Third International Seminar on Early Warning and Business Cycle Indicators

17 – 19 November 2010
Moscow, Russian Federation

New tools for tracking the Mexican Business Cycle

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Introduction

The general condition of an economy is determined by several factors simultaneously interacting, but with different performances. This fact makes it difficult to track the economic activity. Analysts and policymakers usually have to deal with a great number of indicators, with different timeliness and moving in different directions for the last month or quarter of the analyzed series. This may cause contradictory statements and misinterpretations by policy-makers, academics, the media, etc., introducing confusion in the society about where the economy is situated in the business cycle, especially when a turning point is near.

In this context, the objective of composite indicators is to provide information on the economy as a whole, including data on the production of goods and services, and labor and financial markets. This is an important issue because it is possible that after an economic activity slowdown, Gross Domestic Product (GDP) could start growing without a decrease in unemployment. According to Mexico´s experience, this can be more than possible. So, ordinary people ask themselves how is it possible that the economy is recovering if they are no job, no money. It is also important to have in mind the financial market since financial factors have a significant influence on the real sector in a globalized and interdependent world especially.

Composite indicators provide a general vision of the economy, standing out from among several indicators. Starting from a vast set of figures, the objective is to explain the global tendency of the economy. It seems easier for people to interpret two or three indicators than identifying common trends across many separate indicators. However, monitoring the particular indicators should not be disregarded.

Description of the first Mexican System of Composite Indicators

In 1998 the National Institute of Statistics and Geography (INEGI) began the construction of the Mexican System of Composite Indicators (SCI_1) that was released in the year 2000. The system was composed by the coincident and leading indicators.

These indicators summarize and show common patterns of the economic trends and turning points in a clear way. The methodology used is based on that originally developed by the National Bureau of Economic Research. Until last October, the INEGI monthly disseminated coincident and leading indicators under the approach of classical business cycle. The coincident indicator has a similar performance to the business cycle. It is constructed based on the following variables:

a) An estimation of a monthly GDP, which is a disaggregation of quarterly GDP, according to the performance of a related variable that in this case is the Global Economic Activity Index (coverage of 84% of GDP in the base year 2003), which is monthly compiled; b) The Industrial production index; c) Retail sales; d) Workers registered at the Mexican Institute of Social Security (this is an

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approximation to formal employment); and e) An indicator on working conditions obtained from the unemployment and underemployment data.

The coincident indicator shows the Mexican economic history for almost 30 years. Following this criterion, six recessions are identified. The first four are considered to be caused by internal problems and an oil price decrease. On the contrary, the last two recessions were due to external factors. By the end of 2000 the world demand presented a slowdown which led to a contraction of the Mexican trade flows. In 2008 the recession initiated with the global financial crisis and the slowdown of the Unites States economic activity.

