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## Business Cycle Indicators

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# Revisions to the Composite Indexes of Business Cycle Indicators for France: Part 1

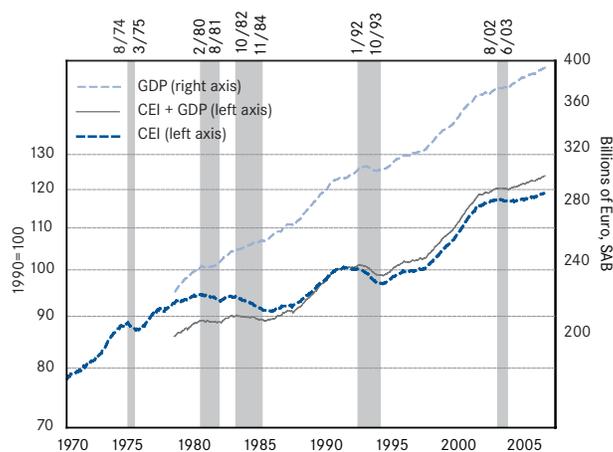
by Jing Sima-Friedman, Associate Economist,  
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Monthly data on aggregate production, employment, real income, and real sales have long served the National Bureau of Economic Research as the principal basis for establishing the U.S. business cycle chronology. To the extent that parallel statistics exist, similar chronologies can be established for other countries. But the existing data are often not sufficiently long and rich enough or comprehensive and accurate enough by themselves and need to be combined with other information, even though the additional findings are produced less frequently and are perhaps shorter. The main source of such additional data are the quarterly national income and product accounts (NIPA), which yield the most comprehensive and internationally standardized measure of aggregate economic activity (real GNP or GDP).

Chart 1, which reflects changes made during the 2006 benchmark revisions, shows a composite index (CEI) of the new monthly coincident indicators for France—the industrial production index, personal consumption of manufacturing goods, total private employment, and wages and salaries. This index, which declined systematically in each of the five recessions between 1974 and 2003, grew about 50 percent (from near 80 to near 120, with 1990=100) between 1970 and 2006.

Reflecting growth in labor productivity as well as output, services as well as goods, real GDP, which starts in 1978, grew faster than the CEI during this period but was less cyclical. For France, GDP rose almost 77 percent between 1978 and the second quarter of 2006 (the available sample period), while CEI rose only 28 percent. Unlike the CEI, GDP had more slowdowns than absolute declines during all but one of the four recessions covered in the 1978–2006 timeframe. The curve combining the data for CEI and GDP, which is used by The Conference Board to determine business cycle chronologies, confirms the four recessions experienced by the French economy during this period.<sup>1</sup>

Chart 1  
CEI, GDP, and CEI+GDP for France: 1970–2006



Note: Shaded areas represent business cycle recessions determined by The Conference Board using an index combining coincident indicators and real GDP (CEI+GDP). Real GDP starts in 1978. The new CEI components are the industrial production index, personal consumption of manufactured goods, total private employment, and wages and salaries (all companies).

Sources: INSEE, The Conference Board

<sup>1</sup> For more details, see Victor Zarnowitz, "Coincident Indicators and the Dating of Business Cycles," *Business Cycle Indicators*, August 2001; Robert H. McGuckin, Ataman Ozyildirim, and Victor Zarnowitz, "The U.S. Economy During and After the 2001 Recession: A Look at the Coincident Index, Real GDP, and Productivity," *Business Cycle Indicators*, February 2005; and Victor Zarnowitz and Dara Lee, "Can U.S. Business Cycles Still Be Dated by Monthly Coincident Indicators Alone?" *Business Cycle Indicators*, March 2005.

## Timing of Coincident Indicators and GDP

The extensive work conducted for the comprehensive benchmark revisions revealed that the indicators for France are particularly diverse and volatile. This makes it difficult to use these data for cyclical timing.<sup>2</sup> Long leads occurred at several peaks (recessions) in industrial production and personal consumption, whereas shorter leads occurred in private employment and at troughs (recoveries). Wages and salaries came close to being roughly coincident, with more lags, but at the cost of missing some turns. Real GDP missed more turns, lagging more at peaks and leading more at troughs. In the end, it was more through off-setting leads and lags than a predominance of approximate coincidences that this combination of indicators was able to achieve the objective of dating the recessions and recoveries in the French economy in a reasonable manner. The new index gained a modest improvement in this respect relative to the old one, but the CEI+GDP series was more influential in determining the beginning and ending of recessions and expansions.

