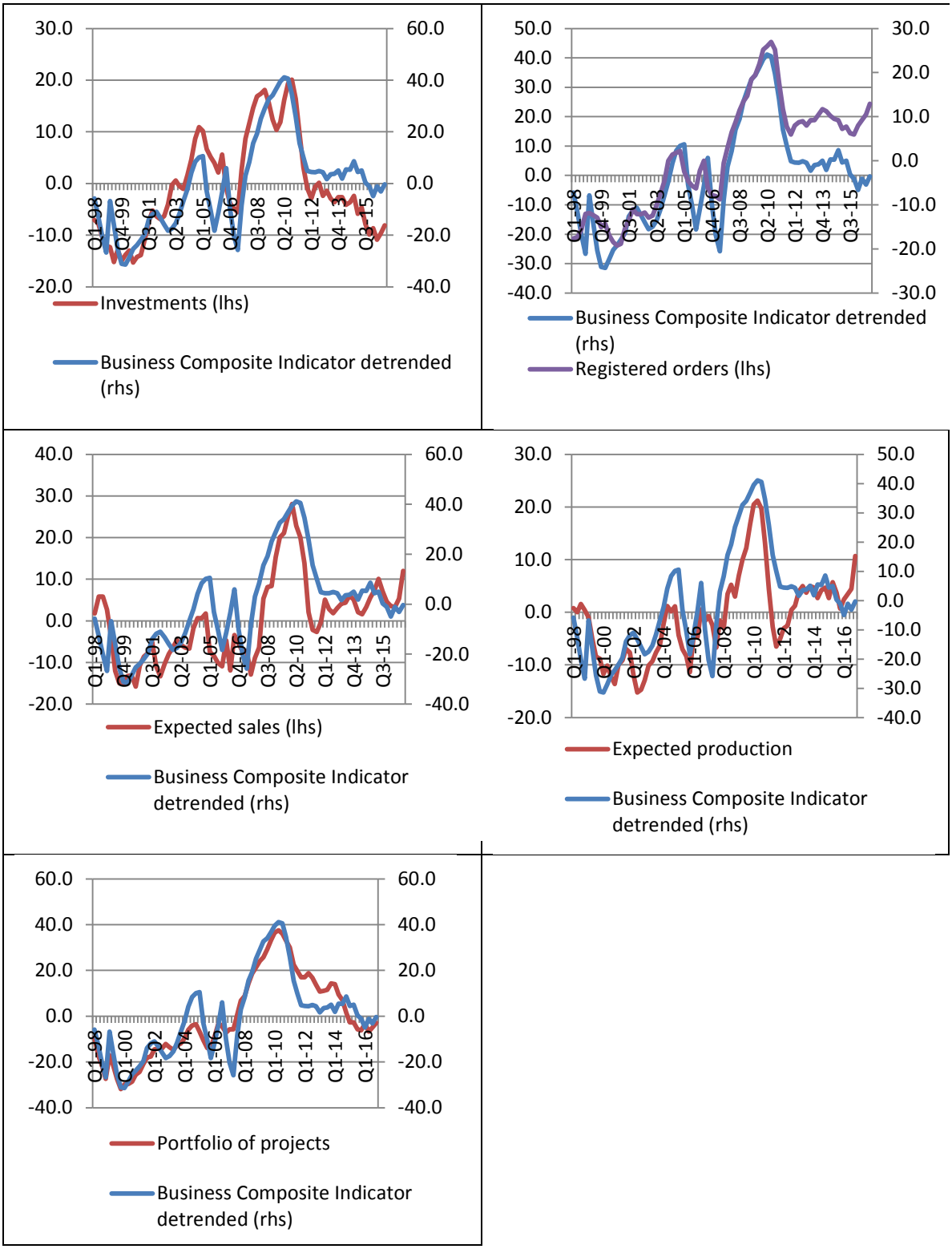
Once the leading variables are selected based on their economic significance, the second step is to remove seasonal patterns, outliers and trends from the reference series (coincident indicator, Business composite indicator) as well as from the business survey leading indicators. In the Business survey the questionnaires eliminate seasonal variations by asking respondents to give their opinion about the evolution of their activity during the quarter under review compared to the same quarter of the previous year. Even so, some seasonality remains in many time series, therefore, seasonal adjustment, a prerequisite for cyclical analysis, is carried out via the X-12 ARIMA program of the US Bureau of the Census, using the additive version for the BS series. Finally, smoothing technique methods are used. Cyclical movements could be volatile and some short-lived false cycles may obscure true cyclical movements. One way of reducing this cyclicality problem and screening out false cycles is through smoothing using a simple centered moving average (three quarters moving average).

