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**DISCERNING ‘TURNING POINTS’
WITH CYCLICAL INDICATORS:
A FEW LESSONS FROM ‘REAL TIME’
MONITORING THE 2008–2009 RECESSION**

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The cyclical indicators approach has been used for decades but the last recession has once more rekindled an interest for them throughout the world. Several new techniques and indicators were introduced in recent years but the actual quality of these ‘newcomers’ was not well established. During the last recession, performance of such ‘veterans’ as indexes by The Conference Board, ECRI, ISM, PhilFed, OECD, etc. has also not been checked in a comprehensive and comparable manner. Another problem with cyclical indicators is that their usage in real time has not yet been fully clarified. Contemporary global economic life is measured in days and hours, but most common economic indicators have inevitable lags of months and sometimes quarters (GDP). Is it possible for a leading indicator (which is monthly in most cases) to be timely? 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? What does the experience of the last recession tell us in this regard? This paper answers these questions for the USA as well as for Russia.

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1. Introduction. The 2008–2009 recession as a ‘crash-test’ for various leading indicators

The cyclical indicators approach has been used for decades since [Burns & Mitchell, 1946] but in the wake of the last recession, the interest for it has been rekindled all over the world. Just for the USA alone, several new techniques and indicators were introduced in the past years (see, for example, [Evans et al., 2002], [Crone, 2006], [Chuavet and Hamilton, 2006], [Chuavet and Piger, 2008], [Novak, 2008], [Aruoba et al., 2009], [Wildi, 2009], [Stock and Watson, 2010b]) but the real quality of these ‘newcomers’ was not well established. During the last recession, the performance of such ‘veterans’ as indexes by The Conference Board, ECRI, ISM, PhilFed, OECD, etc. has also not been validated in comprehensive and comparable manner.

Another problem with cyclical indicators is that their usage in real time has not yet been fully clarified. Contemporary global economic life is measured in days and hours, but most common economic indicators have inevitable lags of months and sometimes quarters (GDP). Is it possible for a leading indicator (which is monthly in most cases) to be timely? 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? What does the experience of the last recession tell us in this regard?

To answer this question we have to examine a series of more narrow ones. Among them: was the last recession expected? Did the leading indicators really give signs of the beginning and (separately) the end of the recession in advance? Why could the experts hardly recognize the turning points in real time? Could and would a turning points’ forecasting be entirely objective?

In our paper all of the problems are examined for two countries: Russia and the USA. Originally, we started our research with Russia¹ and then added the USA as a country which is more traditional and more vital for business

¹ See [Smirnov, 2010a] and [Smirnov, 2010b].

experts and academics. Such ‘doubling’ of analyses allows us to get more broad and convincing conclusions.

In Section 2 we cite some officials – just to remind of the situation as it was on the eve of the recession. The methodological approaches to detecting turning points in real time are discussed, the literature is surveyed and a simple ‘rule of thumb’ for comparisons of various cyclical indicators is suggested in Section 3. Then, we take a look at whether the cyclical indicators gave signals in advance in the USA (Section 4) and in Russia (Section 5). In Section 6, we ascertain a gap between indicators’ signals and experts’ diagnosis (especially in their recognition of the recessions) and discuss the reasons for it. In final Section we make the conclusions.

2. Was the last recession expected?

The USA: unexpected financial turbulence followed by unexpected contraction of real economy

If one should look at 2007 from the current moment in time he will easily see the signals of a forthcoming crisis. There were two most prominent signs: a) permanently (since the beginning of 2006) decline of the real-estate market; and b) negative (since July 2006) spread between long-run and short-run interest rates. Right now one could say that the last means that there were some important investors who had begun to prepare their portfolios for a serious recession. But at the moment the common point is different. The majority of politics, businessmen, and experts thought that the fall of the real-estate was only a correction at a local sector, and negative interest spread was attributed to the heightened demand from China and oil-exporters countries for long US government bonds (those countries really needed such an instrument to sterilize their huge positive trade balance).

So one should not be too surprised that the financial turmoil which came from sub-prime mortgages market was unexpected on the part of Federal Reserve. It can be seen quite well from the comparison of three successive FOMC statements released during only ten days in August 2007:

FOMC statement, August 7, 2007: “...[T]he economy seems likely to continue to expand at a moderate pace over coming quarters, supported by solid growth in employment and incomes and a robust global economy...