Graphic 1
The Coincident Indicator Performance
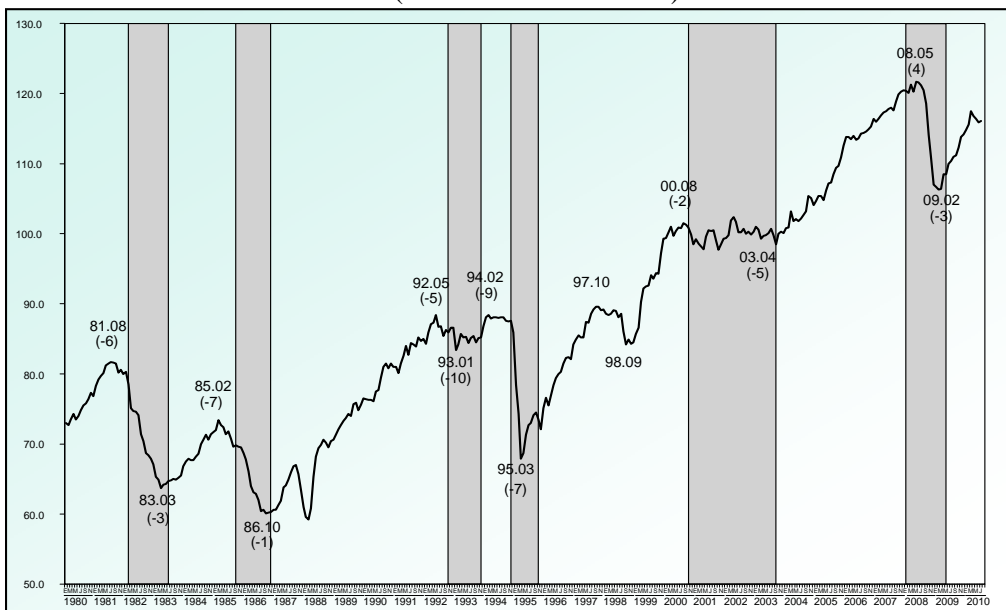(Index base 2003 = 100)
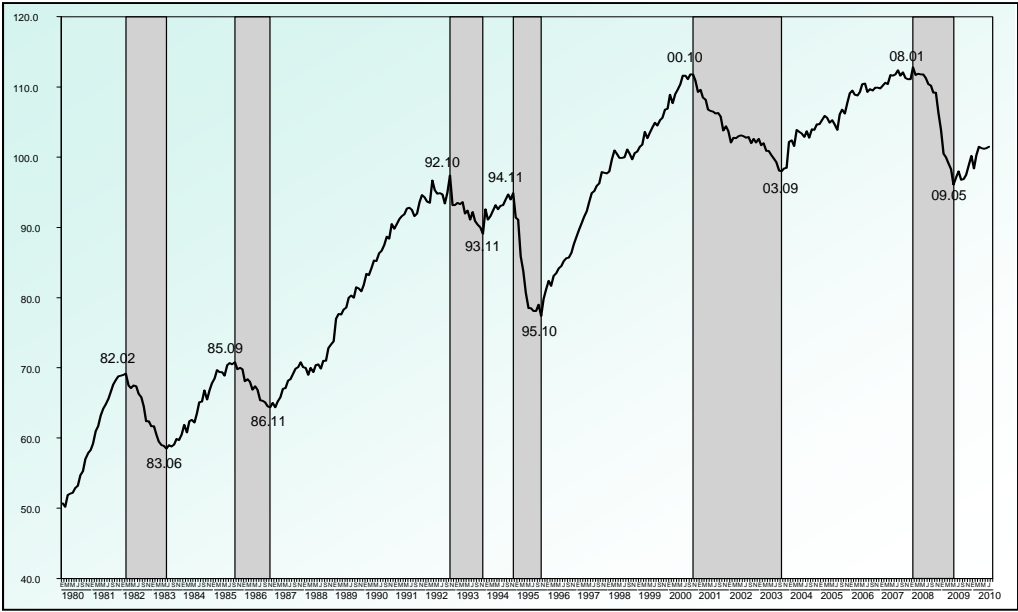
Note: Numbers in the graphic represent the year and month in which turning points of the coincident indicator occurred: peak or trough.

The leading indicator shows in advance the direction of the coincident indicator. It is composed of the following variables:

a) The real exchange rate; b) the Mexican average oil price; c) the Price index of the Mexican stock exchange in real terms; d) Worked hours in manufacturing industry; e) the interest rate; and f) the production volume of the construction industry.

Graphic 2
The Leading Indicator Performance
(Index base 2003 = 100)

Note: Numbers in the graphic represent the year and month in which turning points of
        the leading indicator occurred: peak or trough.
        Numbers in parenthesis indicate the number of months that the leading indicator
        anticipated the turning point of the coincident indicator. These numbers may
        change over time.

The experience obtained in the construction of the Composite Indicators

It must be said that before the construction of these indicators it is strongly required a well
developed data set of monthly economic indicators with an adequate timeliness, otherwise the
composite indicators will be useless[2]. Another important aspect to consider is that long series are
required for showing business cycles over time.

During the construction, series with coincident turning points in most of the cycles were selected
(the variables were compared against the monthly disaggregation of quarterly GDP). Once the
coincident indicator was constructed, the remaining variables were analyzed in order to look for
series with leading turning points. It would be interesting to introduce sentiment indicators in the
construction of this indicator, but in Mexico the consumer confidence index series starts from 2001
and the producer confidence one from 2004, which represents short periods of time.

When the coincident and leading indicators began to be constructed, series with a length of eighteen
years were available (starting in 1980). The determining criterion in selecting the series was that
these had presented coincident or leading behaviors in most of the cycles during the eighties and
nineties. If recessions can be caused by different factors, it is unlikely that a single variable will
perform best in all cycles.

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[2] An alternative for timeliness improvement would be the estimation of some variables, but the INEGI does
not make it.

In 2004 a revision of the composite indicators components took place. It was observed that for the recessive phase occurred from 2000 to 2003 in the Mexican economy, the coincident and leading indicator showed a congruent behavior: the leading indicator anticipated, several months in advance, the turning points of the coincident indicator. That was the reason for the validation of the components used.

In general, from 1980 to 2008, the leading indicator fulfilled its function to anticipate the coincident indicator turning points, averaging 5.8 months on peaks and 5.2 months on troughs.