## Adding the GDP to the CEI

The Institut National de la Statistique et des Études Économiques (INSEE) offers France's real GDP in quarterly, seasonally adjusted form. In our analysis, GDP was interpolated linearly to yield monthly estimates, which are used along with the four coincident indicators. From the beginning of 1978 to the end of 2005, this metric, which is the broadest measure of French economic activity, grew slightly more than 2.7 percent per year. Chart 1 suggests that the source of this modest growth performance lies in the sharp slowdowns the French economy experienced in 1980–1984 (when monthly data for industrial production (FRIP), employment (FREMPL), personal consumption of manufactured goods (FRPCON), and wages and salaries (FRWAGE) showed two recessionary declines) and in both 1992–1993 and 2002–2003 (when the same four series and GDP, although the latter only partially, weakened considerably). In contrast, all of the coincident French indicators show much stronger growth at other times (e.g., 1985–1991, 1994–2002). The evidence for these periods is more fragmentary and based on fewer indicators for fewer years, but it does suggest vigorous growth in the early 1970s, a brief recession in 1974–1975, a slowing trend in the late 1970s, an abortive recovery in 1982, and weak or flat growth in 2002–2003.

## Components of the French CEI

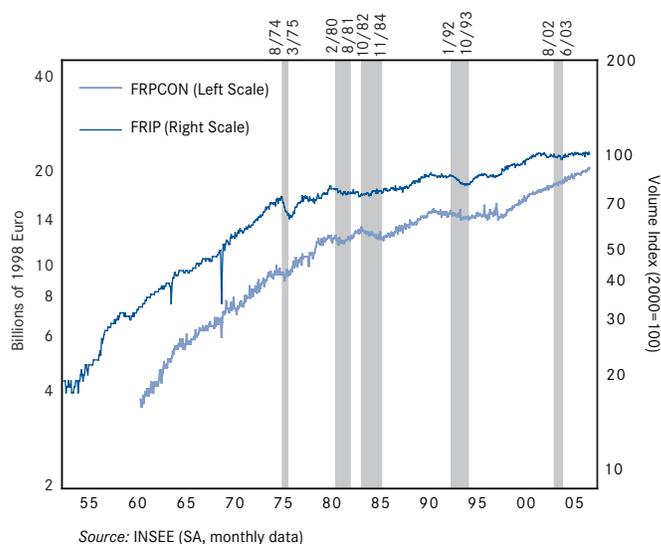
In general, monthly data on aggregate production, employment, real income, and real sales for France are not rich, comprehensive, or accurate enough to define and date business cycles in countries other than the United States. These CEI time series

serve this purpose well only when combined with quarterly information from real GDP and other national income and product accounts.<sup>3</sup> For France, the search for the most comprehensive and representative time series with the best historical timing record in the CEI category yielded four final choices: FRIP, FRPCON, FREMP, and FRWAGE.

**FRIP**, which is a volume index produced by INSEE, is composed of Laspeyres indices, using constant weights based on value added at base-year factor costs that cover agro-industry products (food, beverage, tobacco), automobile and capital industries (machinery, equipment), and intermediary, investment, consumption, and energy goods. This industrial production series tracks all forms of manufacturing but excludes construction. When seasonally adjusted, the FRIP tends to have short or intermediate leads at business cycle peaks and shorter leads or lags at troughs, a few short and small extra declines along with frequent similar irregular fluctuations, and a strong long-term growth trend (Chart 2).

On the positive side, the FRIP has a relatively long and consistent history, having grown about fivefold from 1955 to 2005 and declined in each of the five recessions. But the FRIP failed to distinguish between the two back-to-back recessions in 1980–1984 and had small and short extra declines in 1957, 1976–1977, and 1995. While it is less than satisfactory as a coincident indicator, it is nonetheless included for lack of a more adequate replacement.