The Federal Open Market Committee decided today to keep its target for the federal funds rate at 5–1/4 percent”.

FOMC statement, August 10, 2007 (three days later): “In current circumstances, depository institutions may experience unusual funding needs because of dislocations in money and credit markets... The Federal Reserve will provide reserves as necessary through open market operations... at rates close to the Federal Open Market Committee’s target rate of 5–1/4 percent”.

FOMC statement, August 17, 2007 (seven more days later): “Financial market conditions have deteriorated, and tighter credit conditions and increased uncertainty have the potential to restrain economic growth going forward. In these circumstances, although recent data suggest that the economy has continued to expand at a moderate pace, the Federal Open Market Committee judges that the downside risks to growth have increased appreciably”.

But despite all this deterioration in financial markets, the Federal Reserve avoided lowering its target for the federal funds for over a month – until September 18. At that time, the Federal Reserve made its first step in a long run of its anti-crisis decisions and lowered the rate by 50 basic points. The reasoning behind it was the following:

FOMC statement, September 18, 2007: “Economic growth was moderate during the first half of the year, but the tightening of credit conditions has the potential to intensify the housing correction and to restrain economic growth more generally. Today’s action is intended to help forestall some of the adverse effects on the broader economy that might otherwise arise from the disruptions in financial markets and to promote moderate growth over time”.

As one may see, the Federal Reserve still hoped to fix the financial turbulence without allowing it to wound the real economy. One would also remember that Dow Jones touched its historical maximum during the session on October 11, 2007. It means that it was not just the Federal Reserve that was so optimistic! And even a quarter later, in January 2008 Federal Reserve insisted:

FOMC statement, January 22, 2008: “Today’s policy action (lowering of the federal fund rate by 75 basic points. – S.S.), combined with those taken earlier, should help to promote moderate growth over time and to mitigate the risks to economic activity.”

It is now well known that the Great Recession begun at that moment while the Federal Reserve still hoped “to promote moderate economic growth over

time”. So the contraction in real sector was quite unexpected by policy makers in the USA, wasn’t it?

Russia: “a haven of stability”

On January 23, 2008 just one day after the mentioned Federal Reserve’s decision, Alexei Kudrin, the Russian Finance Minister, easily admitted to the ‘global crisis’ but refused any risk for Russian economy in his interview which was taken during the World Economic Forum in Davos. He said:

“In the past few years, Russia has managed to achieve economic stability piling up substantial international reserves, which play the role of an air-bag. I believe Russia will soon be the focus of attention as a haven of stability... As a country with substantial reserves, Russia could help soothe the global crisis” (World Economic Forum in Davos, January 23, 2008; <http://en.rian.ru/russia/20080123/97602999.html>).

Andrei Klepach, Russian deputy economy minister, was the first official who recognized the beginning of the recession in Russia. On December 12, 2008 (almost three months after Lehman Brothers bankruptcy!) he said:

“The recession has already begun and, I’m afraid, it won’t end in two quarters” (http://rbth.ru/articles/2008/12/15/151208_recession.html).

As the recession was confessed three months after it had started it was unexpected by policy makers, wasn’t it?

3. Data and methods

Using cyclical indicators in real-time: statement of the task

Of course policy makers’ optimism may be attributed to their fears of self-realized forecasts (economic agents may reduce their activity being guided just by ‘official’ predictions and hence the recession scenario would be realized). But what did the existing cyclical indicators show on the eve of the crisis? Were there signs of recession visible in advance or not? The answer to this question is not as simple as it seems, because these 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.

Statistical methods used for detecting turning points: a survey

There were tens of resourceful researches devoted to cyclical turning points dating and prediction. We'll only enumerate a few formal methods which have been applied to this problem:²