<div align="center">

Graphic 3
The Coincident and Leading Indicator Performance
(Base 2003 = 100)

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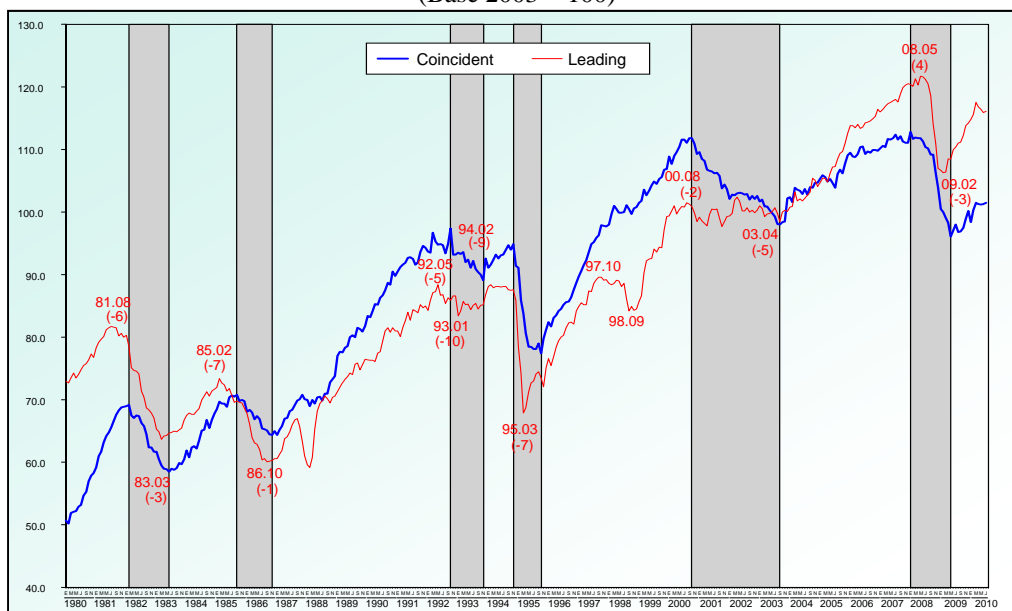
Note: Figures above the leading indicator graph refer to the anticipation of peaks and figures below the graphs refer to the anticipation of troughs.

But, since the composite indicators were constructed taking into account the history of internal shocks or a combination of these and exogenous shocks, the leading indicator did not anticipate the beginning of the recessive phase in 2008[3], due to the fact that the recession came from abroad and was spread through a drop of Mexican exports, remittances by Mexican emigrants from the United States (U.S.) and the decline of foreign tourism[4].

This fact led us to think about the need to update the system revising their components and ask ourselves if it was necessary to give more weight to the last recession when constructing the new leading indicator.

This experience indicated that when constructing a system of composite indicators it is necessary to consider the alternative of another possible source of shock in the future, even if the history does not show a very strong relation. Therefore, it should be assessed the inclusion of components that maybe did not show a "perfect behavior" in the past recessive or expansive phases but might have leading characteristics at the present time. In short, the technique should be complemented by the

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[3] Although this fact, the analysis of many other economic indicators was showing that a recession was coming.
[4] Nevertheless, the leading indicator anticipated the recovery of the coincident one.

application of knowledge about the structural changes in the performance of the country. The dependence of the Mexican economy from that of the U.S. economy has increased in recent years; therefore, variables of this country should also be considered in the analysis for Mexico.

Another element to mention is the indicators variability. Compared with the U.S. composite indicator, it is clear the volatility of the Mexican one[5]. For analytical purposes, it is easier to track smooth trends rather than volatile ones, particularly on a month-to-month basis.