Chart 2  
Personal Consumption of Manufactured Goods  
and Industrial Production (Excluding Construction)



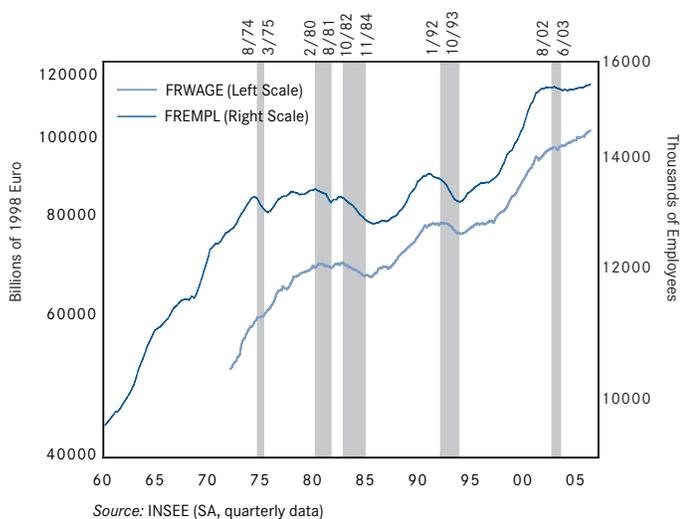
<sup>2</sup> A table listing the timing at business cycle peaks and troughs of the new coincident index for France, its four components, real GDP, and the old index (prior to the last comprehensive benchmark revisions) can be found on our website: [www.conference-board.org/economics/bci](http://www.conference-board.org/economics/bci).

<sup>3</sup> This is increasingly valid even for the United States, where CEI data are particularly informative.

**FRPCON** (Chart 2) is a broader demand aggregate than the retail sales volume, which FRPCON now replaces. It has better cyclical timing and conformity than the previous indicator and, when used as a trailing three-month moving average, is slightly smoother. But both series lead at some turns and miss a couple of other turns. Although FRPCON was originally treated as a component of the leading index, it is more appropriate to include it in the CEI as a broad measure of aggregate demand (similar to the real manufacturing and trade sales series in the U.S. CEI).

**FREMPL** measures the number of paid employees in the private nonagricultural sector. It is broader in coverage than paid employment, which was used in the CEI prior to the May 2006 benchmark revision, because it includes not only manufacturing but also construction and energy. Because INSEE compiles the FREMPL as a seasonally adjusted quarterly series, The Conference Board must convert it to a monthly series by linear interpolation between center months of each quarter to use it as a CEI component.<sup>4</sup> As a result, it becomes artificially smooth (Chart 3). We initially considered total (private and government) paid employment, but this proved insufficiently cyclical because of the large size and countercyclical nature of public sector employment in France.

Chart 3  
Wages and Salaries Paid by Nonfinancial and Financial Companies and Number of Employees in the Private Nonagricultural Sector (Including Construction and Energy)



**FRWAGE** was chosen for lack of an available monthly personal income series. Wages and salaries cover the earnings of labor employed by all companies, financial and nonfinancial. This series, which is shown in Chart 3, clearly declined, along with most other important coincident indicators, on

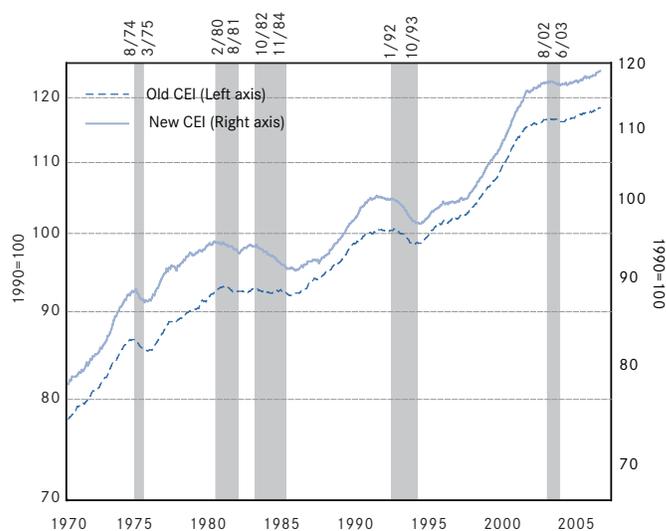
<sup>4</sup> INSEE uses survey data from the Ministry of Employment and Statistics of the Central Unemployment Benefits Agency to derive the quarterly employment estimates. The original source data do not take into account the changes in employment in establishments with fewer than 10 employees or in new establishments, but INSEE has procedures for correcting this bias and obtaining up-to-date seasonally adjusted quarterly numbers.