- Regression analyses: [Alexander and Stekler, 1959], [Hymans, 1973], [Stekler and Schepsman, 1973], [Vaccara and Zarnowitz, 1978], [Wecker, 1979], [Auerbach, 1982], [Kling, 1987], [Huh, 1991], [Stock and Watson, 1992], [Broyer and Savry, 2002], [Stock and Watson, 2003], [McGuckin and Ozyildirim, 2004], [Kholodilin and Siliverstovs, 2006], [Nilsson and Guidetti, 2008];
- Spectral analyses: [Hymans, 1973], [Sarlan, 2001];
- Dynamic factor model: [Stock and Watson, 1989], [Huh, 1991], [Stock and Watson, 1992], [Diebold and Rudebush, 1996], [Kim and Nelson, 1998], [Matheson, 2011];
- Principal components: [Stock and Watson, 1999], [Evans et al., 2002], [Stock and Watson, 2002];
- VAR in its various modifications: [Canova and Ciccarelli, 2004], [Dueker, 2005], [Galvão, 2006], [Paap et al., 2009], [Dueker and Assenmacher-Wescheb, 2010];
- Macroeconomic models: see [Watson, 1991], [Del Negro, 2001];
- Various statistical “diagnostics” rules adopted from engineering, informatics, biology, medicine and other sciences (even from earthquakes forecasting): [Neftci, 1982] and the followers ([Palash and Radecki, 1985], [Diebold and Rudebush, 1989], [Huh, 1991], [Koenig and Emery, 1994], [Diebold and Rudebush, 1996]);³ [Mostaghimi and Rezayat, 1996]; [Birchenthal et al., 1999]; [Keilis-Borok et al., 2000]; [Qi, 2001]; [Andersson et al., 2004], [Andersson et al., 2006]; [Wildi, 2009]; [Berge and Jordà, 2011];
- Markov regime-switching models: [Hamilton, 1989], [Lahiri and Wang, 1994], [Hamilton and Perez-Quiros, 1996], [Layton, 1996], [Layton, 1998], [Layton and Katsuura, 2001], [Koskinen and Öller (2004)], [Chauvet and Piger, 2003], [Chauvet and Piger, 2008], [Levanon, 2010];

² We tried to list the references for each group in their chronological order but scarcely the task is solved without drawbacks and omissions.

³ See also critics of assumptions of Neftci's method in [Emery and Koenig, 1992].

- Various modifications of probit and logit models:⁴ [Nazmi, 1993], [Mostaghimi and Rezayat, 1996], [Estrella and Mishkin, 1998], [Birchenhall et al., 1999], [Chin et al., 2000], [Layton and Katsuura, 2001], [Dueker, 2002], [Chauvet and Potter, 2002], [Peláez, 2005], [Leamer, 2007], [Novak, 2008], [Kauppi and Saikkonen, 2008], [Harding and Pagan, 2010];
- Many other more or less formal methods as well as their combinations: [Jun and Joo, 1993], [Anderson and Vahid, 2001], [Sephton, 2001], [Carmacho and Perez, 2002], [Price, 2008].

As recessions are very rare events, it's difficult to estimate parameters by traditional statistical methods. And more: all these methods usually need a long statistical time-series and some 'true' set of peaks and troughs for historical 'learning period' to estimate parameters of the models. These assumptions are more or less fulfilled for the USA with their high quality statistics and the NBER's conventional list of business cycle turning points.⁵ In many other countries (especially in emerging countries and Russia in particular) the quality of statistics is much worse and there are no common views on dating of cyclical turning points. But even for the USA the situation is not entirely clear. In most cases the 'in-sample' results for such 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. For the USA we know: [Evans et al., 2002] (based on [Stock and Watson, 1999] and

⁴ Usually the probability of a *recession* is an output of such models (as well as markov regime-switching models and many others). But in [Nazmi, 1993] and [Lahiri and Wang, 1994] the probability of expansion is estimated.

⁵ Usually the NBER's dating of turning points is considered indisputable. As far as we know only [Stock and Watson, 2010b] and [Berge and Jordà, 2011] have studied the validity of this dating by statistical procedures.

[Fisher, 2000]); [Chauvet and Hamilton, 2005]; [Chauvet and Piger, 2008]; and [Wildi, 2009]. For Russia it is [Smirnov, 2006].

Rules of thumb: a survey

In practice, an expert observes a wide spectrum of cyclical indicators. One of them is constructed as an ‘optimal’ in some statistical sense; others summarize the information from Business Tendencies Surveys (BTSs); and third are completely empirical (like most of composite leading indicators), etc. If an expert intends to compare their behavior in real time and to reveal the ones which are possibly useful – for decision makers in highly uncertain situation with unknown (‘open’) date of the successive turning point – he has no other way but to analyze very simple statistical measurers of those indicators and then to apply to them some rule of thumb.