Graphic 4
Coincident Indicators: Mexico and United States
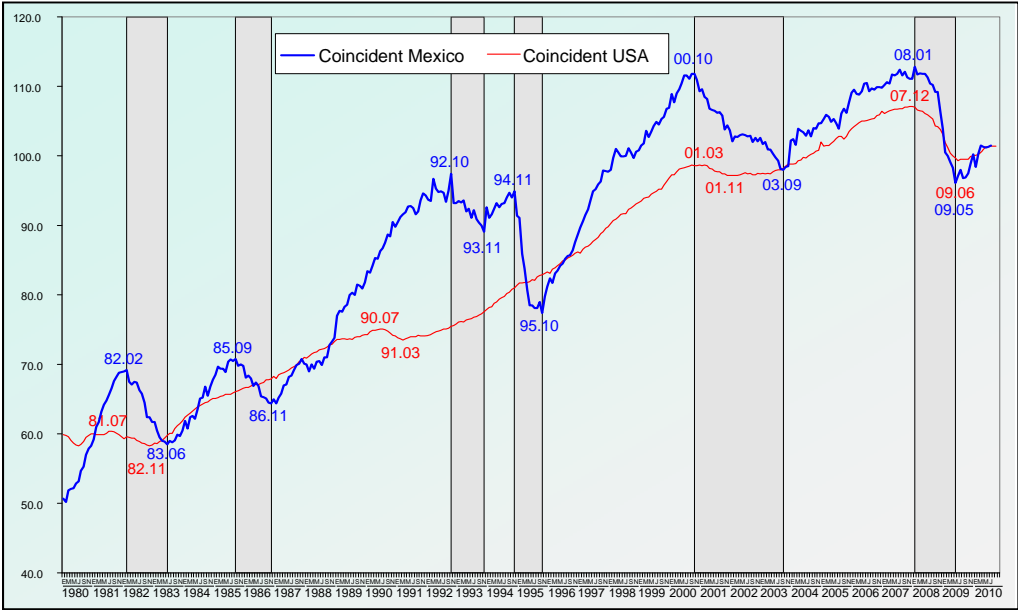
The above mentioned aspects became an important issue that led to an assessment on the usefulness of the system of composite indicators that was being generated at that time.

A new System of Composite Indicators

As a result of research activities on new tools to track the business cycle and considering international comparability it was decided to generate a new system of composite indicators using the same methodology as the OECD[6]. This work began in the first half of this year. The new name is: System of Cyclical Indicators (SCI$_2$).

The components selection for the coincident indicator has two differences when comparing with the former system: the indicator on unemployment and underemployment was substituted by the urban unemployment rate; and total imports were included.

The Coincident Indicator components are: a) The estimation of monthly GDP (a monthly disaggregation of quarterly GDP); b) Industrial production index; c) Retail sales; d) Workers registered at the Mexican Institute of Social Security; e) Urban unemployment rate; f) Total imports.

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[5] The Mexican indicator is not filtered.
[6] We would like to thank the experts of the OECD for providing guidance in the implementation of this methodology.

For the new leading indicator, a U.S. variable was introduced and the oil price was substituted by non-oil exports. Therefore, components are: a) The price index of the Mexican stock exchange in real terms; b) The real exchange rate; c) The interest rate; d) The Standard & Poor's 500 Index (U.S.); e) The manufacturing employment trend; and f) Non-oil exports.

The methodology is based on the "growth cycle" approach. This defines the economic cycle (the cyclical component of indicators or variables) as the economy´s deviations from its long-term trend.

The results are shown in the next graphic and table. The system anticipated the last two coincident turning points (nine months in the peak and three in the trough). Moreover, according to the last available information, the leading indicator is showing a possible peak in expansion, as in other countries.

Graphic 5
System of Cyclical Indicators
(Growth cycle)
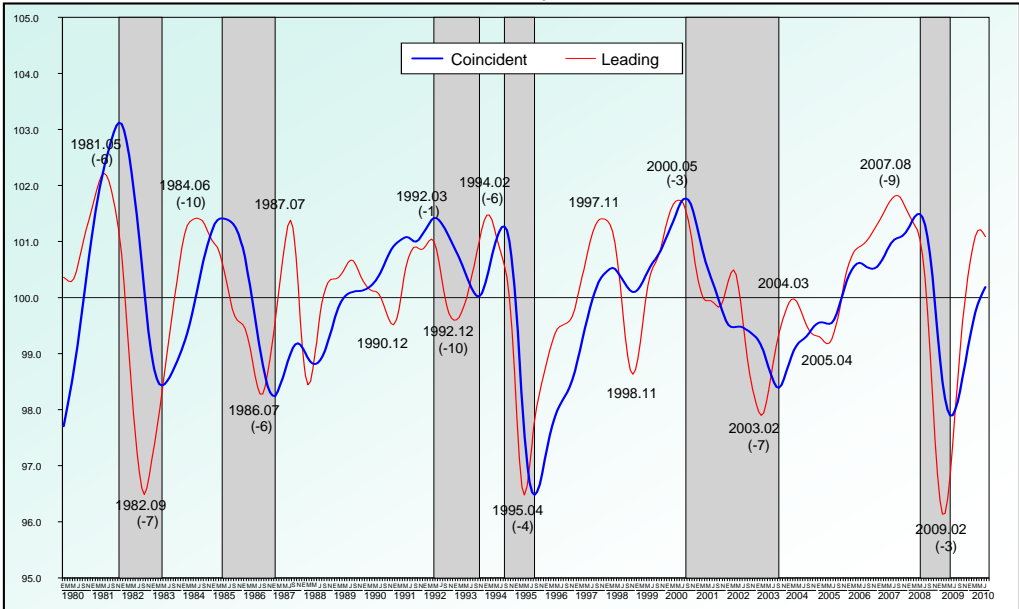
It must be point out that, ex-post, spurious turning points in the leading indicator can be observed[7], but we have to remember that the stress was put in anticipating the recent recessions. Besides, as it was mentioned before, it is really unlikely to find a "perfect leading indicator" that anticipates the coincident indicator performance in all economic cycles.