three occasions—1980–1981, 1982–1984, and 1992–1993—all of which meet the established criteria for recessions. It flattened rather than declined briefly in the 1974–1975 and 2002–2003 recessions.

### Advantages of the New CEI

The overall effect of the changes in the composition of the French CEI can be seen in Chart 4. According to the new index, France suffered five declines in total economic activity during the 1970–2005 period. The old index also had consistent declines only during these five episodes, but they were smaller and less articulated. The only exception is the 1992–1993 recession, when the timing of the old index was arguably somewhat better than that of the new one.

Chart 4  
Old CEI and New CEI for France: 1970-2005



Note: Shaded areas represent business cycle recessions determined by The Conference Board using an index combining coincident indicators and Real GDP (CEI+GDP). New CEI components are the industrial production index, personal consumption of manufacturing goods, total private employment, and wages and salaries (all companies). Old CEI components are retail sales, the industrial production index, real imports, and paid employment.

Sources: INSEE, The Conference Board

### Next month Revisions to the French leading indicators

A longer version of this essay, which includes a table listing the timing at business cycle peaks and troughs of the new coincident index for France, its four components, real GDP, and the old index (prior to the last comprehensive benchmark revisions), can be found on our website: [www.conference-board.org/economics/bci](http://www.conference-board.org/economics/bci).

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# Revisions to the Composite Indexes of Business Cycle Indicators for France: Part 2

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Last month's issue focused on the impact of the 2006 benchmark revisions on the coincident indicators for France. This month, in addition to noting a number of changes to the components of the composite index of leading indicators (LEI), we examine two methodological innovations to the LEI introduced by the revisions: a new method for calculating the contribution of the yield spread and a trend adjustment.

## Revising the Contribution of the Yield Spread

The yield spread is calculated as the difference of the long-term interest rate minus the short-term rate. In the LEI for France, the long-term rate used is the 10-year bond yield and the short-term rate is the rate on day-to-day loans. (Both rates are unchanged from the data used for the LEI for France before this benchmark revision.) Before this revision, the interest rate spread was used directly as a component of the composite index. This use implied that the contribution of this component to the index was the change of the yield spread over the previous month. Under this formula, any decline in the spread affected the LEI adversely and any increase affected it positively. But declines in the spread happen not only before recessions but on many other occasions as well. It is only when the spread inverts, or becomes negative (i.e., the long rate is less than the short rate), that a more reliable signal of a recession is received. This means that the contribution of the spread to the composite index should be its level rather than its change. To accomplish this, it is necessary and sufficient to cumulate the spread (difference in the rates) monthly so that the value of the spread itself in each consecutive month represents the contribution of the spread to that month's LEI. Such a revision is consistent with the theory of the term structure of the interest rate, which explains the nature of and reasons for the effects of the yield spread on future economic activity. It also creates a more cyclical and less noisy leading index and makes the methodology of the French LEI consistent with the composite index methodology introduced for the United States last year.<sup>1</sup>

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<sup>1</sup>See Victor Zarnowitz and Dara Lee, "The New Treatment of the Yield Spread in the Composite Index of Leading Indicators," *Business Cycle Indicators*, September 2005.

