*Sergey Smirnov*

# THOSE UNPREDICTABLE RECESSIONS…

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Contemporary global economic life is measured in days and hours, but most common economic indicators have inevitable lags of months and sometimes quarters (GDP). Moreover, the real-time picture of economic dynamics may differ in some sense from the same picture in its historical perspective, because all fluctuations receive their proper weights only in the context of the whole. Therefore, it's important to understand whether the existing indicators are really capable of providing important information for decision-makers. In other words, could they be useful in real-time? Why then was it so difficult for the experts to recognize the turning points in real time? What hampers this ability to recognize? Can a turning points' forecast be entirely objective? The paper answers these questions in terms of three cyclical indicators for the USA (LEI by the Conference Board, CLI by OECD and PMI by ISM) during the last 2008–2009 recession.

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# 1. Introduction. A fact and its interpretation

Attempts to predict a recession using various "formal" methods has become commonplace since the Great Depression of 1930s and quite a lot of effort was spent to achieve this goal. But rarely have they been very successful. Various samples of real-time forecasts created by professional forecasters, who use a wide spectrum of methods and all available information, have shown that most experts are too lagging not only in predicting but even in their recognition of recessions (e.g. see [Fels and Hinshaw, 1968], [Steckler, 1968], [McNees, 1987], [McNees, 1992]).

The *leading* cyclical indicators approach, which became very popular after [Burns and Mitchel, 1946], has also not been able to solve the problem. These indicators usually give a good picture if one looks for a long historical retrospective but they are often not very effective in 'real-time', when one deals with observations that are recent. This problem is well known; it was dealt with from time to time by various authors (e.g.: [Alexander, 1958], [Stekler and Schepsman, 1973], [Hymans, 1973], [Zarnowitz and Moore, 1982], [Diebold and Rudebush, 1991], [Koenig and Emery, 1991], [Boldin, 1994], [Koenig and Emery, 1994], [Lahiri and Wang, 1994], [Filardo, 1999], [Diebold and Rudebush, 2001], [Camacho and Perez, 2002], [Filardo, 2004], [McGuckin and Ozyildirim, 2004], [Chauvet and Piger, 2008], [Leamer, 2008], [Nilsson and Guidetti, 2008], [Paap et al, 2009], [Hamilton, 2011] and others).[3]

This paper will try to examine the behavior of three popular cyclical indicators for the USA during the recession of 2008–2009. These indicators are: the Leading Economic Indicator (LEI) by The Conference Board; the Composite Leading Index (CLI) by the OECD (in its 'amplitude adjusted' form); and Purchasing Managers' Index (PMI) by the Institute for Supply Management. We shall consider not only their dynamics but also the conclusions made by their producers. On this ground we shall try to answer several interrelated questions. First, did the leading indicators really give signs of the beginning and the end of the 2008–2009 recession in advance? Second, did the experts make correct and timely conclusions concerning the approach of the turning points? Since our answer to the first question is 'yes' and 'no' to the second, we shall also discuss the reasons why the experts could hardly recognize the turning points (especially the cyclical peak) in real time.

In Section 2 we discuss the methodological approaches for detecting turning points in real time. Then, we take a look at whether the cyclical indicators gave signals in advance during the

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[3] The most common conclusion to these papers is that the final version of cyclical indicators draws a favorable picture and hence one may be misled if he puts himself in the hands of the revised historical time-series. On the other side [Hymans, 1973], [Boldin, 1994], [Lahiri and Wang, 1994], [McGuckin and Ozyildirim, 2004] pointed that real-time data are also useful (as a rule they mentioned historical versions of the modern LEI by The Conference Board).

last recession of 2008–2009 (Section 3). In Section 4, we ascertain a gap between indicators' signals and experts' diagnosis (especially in their recognition of the recessions) and discuss the reasons for it. In the final Section we present our conclusions.

## 2. Data and methods

### *Peaks and troughs*

If one monitors business cycles in real time, he has no necessity for exact dating the turning points but rather for predicting an inevitability of such turning points. Hence, we suppose that an indicator is 'good' if it gave an alarm signal near the turning points as they are dated now by NBER's Business Cycle Dating Committee. That is why we used December 2007 as the peak and June 2009 as the trough of the last American cycle for our comparisons of three chosen cyclical indicators (LEI, CLI, PMI). We suppose that any 'good' cyclical indicator had to point to an imminent turn in the economy at those turning points.

### *Real-time analyses and data vintages*

All cyclical indicators are usually revised because of revisions of initial statistical data, re-estimation of seasonal adjustments and general improvement of methodology. All these reasons are quite natural and hence undisputable but they cause a doubling of perception: one view may be visible in real-time (with flash and/or preliminary data) and quite a different one – in historical retrospective (with revised data and adjusted methodology). As our aim here is to check the *real-time* qualities of the three mentioned cyclical indicators, we are interested in those historical vintages which correspond to January 2008 and July 2009. This is one month after the peak and the trough of the last American cycle; the most important statistical data for the last month of the previous cyclical phase became known at these points. Of course, in real time nobody knew that the American economy is just around the corner. But did the indicators tell us that a change in cyclical trajectory's direction is approaching?

### *Detecting turning points with '5 out of 6' rule of thumb*

It is not an easy task to conclude in real time that there are any visible signs of an approaching turning point as the leading indicators, just like all other financial and economic indicators, tend to fluctuate. Therefore, one must decide whether these fluctuations are just white noise or do they contain an important signal about changes in the trajectory of economy as well. In other words, one must extract middle-run changes in the trajectory resting upon only a few

observations. As recessions are very rare events, it's difficult to estimate turning points by traditional statistical methods and various 'rules of thumb' are widespread in real-time context.