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[7] In these cases, coincident indicator also shows a change in the direction, but not long enough to be considered as presenting a peak or trough.

Table 1
Dating of turning points in the Cyclical Indicators

Turning points	Coincident	Leading	Months in advance
Peak	1981-11	1981-05	6
Trough	1983-04	1982-09	7
Peak	1985-04	1984-06	10
Trough	1987-01	1986-07	6
Peak		1987-07	
Trough		1990-12	
Peak	1992-04	1992-03	1
Trough	1993-10	1992-12	10
Peak	1994-08	1994-02	6
Trough	1995-08	1995-04	4
Peak		1997-11	
Trough		1998-11	
Peak	2000-08	2000-05	3
Trough	2003-09	2003-02	7
Peak		2004-03	
Trough		2005-04	
Peak	2008-05	2007-08	9
Trough	2009-05	2009-02	3

Table 2
Coincident indicator and its components
(Monthly differences in percentage points)

|		Coincident indicator	Monthly disaggregation of GDP	Industrial production index	Retail sales	Workers registered at Social Security	Urban un-employment rate	Total imports
2009	Aug	0.15	0.30	0.27	0.01	(-) 0.05	(-) 0.04	0.28
	Sep	0.20	0.32	0.34	0.03	0.00	(-)0.14	0.32
	Oct	0.24	0.32	0.39	0.06	0.04	(-) 0.22	0.34
	Nov	0.26	0.30	0.40	0.09	0.08	(-) 0.26	0.34
	Dec	0.25	0.26	0.39	0.09	0.12	(-) 0.27	0.32
2010	Jan	0.24	0.22	0.36	0.09	0.14	(-) 0.23	0.30
	Feb	0.22	0.23	0.33	0.08	0.15	(-) 0.21	0.27
	Mar	0.19	0.23	0.28	0.05	0.15	(-) 0.15	0.23
	Apr	0.15	0.21	0.22	0.02	0.14	(-) 0.09	0.17
	May	0.12	0.18	0.17	0.00	0.12	(-) 0.09	0.10
	Jun	0.09	0.16	0.13	(-) 0.02	0.11	(-) 0.12	0.04
	Jul	0.09	0.16	0.11	(-) 0.02	0.09	(-) 0.16	0.02

Source: INEGI.

Table 3
Leading indicator and its components
(Monthly differences in percentage points)

		Leading indicator	Manufacturing employment trend	Non-oil exports	Price index of the Mexican stock exchange	Real exchange rate	Interest rate	Standard & Poor's 500 Index (USA)
2009	Aug	0.58	0.57	0.48	0.28	(-) 0.04	(-) 0.18	0.56
	Sep	0.55	0.57	0.55	0.22	(-) 0.05	(-) 0.09	0.51
	Oct	0.50	0.56	0.57	0.16	(-) 0.09	(-) 0.01	0.44
	Nov	0.44	0.45	0.55	0.12	(-) 0.15	0.04	0.36
	Dec	0.36	0.34	0.49	0.07	(-) 0.19	0.06	0.29
2010	Jan	0.30	0.26	0.44	0.03	(-) 0.22	0.07	0.22
	Feb	0.24	0.19	0.40	0.01	(-) 0.22	0.08	0.16
	Mar	0.19	0.12	0.34	(-) 0.01	(-) 0.20	0.07	0.11
	Apr	0.10	0.04	0.26	(-) 0.04	(-) 0.15	0.07	0.04
	May	0.01	(-) 0.03	0.16	(-) 0.06	(-) 0.08	0.06	(-) 0.04
	Jun	(-) 0.05	(-) 0.10	0.11	(-) 0.07	(-) 0.02	0.06	(-) 0.08
	Jul	(-) 0.08	(-) 0.16	0.10	(-) 0.07	0.02	0.05	(-) 0.08

Source: INEGI.