## Adjusting the Trend of the LEI

The benchmark revision also incorporated an old and well-known trend adjustment to the leading index.<sup>2</sup> The new procedure does not affect the cyclical properties of the LEI, but it does offer a few advantages. Because the procedure equates the trend in the LEI to the trend (measured by the average monthly growth rate) in the coincident index (CEI), it “fixes” the long-term trend in the LEI. This means that the trend of the LEI will now be invariant to changes in the composition of the index or the set of indicators used to calculate it. This facilitates the interpretation of the indexes as cyclical measures and provides a more consistent framework for their use. This trend adjustment also aligns the growth of the LEI more closely to that of the CEI, which, because the coincident index is a measure of current economic activity, makes the levels of these indexes more meaningful. While the composite indexes are mainly used to indicate directional changes in aggregate economic activity, many users also regard them as measures of the level of economic activity. The trend adjustment encourages this use.<sup>3</sup>

## Other Component Changes

The revised index of leading indicators (Table 1) includes the survey diffusion index of industry production expectations, a new component that has a relatively good record of leading but also has many extra turns. Despite this extra sensitivity, we believe it adds leading information to the composite index that can help predict the direction of the French economy. The price to unit labor cost ratio in manufacturing has been broadened from manufacturing to all private nonagricultural markets. The new definition covers about 77 percent of the French economy’s value added in all sectors, as opposed to only about 13.5 percent in the old component. The personal consumption of manufactured goods component, which was initially classified as a leading series, is no longer

included in the LEI. It has been reclassified as a coincident series based on revised data and five additional years of observations since The Conference Board initially released the composite indexes for France. Other components that have been omitted include bond yields, which suffered from excessive volatility and extra turns as well as some long and overlapping leads; the consumer confidence index (CCI), a diffusion index based on opinion balance that was dropped because of its short record and unreliable timing performance; and the quarterly series of changes in inventory, which was found to have deficiencies in cyclical timing similar to those in the CCI.

Table 1  
Changes in Leading Index Components: May 2006\*

1	Yield spread (10-year minus day-to-day loan rate)	Same, cumulated
2	Stock price SBF 250 (Dec. 31, 1990=100)	Same
3	Building permits residential, thousands (3-month moving average)	Same
4	New unemployment claims, thousands (3-month moving average)	Same
5	Industry new orders, diffusion index	Same
6	Ratio, price to cost (unit labor cost), nonagricultural private market sector (Index: 1995=100)	Redefined
7	Industry production expectations, diffusion index	New
8	Personal consumption: manufacturing products, bill. Euro (SA)	Omitted
9	Bond yields 10 years: percent (NSA)	Omitted
10	Change in stocks: millions of Euros (SA), monthly interpolation (TCB)	Omitted
11	Consumer Confidence Index	Omitted

\* See the monthly press release on The Conference Board website for updated standardization factors.

Sources: The Conference Board, INSEE, Rexecode, Thomson Financial

<sup>2</sup>The trend adjustment, which was reinstated in the U.S. LEI in the July 2005 revisions, is accomplished by adding an adjustment factor to the monthly growth rate of the LEI. This adjustment factor is computed by subtracting the average monthly growth rate of the LEI (0.0951) from the average monthly growth rate of the CEI (0.0994) over the 1970–2004 period, making the adjustment factor 0.0043. This adjustment factor is then added every month to the growth rate of the LEI. These trend adjustment factors will be updated once a year during the regular annual benchmark revisions of the composite indexes.

<sup>3</sup> See Gad Levanon, “Details of the Trend Adjustment to the Leading Economic Indicators,” *Business Cycle Indicators*, August 2005.

## Gauging the Impact of the New LEI

The comparison of the old and new leading indexes for France in Chart 1 shows that the new index has larger cyclical movements and some longer leads (note the timing of the two series at the 1981 trough). While both versions of this index miss the 1982–1984 recession, the new index shows less retardation than the old one.

Overall, the new LEI is better suited to predicting business cycle turning points as well as monthly changes in the economy. Out-of-sample forecasting exercises performed as part of the benchmark revision also suggest that the new LEI offers a statistically significant advantage over the old LEI as a forecasting tool. We performed these tests by comparing alternative series of out-of-sample forecast errors generated from regressions of the growth rate of the coincident index on lags of the growth rates of the old LEI and the new LEI.<sup>4</sup> As shown in Table 2, the findings from these exercises indicate that the new LEI offers a 2.5–4 percent reduction in forecast errors over the old LEI for the variety of different forecasting exercises performed.