This doesn't mean that no advanced statistical procedures are used to detect cyclical turning points. In fact there were tens of resourceful researches devoted to cyclical turning points dating and prediction.[4] The trouble is that in most cases the 'in-sample' results for refined econometrical models are much better than 'out-of-sample'; hence the quality of any such model in real time is under great doubt. And more, if an expert monitors business cycles in real time it's not enough for him to know that somewhere in the past somebody has suggested a 'really good' approach for forecasting turning points and a 'really good' filter for extracting the necessary information. Such an expert is obviously needed in regular (no less than monthly) publications of an indicator, which is based on this 'correct' approach and this 'good' filter. Without such publications, nobody would use these scientific results in real time. The trouble is the usual absence of such publications: it's not a typical task for an academic to produce a regular statistical newsletter or even a figure for the next month published via internet. Exclusions are not numerous. We know: [Chauvet and Hamilton, 2006]; [Chauvet and Piger, 2008]; [Paap et al., 2009]; and [Wildi 2009]. Most of these indicators were introduced after the beginning of 2008-2009 recession.

In our subsequent analyses we assume that negative/positive cyclical wave is really under way if a cyclical indicator is declining/growing in five (minimum) months out of six. Designating a negative monthly change with -1 and positive monthly change with +1, we may affirm that the sum for a six months span would be between -6 and +6. If all six changes have the same sign, the sum is equal to -6/+6; if only five changes have the same sign and one change has another sign the sum is equal to -4/+4. If the sum is -2, 0 or +2 we may conclude that no definite direction is observed.

The total number of combinations of six binary values is $C(6,2) = 2^6 = 64$. As there are six combinations with five identical directions and one "other" and only one combination with all six identical directions we may conclude that the probability of 'five (minimum) out of six' sequence of symmetrically distributed random variable is equal to 7/64 = 11%.

In more formal terms, we may say that in testing a null-hypotheses of no change in trajectory (with an alternative hypothesis of negative/positive tendency) by our "five out of six" rule we have a probability of Type I error (erroneous rejection of null hypothesis or a false turning point) equal to 11%. It's only slightly more than the usual threshold in statistical check of hypothesis.

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[4] See [Smirnov, 2011] for a survey.

We assume that an indicator with 'high' absolute score on the eve of a turning point had some anticipatory trend in proper direction and since it was possibly useful for predictions in real time. On the contrary, an indicator with 'low' score showed only chaotic oscillations and hence was rather useless for predicting a turning point.

# 3. Did the leading indicators give signals in real time?

## *Predicting the 'peak' of December 2007*

'Real-time' picture for all three selected indicators on the eve of the recession is shown on charts in Appendix and most general notes are summarized in Table 1. The preliminary conclusions are quite obvious. The most well known coincident (not leading!) indicator based on business surveys' (PMI by ISM) gave the most drastic signal for the economical drop in real time. Two composite leading indexes (by The Conference Board and by OECD) also gave strong reasons for anticipations of decline.

**Table 1 'Net' Score of Ups and Downs (a 6 months span)**

| Indicator | Date of release | R-T/R* | | Anamnesis |
|---|---|---|---|---|
| | | Initial Index | Y-o-Y change | |
| **On the Threshold of the Peak of December 2007** | | | | |
| LEI by TCB | 18.01.08 | -2/-4 | -4/-4 | The real-time net score for the initial LEI is not too impressive; for the Y-o-Y % changes it is more significant. The LEI dropped below the 'support level' of the two-years flat trend in November-December of 2007. |
| CLI by OECD | 11.01.08 | -4/-4 | -4/-2 | The real-time net score for the CLI (as well as for its Y-o-Y % changes) is quite high (note that the net score for the revised % changes is lower). The negative trend for the indicator and its % changes is obvious in spite of the fact that only November figure (not December figure as in almost all other cases) is available at the moment. |
| PMI by ISM | 02.01.08 | -6/-2 | 0/0 | In real time it gave a serious signal for the beginning of the 2008 recession: the net score for the index in December 2007 was equal to -6 (the possible minimum) and its level was the least since 2003. |
| **On the Threshold of the Peak of June 2009** | | | | |
| LEI by TCB | 20.07.09 | 0/0 | +2/+2 | The real-time net score for the initial LEI and for the Y-o-Y % changes is not significant for a 6 month span. But the LEI rose during all the last three months since April 2009. |
| CLI by OECD | 10.07.09 | -2/0 | 0/0 | The real-time net score for the CLI as well as for its Y-o-Y % changes is quite low. Since only May figure was available at the moment one had only two months of growth since April 2009. |
| PMI by ISM | 01.07.09 | +6/+6 | +6/+6 | In real time it gave a serious signal for the end of the 2008 recession: net score for the index in July 2009 was equal to +6 (the possible maximum). At the same time its level was still below 50 points. |

Notes: * – R-T – real time (January 2008 or July 2009); R – revision of January 2011.
A negative net score means that the number of downs (during a 6-months span before a turning point) is greater than the number of ups; for a positive score the opposite is the case.

### Predicting the 'trough' of June 2009

In July 2009 the PMI by ISM also gave (see Table 1 and charts in Appendix) the most prominent signals for the end of the recession. On the other hand, its signal was not indisputable: the PMI was still below 'critical' 50% level (in fact it was even below 45% level).Two composite leading indexes (by The Conference Board and by OECD) began to grow as of April 2009 and hence before the trough of the crisis. One may decide for himself whether a strong growth of the leading indicators during three consecutive months was really enough to believe the Great Recession was at its end.