When analysis is being made for the last month of a time series, it is easier to interpret the indicators direction due to the smoothness resulting from the methodology.

Graphic 6
Comparability between Coincident Indicators*
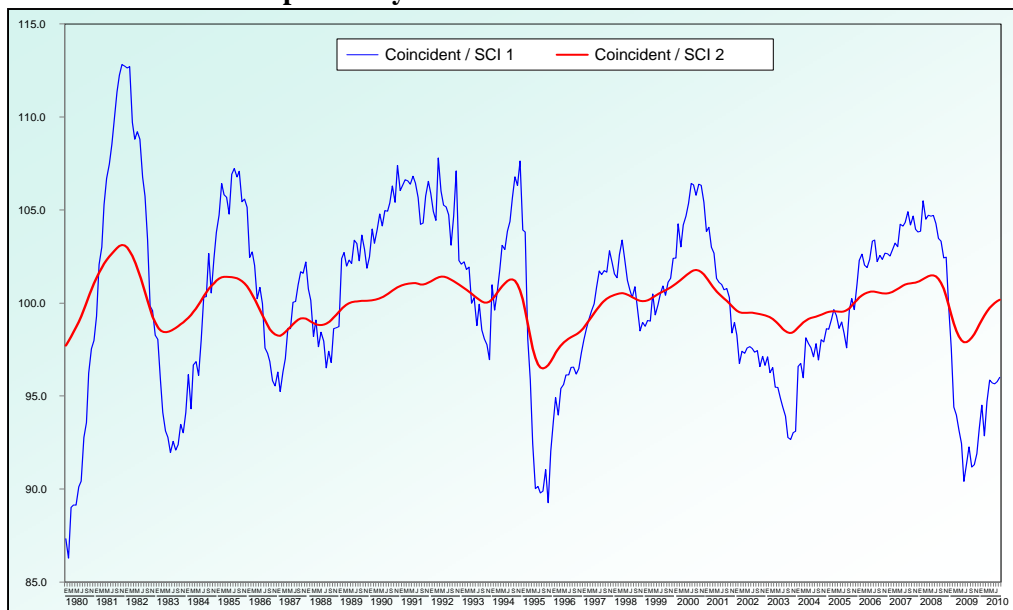
*The coincident indicator SCI_1 was transformed to the growth cycle approach for comparing purposes.

The Mexican Business Cycle Clock

Composite indicators facilitate tracking the aggregate economic activity by just monitoring its behavior. Specialized users can do this easily. General users need a more visual, intuitive and organizational tool such as the Business Cycle Clock. It shows in a graphic way where the general economy and some selected economic aggregates are located in the business cycle.

Based on the original Business Cycle Tracer developed by Statistics Netherlands, the INEGI developed the Mexican Business Cycle Clock (MBCC)[8] during the second half of this year.

The MBCC was thought as complementary in the dissemination of the SCI_2. A set of sixteen indicators are included: the coincident and leading indicators, their components (mentioned in the previous section) and two sentiment indicators which are not included in the composite indicators because of the series short length, but are included because they are indicative of the economic situation.

The variables nomenclature is the following: Coincident (C), Leading (A), coincident components $(C_1,\ldots,C_6)$, leading components $(A_1,\ldots A_6)$, producer confidence (IP) and consumer confidence (IC).

As in the case of other clocks or tracers developed, the MBCC interface has a main clock with animation control buttons and a table to select indicators. There is another part constituted by 6 graphics (for space reasons) which can be selected among the sixteen provided as the user may wish. The combination of the main clock and the set of graphics show how the cyclical component of the several indicators moves through the quadrants while locating their position relative to their long-term trend (represented by 100).
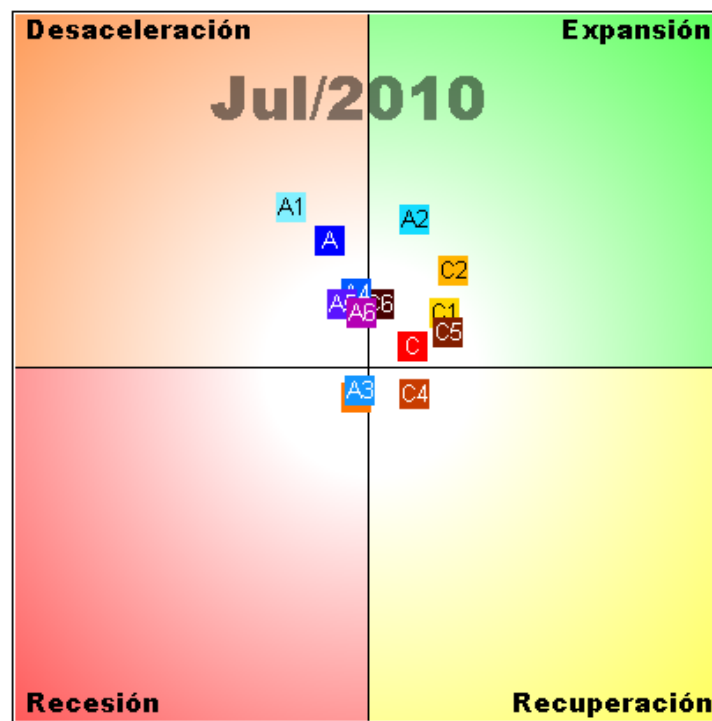
Graphic 7
Mexican business cycle clock