3.3 Evaluation

This step is a part of the selection process of the CLI, we apply it once to test the cyclical performance of the pre-selected candidate components by detecting the different turning points, peaks and troughs as well as lead time. Lead times are measured in quarters and reflected the time between the turning points in the reference series and the component in question. They should be on average between one and two quarters with small variances. By plotting every indicator around the reference series (BCI) to test its leading nature, investments and registered orders are the best performing individual leading indicators with an average time lead between one quarter and two quarters. As shown in chart 3, registered orders and investments witnessed a peak in Q3-04 and Q1-04 respectively, followed by a peak on the BCI curve (in Q1-05). When the BCI was in upward trend between Q2-2007 and Q2-2010, both registered orders and investments provided an early signal as their respective curves precede the upward phase of the BCI curve. Expected production, expected sales and portfolio of projects are supposed to be leading ones, but their leading nature is not pronounced, or even absent, during the sample period (chart 3). According to chart 3, there is no evidence of a significant lead in the timing of the turning points but a similar evolution with the business cycle. They might be contaminated with other kinds of political and

security factors. Thus, when analysis is made, these factors must be considered in order to track the business cycle appropriately.

Chart 3 Individual Leading indicators



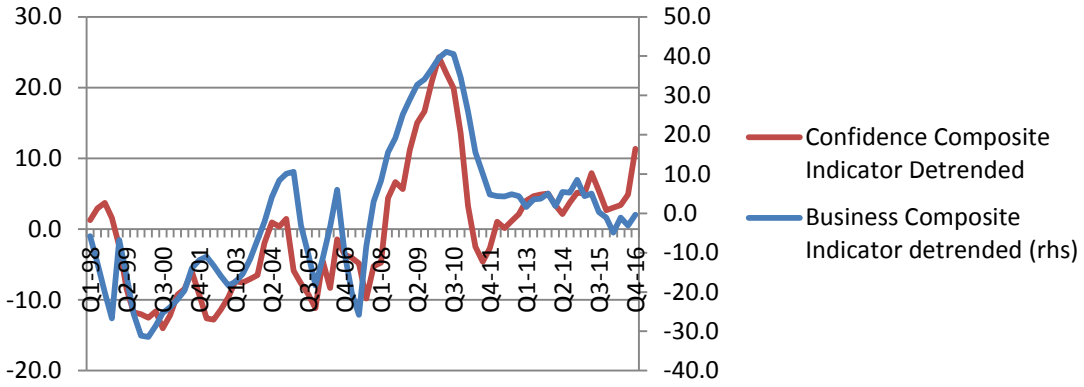
3.4 Aggregation and Computation

After selecting the individual leading components, we combine them into various CLIs in order to reduce the risk of false signals, and to provide a cyclical indicator with better forecasting and tracking qualities than any of its individual components. They are calculated on the equally weighed average of every single indicator in line with the OECD system. The best performing CLI will be chosen based on the same economic and statistical criteria's mentioned above and applied to single leading indicators. Below are the three CLIs suggested:

a Confidence composite indicator: Expected Production +expected sales /2

Confidence could be low, because business people are uncertain about prospects and/or unhappy with current company performance. This may reflect uncertainty about the macroenvironment within which the company operates. Usually this type of sentiment indicator is designed to forecast the direction of the economy and is considered a leading indicator. In Lebanon, confidence is mainly related to political and security stability, which explains the volatility and the lagging and sometimes coincident nature of this indicator, especially after a deep recession (following 2006 War) or a strong growth (between 2008 and 2010). The sequence of turmoil (between 2005 and 2007) had hardly affected economic activity thus spreading a pessimistic business climate which started to recover one year ago in 2008 (chart 4).

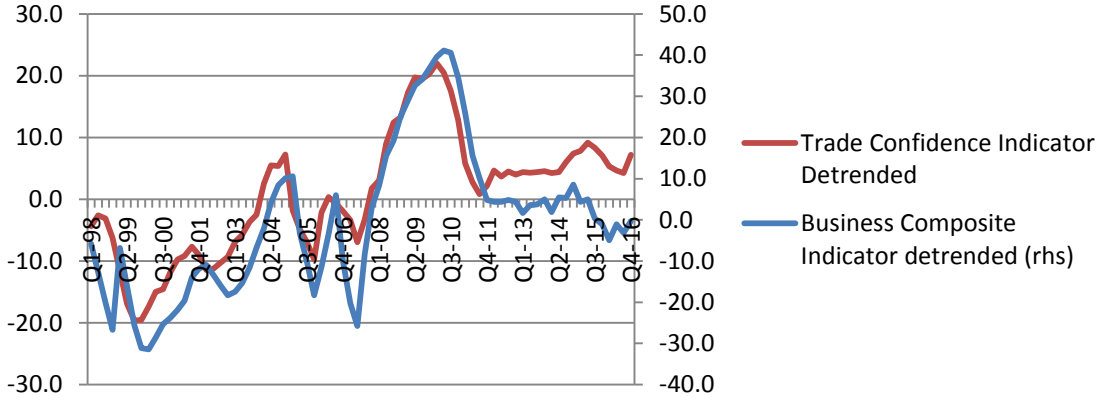
Chart 4 Confidence Composite Indicator vs. BCI