### What did the experts write on the thresholds of turning points?

If one looks at the past from the present moment he may conclude that all three (LEI, CLI, and PMI) cyclical indicators really gave some important signals about the approaching turning points during the 2008–2009 recession though these signals were, for the most part, not entirely definite in real time. Moreover, for the trough at June 2009, they were less expressive than for the peak at December 2007. In any case, since the indexes didn't give an obvious signal, some final 'diagnosis' by an expert who could weight all 'pros' and 'cons' and propose his personal conclusion were obviously needed. But if one remembered what the experts told us in real time, one would probably be surprised by a high degree of experts' optimism.[5] The following remark by Victor Zarnowitz – a famous guru in the field of business cycles – illustrates the point: "Some pundits mistake the fears for facts and believe the recession is already with us." He wrote these words in late February 2008 (see: [Zarnowitz, 2008], p.2), when the recession has already begun. It's not difficult to find much more quotations like this; this point of view was common. In particular, experts usually predicted the 'slowing of growth' just before the drop of the economy (see Table 2).[6]

Forecasting of the trough (and succeeding recovery) for the USA during the last recession proved to be much better (also see Table 2) in spite of the fact that for cyclical indicators the period of their improvements close to the trough was much shorter than the period of falling close to the peak.[7]

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[5] [Fels and Hinshaw, 1968] wrote about the 1957 peak: "Many were noncommittal, others optimistic" (p. 30). [Fintzen and Stekler, 1999] have studied similar issues based on polls of professional forecasters near the beginning of 1990 recession. Not much has changed since then.

[6] See [Smirnov, 2011] for more details about many other cyclical indicators.

[7] Earlier, many authors have also noted that it's less difficult to predict the end of a recession than to predict its beginning (see: [Fels and Hinshaw, 1968], [Hymans, 1973], [Chaffin and Talley, 1989], [Koenig and Emery, 1991], [Koenig and Emery, 1994], [Fintzen and Stekler, 1999], [Anas and Ferrara, 2004]).

**Table 2 News Releases for Various Cyclical indicators in Real Time**

| Indi-cators | Date of release | Diagnosis in real time | Notes |
|---|---|---|---|
| | | **The peak of December 2007** | |
| LEI by TCB | 18.01.08 | "Increasing risks for further economic weakness; economic activity is likely to be sluggish" | For several months in 2008 TCB wrote "weak activity" or "weakening activity"; they wrote about *contraction* of the economy in November 2008 (!) for the first time ("Economy is unlikely to improve soon, and economic activity may contract further"); and mentioned the word *recession* only in December 2008 just after the NBER had announced the peak of December 2007 ("The recession that began in December 2007 will continue into the new year; and the contraction in economic activity could deepen further"). |
| CLI by OECD | 11.01.08 | "November 2007 data indicate a slowdown in all major seven economies except the United States, Germany and the United Kingdom where only a downturn [of growth rates] is observed." | OECD gives the following clarifications: "Growth cycle phases of the CLI are defined as follows: expansion (increase above 100), downturn (decrease above 100), slowdown (decrease below 100), recovery (increase below 100)." And more: "The above graphs [of CLIs] show each countries' growth cycle outlook based on the CLI which may signal turning points in economic activity approximately six months in advance." In other words, in January 2008 OECD waited for downturn of the USA economic growth rates in the mid of 2008 only; in February 2008 their expectations were the same. They changed their growth cycle outlook to "moderate slowdown" in March and then to "slowdown" in May 2008. Hence, they waited for a moderate contraction of the economy (not a drop of growth rates!) not until after the autumn 2008 (March plus half a year). |
| PMI by ISM | 02.01.08 | "A PMI in excess of 41.9 percent, over a period of time, generally indicates an expansion of the overall economy. Therefore, the PMI indicates that the overall economy is growing [in December 2007] while the manufacturing sector is contracting." | The conclusion about the growth of the overall economy was held by ISM for ten months up to November 3, 2008 (a month and a half after the Lehman Brothers bankruptcy!). At that moment, ISM mentioned a recession for the first time: "…[T]he PMI [for October 2008] indicates contraction in both the overall economy and the manufacturing sector." NBER announced the December 2007 peak only one month later. |
| | | **The trough of June 2009** | |
| LEI by TCB | 20.07.09 | "The recession will continue to ease; and the economy may begin to recover." | The three months before (in April) The Conference Board predicted: "the contraction in activity could become less severe"; in July they mentioned the possibility of a recovery for the first time; in August they stated that the recession was bottoming out. Thereby, the predictions of the trough by TCB were more or less timely but they were hardly "leading", and were rather "coincidental". |
| CLI by OECD | 10.07.09 | "Possible trough" | The sequence of OECD's growth cycle outlooks was the following: "slowdown" (June 8)/ "Possible trough" (July 10)/ "[Definite] trough" (August 7). The outlook is quite good except for the fact that OECD presumes a six month lag between CLI and economic activity and this time we could observe a lag around zero. |
| PMI by ISM | 01.07.09 | "A PMI in excess of 41.2 percent, over a period of time, generally indicates an expansion of the overall economy. Therefore, the PMI indicates growth for the second consecutive month in the overall economy, and continuing contraction in the manufacturing sector" | The diagnosis for the trough in the overall economy seems almost perfect. Of course it depends decisively on the critical level of 41.2. In real time, one had to decide whether to trust the 'rule of thumb' which had shown itself as not very effective on the eve of the recession. One may also notice that the critical level was slightly revised from 41.9 since December 2007; but this is barely important. |

# 4. Why do experts recognize cyclical peaks in real time so rarely?

In fact, we have an even more complex 'three-compound' paradox:

- leading indicators lead peaks more than troughs;[8]

- peaks are announced by NBER with less lags than troughs;[9]

- in spite of this, peaks are recognized by private experts worse than troughs.

The first and the second propositions are obvious from Table 3; and the third proposition is followed from the discussion in the previous Section. How all these contradictions could be resolved? Why do experts recognize cyclical peaks in real time so rarely?