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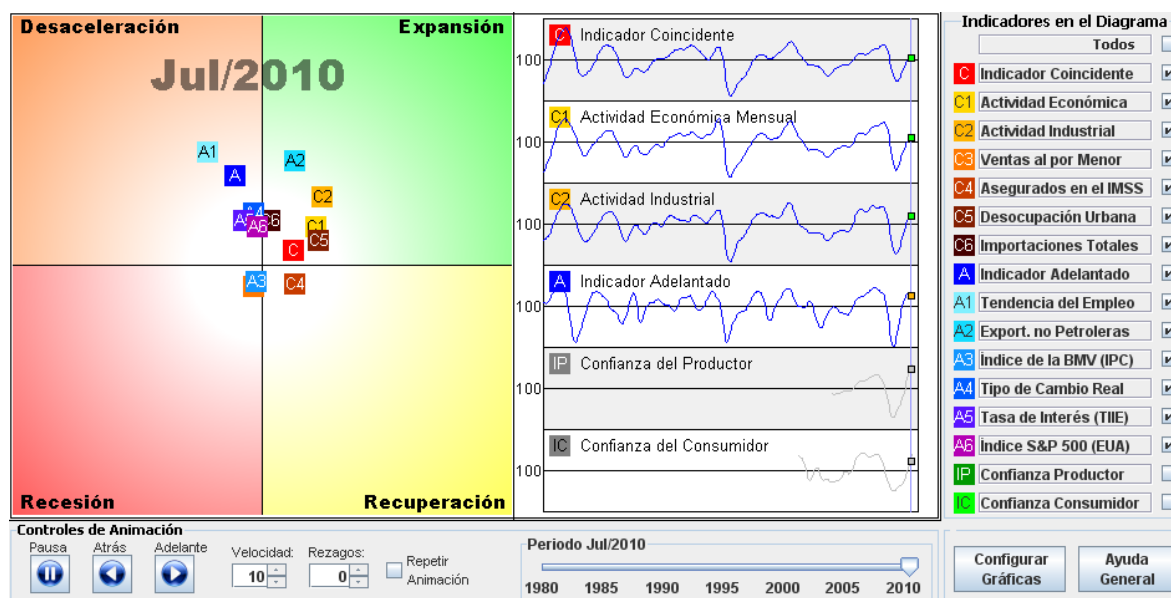
[8] In the Help Information of the clock posted in the INEGI website there is a text mentioning this fact.

The indications for user interpretation are the following:

- Expansion: When the cyclical component of the indicator is located over its long-term trend (represented by 100) and is increasing (green).

- Slowdown: When the cyclical component of the indicator is located over its long-term trend and is decreasing (orange).

- Recession: When the cyclical component of the indicator is located below its long-term trend and is decreasing (red).

- Recovery: When the cyclical component of the indicator is located below its long-term trend and is increasing (yellow).

The typical behavior of the cyclical component of an indicator on the four quadrants of the clock is a movement counter- clockwise. When the value of the cyclical component crosses the vertical axis marks a possible peak (if the crossing occurs in the upper quadrants) or possible trough (if the crossover occurs in the lower quadrants)[9].

The clock is also complemented with a dashboard, which presents graphics of the whole set of indicators, the colors show in what phase of the cycle the indicators are located.

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[9] The turning point identification requires that the time span between a peak and a trough last not less than 9 months.