b Trade confidence indicator: (Sales +Expected sales- Inventories)/3

The Trade Confidence indicator is inspired from the OECD composite confidence indicators. It's the arithmetic average of the answers to the questions on current sales, expected sales and stock of goods (inverted). In Lebanon, the leading nature of this indicator is more pronounced in the beginning of the sample period compared to the end of it because of political tensions, security challenges, and regional turmoil, caused particularly by the spillover risks from the Syrian crisis that affected Lebanese economy; Real economic growth dropped from 10% in 2009 to an average of 2% between 2012 and 2016. This might also be attributable to the sharply leading and subjective nature of one of the three questions considered (expected sales) while the other questions have no leading properties (current sales and stocks) (chart 5).

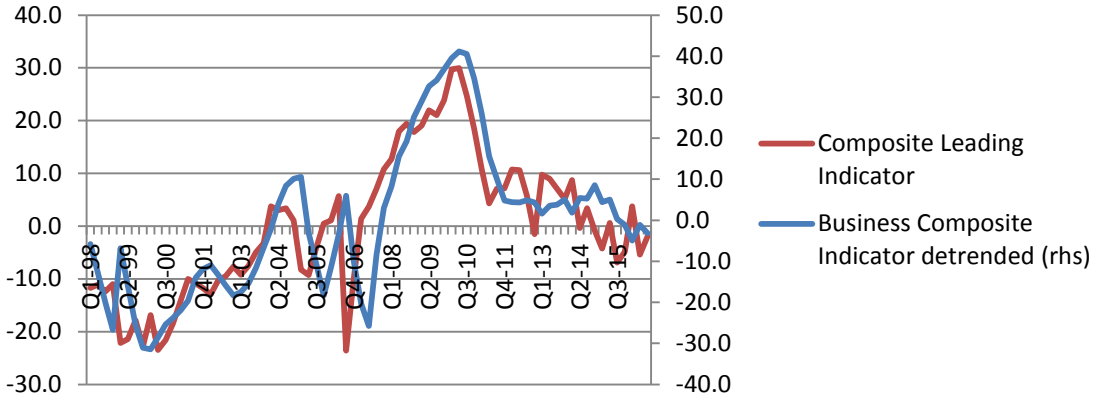
Chart 5 Trade Confidence Indicator vs. BCI



c Composite Leading indicator: (Registered orders +investment +portfolio of projects)/3

This indicator, is constructed by choosing the best performing individual leading indicators found above (registered orders and investment) plus the portfolio of projects in order to cover both industrial and construction sector included in the BCI (the reference series). Its leading nature is pronounced over the stable period, except for the last few years due to the external factors cited above.

Chart 6 Composite Leading Indicator vs. BCI



Finally a Vector Auto regressive (VAR) model as well as a Granger causality test have been used to test statistically the lead time and the causality between the reference series and the CLIs. A significant causality was found for both Trade Composite indicator and the Composite Leading indicator with a lead time between one and two quarters. The results relative to the Confidence Composite indicator were not significant as expected, since expected production and expected sales are very volatile and sensitive to external shocks. Finally, Trade Confidence indicator and the Composite Leading Indicator will be retained as the best performing leading indicators in anticipating the economic activity, especially in relatively stable periods where no exogenous factors interfere.

4. Conclusion

The different single and composite Leading indicators suggested in this study provide a useful tool for policymakers for short term forecasting by giving early signals of turning points in the business cycle. After selecting, filtering and evaluating the main variables of the BDL business survey, two composite leading indicators for the Lebanese economy were computed and proven economically and statistically significant as they performed consistently in anticipating economic

activity one or two quarters earlier. However, we should remain vigilant against the interpretation of such indicators as they should not be used to judge the pace or the strength of a recovery or downturn phases but only to deliver an early indication of turning points. Moreover, the subjectivity of their qualitative components and continuous regional uncertainties and turmoil on various levels remained the main constraint to produce a reliable leading indicator for Lebanon. Lastly, the recommendation for future research is to consider the possibility to explore a quantitative composite leading indicator for the Lebanese economy.

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