**Table 3 Leads and Lags at Peaks and Troughs (the five US cycles since 1980)**

| Turning points (dated by NBER) | | Leads (-) and Lags (+) of Cyclical Indicators, months | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | NBER's decision | | LEI turning points | | CLI turning points | | PMI turning points | |
| Peaks | Troughs | Peaks | Troughs | Peaks | Troughs | Peaks | Troughs | Peaks | Troughs |
| Jan. 80 | Jul. 80 | 5 | 12 | -15 | -2 | -18 | -3 | -18 | -2 |
| Jul. 81 | Nov. 82 | 6 | 8 | -8 | -10 | -8 | -6 | -8 | -6 |
| Jul. 90 | Mar. 91 | 9 | 21 | -18 | -2 | -36 | -3 | -31 | -2 |
| Mar. 01 | Nov. 01 | 8 | 20 | -11 | -2 | -14 | -2 | -16 | -1 |
| Dec. 07 | Jun. 09 | 12 | 15 | -5 | -3 | -6 | -4 | -43 | -6 |
| Average | | 8.0 | 15.2 | -11.4 | -3.8 | -16.4 | -3.6 | -23.2 | -3.4 |

The reasons which have been given for this phenomenon in other papers are as follows:

(1) the transition from expansion to contraction is not often sharp or distinct ([Koening and Emery, 1994]); "We cannot get away from the fact that while peaks are always led by slowdowns, slowdowns do not always lead to a business-cycle peak" ([Alexander, 1958], p.301);

(2) timely preventive measures may preserve the economy from sliding into recession ([Stekler, 1972], [Anas and Ferrara, 2004]);

(3) "…[R]ecessions are hard to predict, in part because they are a result of shocks that are themselves unpredictable " ([Loungani and Trehan, 2002], p.3); in other words experts have extremely weak expectations prior to a forthcoming slump.

We may also assume the NBER's unwillingness to "create" a situation of a double dip recession (in 1980–1981 they announced the trough of July 1980 in July 1981 and this was just a month of a new peak). According to the NBER's rules, the length of any cyclical phase (contraction or expansion) should be no less than 6 months but the length of a whole cycle

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[8] For a long time it's been a well-known fact (see for example [Alexander, 1958]). Forty four years ago [Shiskin, 1967] wrote: "Long leads at peaks and short leads at troughs have indeed been a characteristic of the behavior of the leading indicators during the four business cycles since 1948" (p. 45). He supposed a special "reverse-trend adjustment" to eliminate this asymmetry. This adjustment was incorporated into the methodology of the LEI for years. We ought better to recognize this phenomenon not only as a statistical distortion but a real economical fact. [Harris and Jamroz, 1976], [Paap et al, 2009], [Zarnowitz, 2008], [Tanchua, 2010] confirmed that leading indicators lead peaks more than troughs. See also [Zarnowitz and Moore, 1982], [Emery and Koening, 1992].

[9] [Novak, 2008] noted that it takes longer for NBER to announce troughs than to announce peaks.

should be no less than 15 months. Hence, NBER have to wait for at least 6 months to announce a turning point but if the preceding phase was too short they have to wait more. Usually a contraction is the shortest phase, so the lag before trough's announcement turns out to be longer.

Another possible reason for delays in recessions' diagnostics is a psychological "dependency" of independent experts from the dating committee of the NBER which is very cautious and unhurried in its decisions. But the situation is probably even more complex as occasionally 'independent' experts become members of this committee. How would they recognize the beginning of a recession in their "independent expert" role if they have not recognized it in their "official persons" role? There is an evident "conflict of interests". [10]

Another kind of a psychological "dependency" is the one from GDP dynamics. The NBER's committee states this openly:

> *"We view real GDP as the single best measure of aggregate economic activity. In determining whether a recession has occurred and in identifying the approximate dates of the peak and the trough, we therefore place considerable weight on the estimates of real GDP issued by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. The traditional role of the committee is to maintain a monthly chronology, however, and the BEA's real GDP estimates are only available quarterly. For this reason, we refer to a variety of monthly indicators to determine the months of peaks and troughs". (Memo from the Business Cycle Dating Committee, January 7, 2008)*

Belief in GDP as in the best and most comprehensive indicator of economic activity (which belongs not only to the NBER's committee member) effectively prevents from announcing the beginning of a recession if an expert observes a string of positive growth rates of GDP. The data from Table 4 show that this was the situation in the USA until the end of 2008.Only in November-December (after the Lehman Brothers bankruptcy), it became clear that GDP would decline in the 4th quarter of 2008 also – and this was the moment when many experts recognized the recession for the first time.[11]

**Table 4 The USA: Advanced GDP Estimates by Vintages (% changes, SAAR)**

| Vintages | 07Q1 | 07Q2 | 07Q3 | 07Q4 | 08Q1 | 08Q2 | 08Q3 | 08Q4 |
|---|---|---|---|---|---|---|---|---|
| 30.01.2008 | 0.6 | 3.8 | 4.9 | 0.6 | | | | |
| 30.04.2008 | 0.6 | 3.8 | 4.9 | 0.6 | 0.6 | | | |
| 31.07.2008 | 0.1 | 4.8 | 4.8 | -0.2 | 0.9 | 1.9 | | |
| 30.10.2008 | 0.1 | 4.8 | 4.8 | -0.2 | 0.9 | 2.8 | -0.3 | |
| 30.01.2009 | 0.1 | 4.8 | 4.8 | -0.2 | 0.9 | 2.8 | -0.5 | -3.8 |
| 29.07.2011 | 0.5 | 3.6 | 3.0 | 1.7 | -1.8 | 1.3 | -3.7 | -8.9 |

Source: BEA

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[10] It's very probable that this was a real factor during the last recession!

[11] [Fintzen and Stekler, 1999] pointed to the positive preliminary GDP data for the third 1990 quarter as one of the main reasons for the failure of predicting the peak of July 1990. See [Leamer, 2008] for analysis of real-time GDP estimates during the 2001 recession. For interesting arguments against GDP as a stainless indicator in any context see [Nalewaik, 2010].

# 5. To predict a recession or not to predict? That is the question…

We believe the idea of different losses for different errors (Type I and Type II) for different experts (and – separately – decision makers from government or business!) and at different phases of the business cycle is the key to the riddle.[12] The weights in the loss function may vary across forecasters because of different factors. For example, the biased forecasts may be quite rational if experts do note only seek accuracy of their estimates (see [Laster et al, 1999], [Stark, 1997], [Lamont, 2002]). The existence of 'pessimists' and 'optimists' among forecasters is also well established.[13] The idea of using decision-based methods in evaluation of forecasts (see [Granger and Machina, 2006], [Pesaran and Skouras, 2008]]) also seems fruitful.