Table 2  
Predicting Growth in the Coincident Index with the LEI  
Out-of-Sample Forecast Period: 1985:01–2006:02

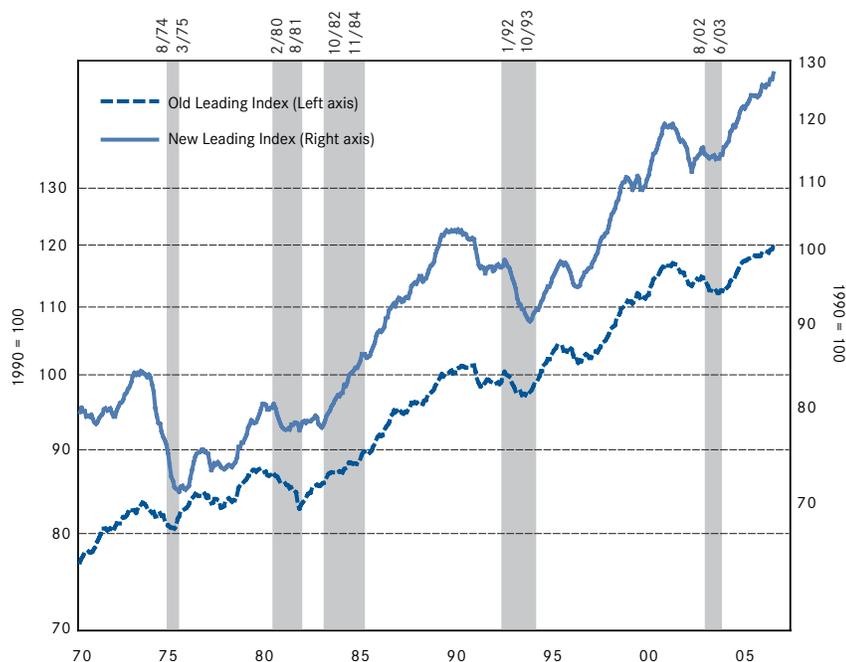
Variables:	Root Mean Squared Forecast Errors		Percent improvement with new LEI
	Forecasting with: Old LEI	New LEI	
6 mo. change	0.1868	0.1800	3.6**
6 mo. change*	0.1873	0.1800	3.9**
3 mo. change	0.1863	0.1817	2.5**
3 mo. change*	0.1881	0.1817	3.4**

\* OLD LEI with trend adjustment.

\*\* Indicates that the reduction in forecast errors is statistically significant at the 10% level based on the Diebold-Mariano test statistic.

Notes: Initial sample: 1970:01–1984:12. The regression equation is  $\Delta_j CEI_t = \alpha \Delta_j CEI_{t-1} + \sum_{i=1}^j \delta_i \Delta_j LEI_{t-i} + \Delta_j$ , which denotes log changes over  $j$  months when  $j = 3$  and 6 months, alternatively.

Chart 1  
Old LEI and New LEI for France: 1970-2005



Note: Shaded areas represent business cycle recessions determined by The Conference Board using an index combining coincident indicators and real GDP.

A longer version of this essay, which includes a table listing the timing at business cycle peaks and troughs of the new and old composite indexes (prior to the last comprehensive benchmark revisions), can be found on our website: [www.conference-board.org/economics/bci](http://www.conference-board.org/economics/bci). The authors would like to thank Denis Ferrand, Catherine Guillemineau, and Gad Levanon for helpful discussions; and Jennifer Chao for excellent research assistance.

<sup>4</sup> For more on tests of predictive accuracy, see Francis X. Diebold and Roberto S. Mariano, "Comparing Predictive Accuracy," *Journal of Business and Economic Statistics*, Volume 13, Issue 3, July 1995, pp. 253-263; Francis X. Diebold and Glenn D. Rudebusch, "Forecasting Output with the Composite Leading Index: An Ex Ante Analysis," *Journal of the American Statistical Association*, Volume 86, pp. 603-610; and "A More Timely and Useful Index of Leading Indicators," a forthcoming article by Robert H. McGuckin, Ataman Ozyildirim, and Victor Zarnowitz in the *Journal of Business and Economic Statistics*.