The indicators are grouped in three columns: a) coincident indicator and components; b) leading indicator and components and c) sentiment indicators.
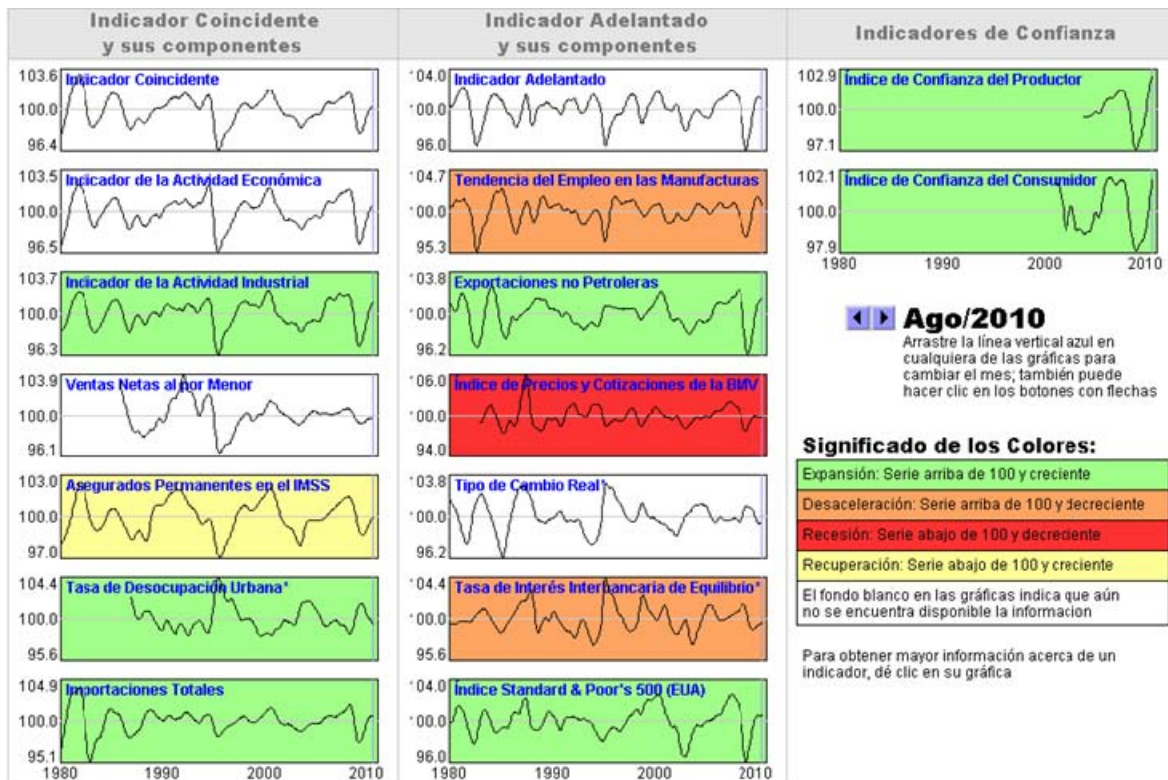
The white background means that the corresponding figures are not yet available in the month indicated in the animation control.

Rapid estimate of Gross Domestic Product (GDP)

Composite indicators are useful tools because they provide high frecuency information on the direction in which the economy is heading, but fail in providing quantitative figures. The leading indicator provides a direction of the economy in the short term but not a magnitude. Therefore, the INEGI is also working on a rapid estimate of GDP. When the project is finished, a careful assessment will be carried out on the results obtained.

To estimate Mexico´s quarterly constant-price GDP in a timely fashion a Vector Auto-Regressions (VAR) model-based procedure is applied. The procedure yields two timely estimates of GDP, the first one with a lag of 15 days after the end of the reference quarter. It makes use of a month of complete data from the monthly Global Economic Activity Index (IGAE) database and an additional month of data from the Monthly Industrial Activity Index database, equivalent to another month of incomplete data from IGAE. The second estimate is based on two complete months of data of the IGAE database and is obtained with 30-day delay, after the end of the reference quarter. In both cases, exogenous variables and general indicators whose data are available are fed into the

model. The procedure follows a bottom-up approach that starts with the estimation of groups of subsectors of economic activity. Then, those results are added to estimate the three major activities and finally the total of GDP.

The dissemination is a matter that will be dealt with and decided carefully for reasons related to the official statistics credibility.

Dissemination

When we began disseminating of the former composite indicators (in 2000), there was some confusion. First, because not everybody was familiar with the concept of business cycle, and second, because analysts were used to consider GDP as the adequate tool to track business cycle.

Over time, analysts understood what the composite indicators convey and were more comfortable using them especially when they realized they were available on a monthly basis.

The new System of Cyclical Indicators and the Mexican Business Cycle Clock will be released in November. A workshop for economic analysts has been organized. Therefore, at this moment (when this paper is being written), users reactions are not available. Some colleagues within the Institute have expressed very positive comments.