To examine all these issues more carefully let's denote the utility of predicting a recession by an *i*-expert as $U^R{}_i$ which takes its values according to Table 5.

**Table 5 Utilities Under Each Forecasting Decision and State of Economy**

| | Actual State of Economy | |
|---|---|---|
| Forecasting Decision* | Recession | No recession |
| Common view: Yes | | |
|    *i*-expert's forecast: Yes | $YR_i(Y_i \mid Y_c)$ | $NR_i(Y_i \mid Y_c)$ |
|    *i*-expert's forecast: No | $YR_i(N_i \mid Y_c)$ | $NR_i(N_i \mid Y_c)$ |
| Common view: No | | |
|    *i*-expert's forecast: Yes | $YR_i(Y_i \mid N_c)$ | $NR_i(Y_i \mid N_c)$ |
|    *i*-expert's forecast: No | $YR_i(N_i \mid N_c)$ | $NR_i(N_i \mid N_c)$ |

Note: * – "Yes" means that according to the forecast there will be a recession; "no" means that there will be no recession.

For example,

$$U^R{}_i = YR_i(Y_i \mid Y_c)$$

is the utility of the truth forecasting of a recession for an *i*-expert while "common view" also predicts this recession.

So, our first proposition is that the utilities for being right depend upon "common view" (terms $Y_c$ or $N_c$ in all equations). It's not the same thing to be right while almost everyone else is wrong and to be right while the others are also right. The first is obviously better:

$$YR_i(Y_i \mid N_c) >> YR_i(Y_i \mid Y_c) \text{ and } NR_i(N_i \mid Y_c) >> NR_i(N_i \mid N_c).$$

Similarly, to be wrong while almost all others are right is much worse than to be wrong while others are wrong too (we suppose that the utilities of mistaken forecasts are all negative):

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[12] [Okun, 1960], [Lahiri and Wang, 1994], [Schnader and Stekler, 1998], [Fintzen and Stekler, 1999], [Filardo, 1999], [Chin et al, 2000], [Dueker, 2002], [Anas and Ferrara, 2004], [Galvao, 2006] wrote on these issues but their results are still underestimated and scarcely explored in the context of business cycles indicators.

[13] [McNees,1992] noted that one of only two persons (out of forty forecasters!) who correctly predicted the recession in July 1990 had given the same forecast since 1987 (see p.19). Indeed, if you forecast some person to die, your forecast will come true somewhere along in the future.

$$YR_i(N_i \mid Y_c) << YR_i(N_{i\|} \mid N_c) \text{ and } NR_i(Y_i \mid N_c) << NR_i(Y_i \mid Y_c).$$

Our second proposition is that the utilities of being right and being wrong – if in accord with all others – are almost the same, because all of them are near zero (of course, the first is *slightly* positive and the second is *slightly* negative):

$$YR_i(Y_i \mid Y_c) \approx 0; \ YR_i(N_i \mid N_c) \approx 0; \ NR_i(N_i \mid N_c) \approx 0; \text{ and } NR_i(Y_i \mid Y_c) \approx 0.$$

Our third proposition is very simple: utilities for various *i* and *j* may be quite different. For risk aversion forecasters there would be a tendency to some average (consensus) level; on the contrary, for forecasters with high risk appetite there would be a tendency for extremes. But, as it is well known, the majority prefers not to lose something rather than to gain the same additional thing.[14] Since the ordinary state of economy is growth (not decline) the 'no recession' forecast would prevail.[15] In other words, an expert loses almost nothing if he is a 'no recession' forecaster:

$$YR_i(N_i \mid Y_c) > NR_i(Y_i \mid N_c).$$

But of course, he doesn't gain anything "special" this way either; he will never be a star. If somebody has such an ambition, he has to forecast recessions more often. For him the utility of his "personal" Type I error (false signal) is more than a utility of his "personal" Type II error (missed signal):

$$NR_i(Y_i \mid N_c) > YR_i(N_i \mid Y_c).\ [16]$$

This is because he hopes that $NR_i(Y_i|N_c)$ will at some point transmute into $YR_i(Y_i|N_c)$ with its great award.

Note, that in practice one may make the name only by forecasting recessions, not expansions. Using the notifications from Table 5 but substituting E (expansion) instead of R (recession) we may write:

$$YR_i(Y_i \mid N_c) >> YE_i(Y_i \mid N_c).$$

The first reason for this asymmetry is a short duration of a typical recession. According to NBER the average period of expansion was more than five times longer than the average period of contraction (59 months compared with 11 months for 11 cycles after 1945). This means that experts usually predict a trough shortly after the beginning of a recession and their error is not large in this case. Hence, there is little chance to be distinguished against such background.

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[14] "…[P]eople typically reject gambles that offer a 50/50 chance of gaining or losing money, unless the amount that could be gained is at least twice the amount that could be lost (e.g., a 50/50 chance to either gain $100 or lose $50)." (see [Tom et al, 2007], p. 515.

[15] As [Leonhardt, 2002] noted: "Economists know that optimism is usually the best bet because the economy grows more often than it shrinks."

[16] $YR_i(N_i|N_c)$ and $NR_i(N_i|N_c)$ are also errors of Type I and Type II respectively but we have assumed that they are around zero because of their inconspicuousness.

But we believe that the second reason also exists, and this reason is a "wishful bias". It is not an absolutely new issue. In March 2001 [The Economist, 2001] asked a tricky question: "Are the economic forecasters wishful thinkers or wimps?" In more scientific context [Ito, 1990] revealed that the forecasters working for Japan's importers predict statistically stronger exchange rate of the yen than the forecasters working for exporters (strong yen is an advantage to Japan's importers, not to exporters).

So, our fourth (and last) proposition is that experts do not forecast recession well partly because nobody (including themselves) wishes it to begin. They hope to the last and admit that there is a recession only after it has begun instead of predicting it. And this may be true in spite of quite visible signals from the cyclical indicators in real time! We mean not only some "mercenary" motives which are often mentioned.[17] At the end, [Fels and Hinshaw, 1968] and [Fintzen and Stekler, 1999] noted that not only private forecasters but also Fed forecasters make the same error: they are too optimistic when a recession is coming. So, we mean some deep inherent unwillingness to predict undesirable things.

In a "good" alarm system, a false signal (which is not too frequent) is better than a missed signal. This is quite natural: for example, a false call to an emergency service is costly but it's rather better than no call at all. Hence, we may suppose that for such a system of false signals would be found no less frequently than missed ones. But if forecasters (as a group) *avoid* to produce "mournful" forecasts, there would be a bias *from* false signals. In other words, due to this effect false signals could become less widespread and for the majority of experts the utility of false alarm signals could become *less* than a utility of a missed one:

$$NR_i(Y_i \mid N_c) < YR_i(N_i \mid Y_c)$$

(this is just the opposite to the inequality mentioned above).

One may use the Surveys of Professional Forecasters by FRB of Philadelphia to analyze the estimates for probability of a recession. The so-called "anxious index" (the average probability of a recession in the following quarter) is plotted on Chart 1. Just from the definition one may expect that if he has a set of quarters with 50% probability of a recession then roughly in half of these quarters there will be a recession and roughly in half there will be no recession. In fact, this is not the case. The "anxious index" exceeds 50% in 13 out of 172 quarters (from 1968:4 till 2011:3) and all of them except 3 fell on a recession. The probability of such an event for a binary variable is equal to $10/13 = 77\%$ which is significantly greater than 50%. This means that forecasters usually underestimate their probabilities of a recession: if they state 50% chance

[17] For example, [Leonhardt, 2002] wrote: "Like stock analysts, economists at big banks and brokerage firms have a financial incentive to predict good times. The profits of their companies -- and thus some of their own pay, which can reach seven figures for chief economists -- depend on people's confidence and their willingness to buy stocks."

of a recession this means that something around 77% which is approximately 1.5 times higher. [18] It's also not difficult to calculate that with the threshold equal to 20% there were 57 quarters with the "anxious index" greater than this level and 28 of them fell on recessions. This gives the ratio of underestimation of recessions' probabilities of around 2.5 times (50%/20% = 2.5).

So, one may conclude that the magnitude of the "wishful bias" for average probabilities of a recession can be found in the range of 1.5–2.5 (at least for private forecasters). When an "average" forecaster tells that the probability of a recession is equal to x%, a decision-maker has to multiply this value by 1.5–2.5 and only then decide if the recession is probable.

**Chart 1 "Anxious Index" According to the Survey of Professional Forecasters by FRB of Philadelphia (1968:Q4–2011:Q3)**
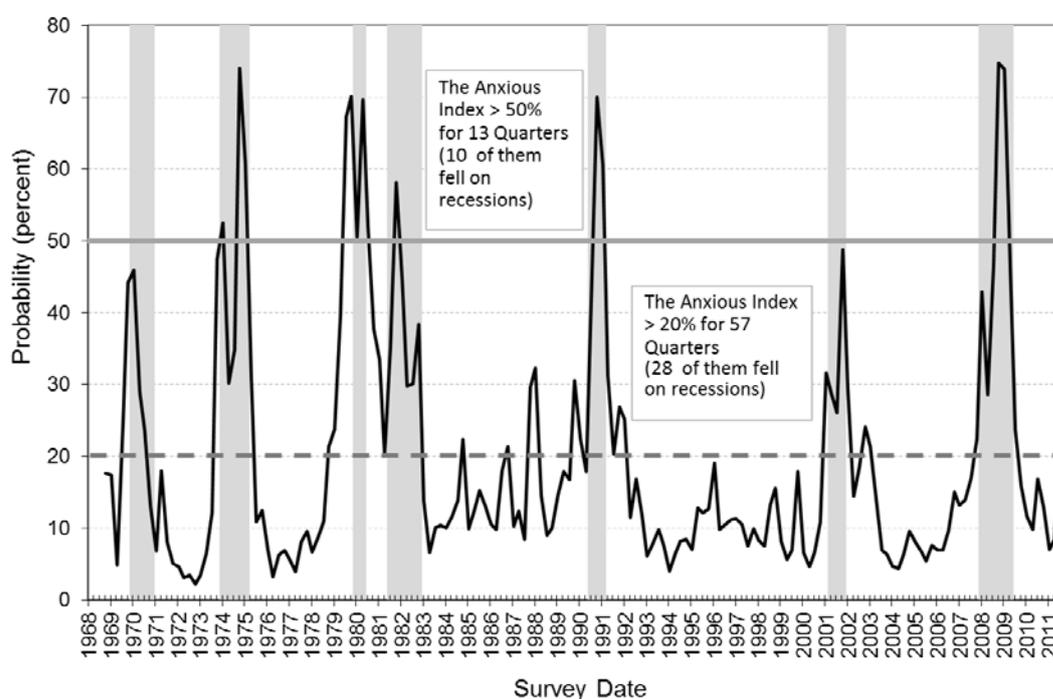


Note: "Anxious Index" is a probability of decline in real GDP in the following quarter. Source: FRB of Philadelphia.

# 6. Conclusions. Predicting of turning points: could and would it be fully non-subjective?

'Historical' and 'real-time' dynamics of business cycle indicators are two different things. While all producers of cyclical indicators would ever seek to improve their indicators' 'historical' quality (and this is quite natural), only monitoring of a recession in a real time – as a crash test for automobiles – would reveal the proper worth of different indicators. With satisfaction, we may state that during the 2008–2009 recession, all three cyclical indicators could

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[18] Moreover, the remaining 3 quarters (out of 13) are not randomly distributed: all of them are "around" the short recession of 1980. This means that the ratio may be higher than 1.5.

be really useful in foreseeing turning points in real time: they (or their growth rates) have really changed their trajectories in the opposite direction some months before a turning point. These changes could be effectively caught by "five (minimum) out of six" rule of thumb. The LEI by the Conference Board, the CLIs by OECD, and the PMI by ISM could be quite informative at the threshold of the peak as well as at the threshold of the trough.[19]

The prominent alarm signal (which is not simply a change in direction but a change of a definite steadiness) from cyclical indicators was hardly leading, but rather coinciding. This is not bad, however. Geoffrey Moore in 1950 wrote, 'If the user of statistical indicators could do no better than recognize contemporaneously the turns in general economic activity denoted by our reference dates, he would have a better record than most of his fellows.'[20] Our results confirm that in real time, an alarm signal which is synchronized with an approaching recession is the 'maximum' which one could hope for. On the other hand, it means that not only leading but also coincident cyclical indicators may be suitable for turning points detection in real time.

One of the main reasons for experts' delays in peaks recognition is their psychological "dependence" on GDP statistical news-releases. Almost nobody among experts believe in Okun's rule of two quarters of decline in real GDP *in theory* but many of them adapt their diagnosis for this rule *in practice*. But GDP has quarterly (not monthly) frequency and long publications lags! Hence, any business or political decision based on GDP would rather be delayed. Even if the 2Q rule would be ideal in historical retrospective it is far from ideal in real time.

In any case, between the moment of 'technical' calculation (and publication) of a cyclical indicator and the moment of an expert's diagnosis of a turning point (especially of a peak) some gap will always exist. Interestingly, not only in historical perspective but also in real-time, leads before peaks are usually longer than leads before troughs but the recognition of peaks is obviously more difficult and a more time consuming process than recognition of troughs. A hypothesis of a 'wishful bias' crosses one's mind as an explanation for this phenomenon: most of private experts don't want to become a messenger of bad news. On the other hand, lags for the NBER's announcements are larger for troughs, not for peaks: in the NBER's loss-function the weight of an improper dating of a trough is obviously more than that of a peak. It's evident from all this that the forecasting of turning points is dependent not only on 'objective' data and methods but rather on 'subjective' conclusions of experts and/or decision makers with their own

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[19] Our analysis tells us that the trust for the critical 50% level of PMI as an adequate indicator for an increase or decrease of manufacturing sector (or 42.5% for the USA economy as a whole) is unwarranted. The 2008-2010 history showed that the existence of a definite and prolonged *tendency* of PMI – aside its absolute level - is an important factor *per se*.

[20] See [Fels and Hinshaw, 1968], p.47. This unpretentious aim was approved by many scholars of authority (e.g.: [Moore, 1961], [Fels and Hinshaw, 1968], [Greenspan, 1973], [Chaffin and Talley, 1989], [Koenig and Emery, 1991], [Koening and Emery, 1994], [Lahiri and Wang, 1994], [Layton, 1997], [Fintzen and Stekler, 1999], [Layton and Katsuura, 2001], [Peláez, 2005], [Hamilton, 2010]).

internal loss-functions. As [Berge and Jordà, 2011] wrote: "Agents facing different preferences and constraints will make different decisions from the same reading of an index"(p. 275).

Evidently, some "wishful bias" in forecasted probabilities of a recession exists. On the average it is equal to 1.5–2.5: if the "anxious index" for the SPF by FRB of Philadelphia is equal to 20% one may understand that the real probability is around 50%; if the "anxious index" is greater than 50% in reality the probability of recession is 75% and even more. Of course, this is true "on average". Some individual forecasters are more accurate, others are less. In any case we may ask a question: what is the nature of turning points forecasting? One may say it's a product of art [Jordà, 2010]], others may seek for formal procedures ([Leamer, 2008] and many others). We believe even the best formal procedures are only instruments for experts with all their experiences and intuitions.

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# Appendix

**Chart A**

**The USA Cyclical Indicators and Their Y-o-Y % Changes (Differences) as They Were on the Threshold of the Peak of December 2007**
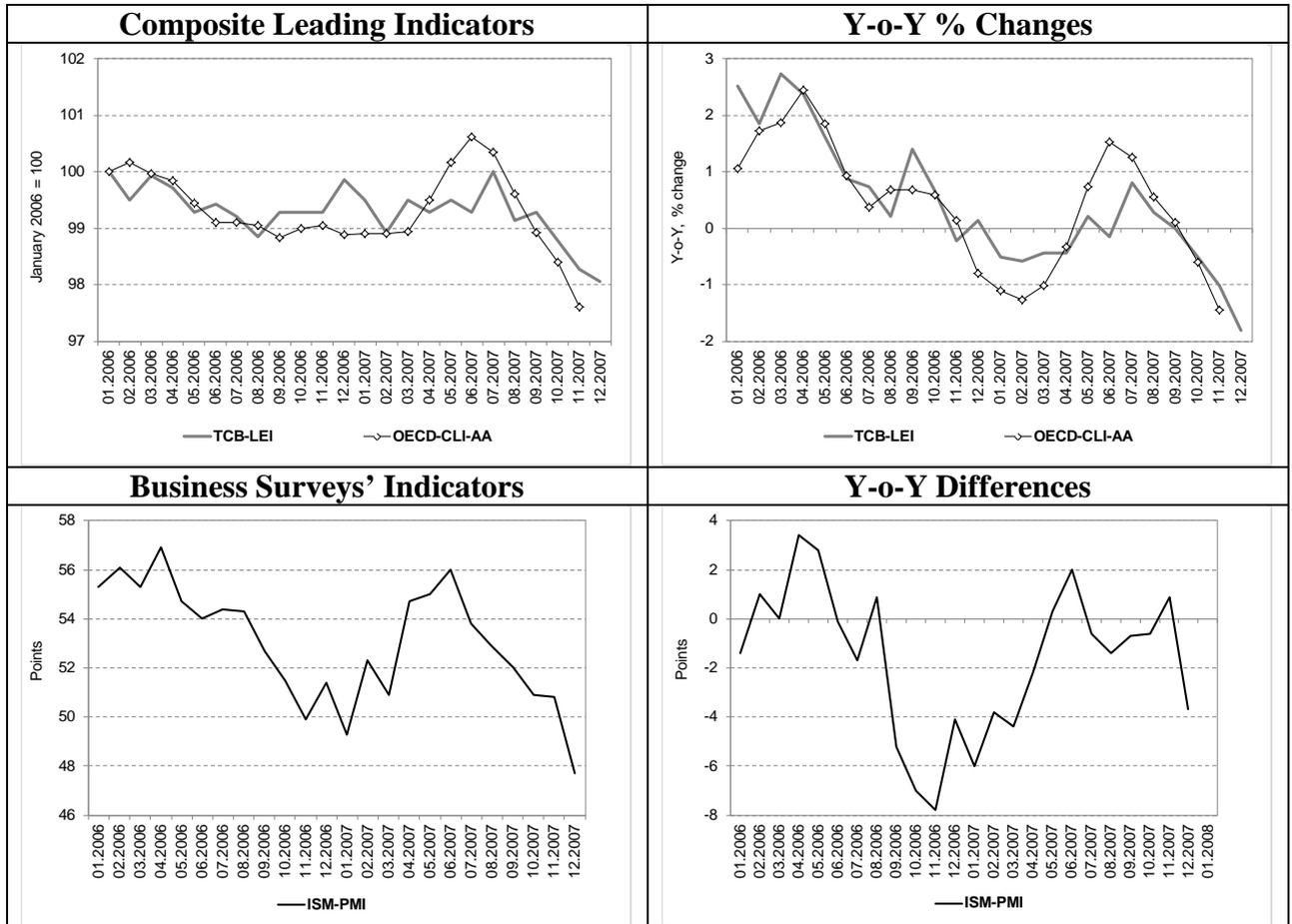


Sources: The Conference Board (TCB); Institute for Supply Management (ISM); OECD.

**Chart B**

**The USA Cyclical Indicators and Their Y-o-Y % Changes (Differences) as They Were on the Threshold of the Trough of June 2009**

| Composite Leading Indicators | Y-o-Y % Changes |
|---|---|
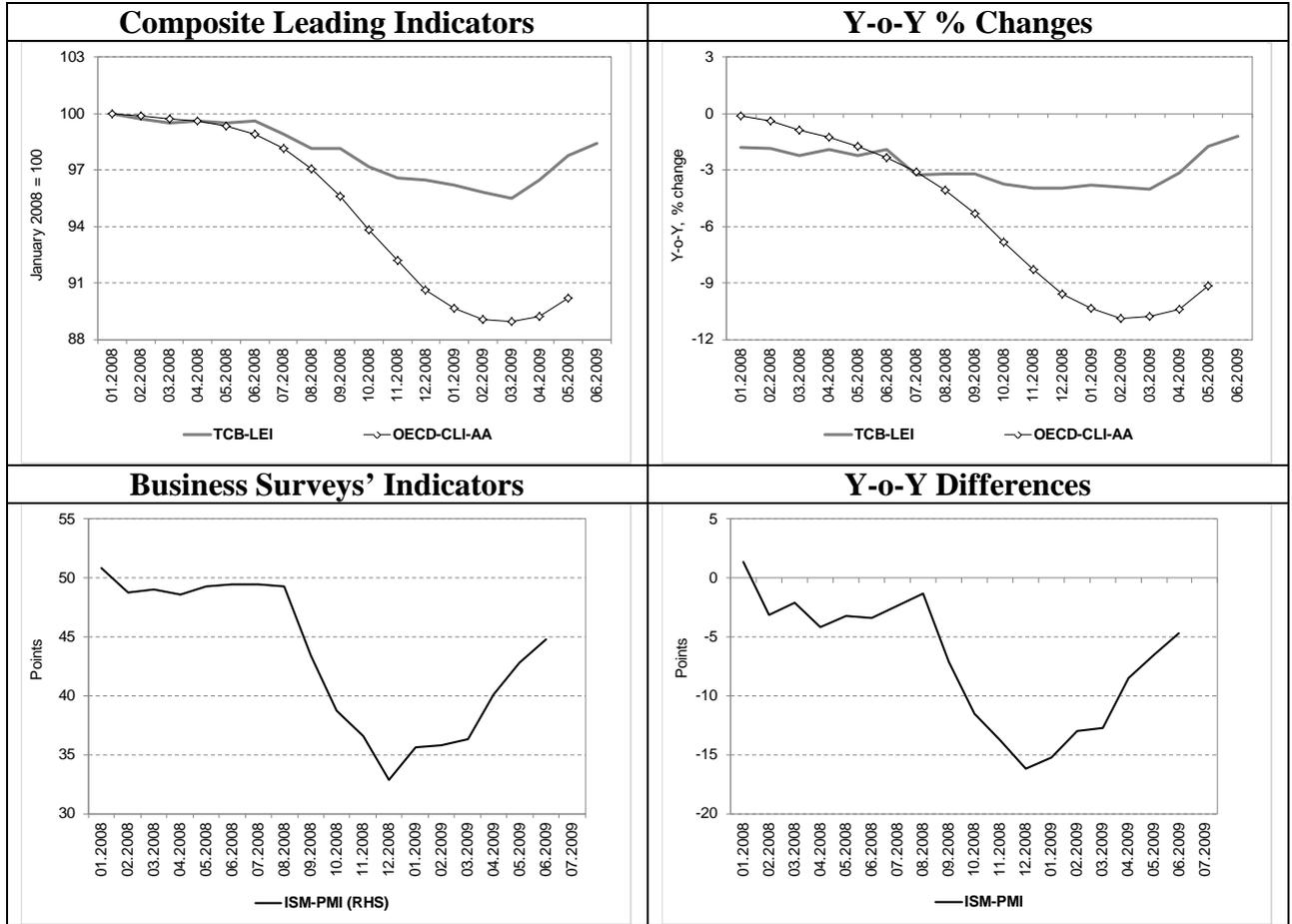


Sources: The Conference Board (TCB); Institute for Supply Management (ISM); OECD

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