Those measures found in literature are: a) changes in an indicator’s level over a time span (one or several months, quarters, etc.); this is the most common way; b) diffusion indexes or dispersions of components of the composite indicators (this approach is typical for more early papers: [Moore, 1954], [Broida, 1955], [Alexander, 1958]; see also [Harris and Jamroz, 1976], [Chaffin and Talley, 1989], [Dasgupta and Lahiri, 1993]; [Novak, 2008]; recent papers [Stock and Watson, 2010a] and [Stock and Watson, 2010b] with their ‘heat charts’ also belong to this tradition).

As we decided to stint ourselves to only analyze the aggregated indexes and not their components we looked at the changes measures. The rules of thumb proposed before are:

- Two consecutive quarters of GDP decline (2Q or “Okun’s rule”). Many have investigated this popular rule and remained unsatisfied (see: [Watson, 1991]; [Boldin, 1994], [Camacho and Perez, 2002], [Leamer, 2008], [Jordà, 2010], [Harding and Pagan, 2010]);
- Decline after N-month (quarters) span⁶: [Alexander and Stekler, 1959]: N from 1 to 7; [Vaccara and Zarnowitz, 1978]: 6 months span decline; [McNees, 1987]: a half a year decline;
- Two, three, four, etc. months of *consecutive* decline of a cyclical indicator (2CD, 3CD, 4CD). See: [Vaccara and Zarnowitz, 1978], [Keen, 1983],

⁶ By the N-th month the index has at least returned to the level of N months earlier.

[Palash and Radecki, 1985], [Koenig and Emery, 1991], [Del Negro, 2001], [Tanchua, 2010], and others;⁷

– Various kindred rules: [Keen, 1983]: “two consecutive months of negative and *decelerating* growth”⁸; [Palash and Radecki, 1985]: “a *peak* for two or more subsequent months”; [Koenig and Emery, 1991]: “the percentage difference between the current value of the CLI and its maximum value over the preceding twelve months”; “the percentage gap between the current value of the CLI and a twelve-month moving average of past values”;⁹

– ‘Accumulated’ measures: [Boldin, 1994]: three-out-of-four months of decline; [Filardo, 1999]: four out of five months; [Altissimo et al., 2010]: the percentage of synchronous movements (movements in the same direction) for a target indicator and predictors of this indicator;¹⁰

– The “3-D” rule: the duration – depth – diffusion for recent moments in comparison with their historical “standards” (see [The Conference Board, 2001]);¹¹

– Other thresholds’ rules, e.g.: 50% for PMI; 0% for PhilFed; 50% for some probabilities of recession; –0.7 for the Chicago Fed National Activity index,¹² etc.

The main shortcomings of the most popular rules are well known. All quarterly rules are not suitable for real-time analyses simply because of low frequency and large publication lags. ‘The number of consecutive months of decline (NCD)’ rules generate false signals too often if $N = 2$ or 3 (especially for Russian economy with its high volatility); more prolonged periods of uninterrupted decline (growth) are very rare, and hence this rule may generate a lot of missed turning points. At last, 3D (duration – depth – diffusion) rule is not applicable to our multi-countries and multi-indicators real-time analyses because of: a) short history of many “new” leading indicators (for the USA

⁷ The rule of two consecutive months of “high” probability of the recession was offered in [Jun and Joo, 1993], [Nazim, 1993] and [Chauvet and Piger, 2008].

⁸ Statistical data on growth rates for three consecutive months are needed to be aware that those rates have declined at decelerating rates for two consecutive months.

⁹ [Zarnowitz and Moore, 1982] supposed to monitor sequential signals of recession and recovery generated by a pair of indexes – leading and coincident growth rates. It’s a good idea, but it had no followers for thirty years!

¹⁰ In general form this non-parametric measure of synchronization was introduced in [Pesaran and Timmermann, 1992].

¹¹ Strictly speaking the “3-D rule” requires: a) the six-month growth rate (annualized) of the CLI to fall below –3.5; and b) the six-month diffusion index to be lower than 50 percent. But all the figures (–3.5%, 50%, 6 months) are retrieved from historical dynamics!

¹² See [Brave, 2009].

as well as for Russia); b) relatively frequent methodological revisions for some "old" indicators; and also c) short history of business cycles movements *per se* (of course we mean Russia in this context). All these factors hamper statistical estimation of thresholds for each "D".

Our 'rule of thumb'

As it was stated above, we need to extract the middle-run changes in the trajectory (changes in cyclical wave) resting upon only a few observations. Many authors suppose (and we agree), that the minimum time span that is required before we may speak about cyclical decline (growth) is 6 months. 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 $7/64 = 11\%$.

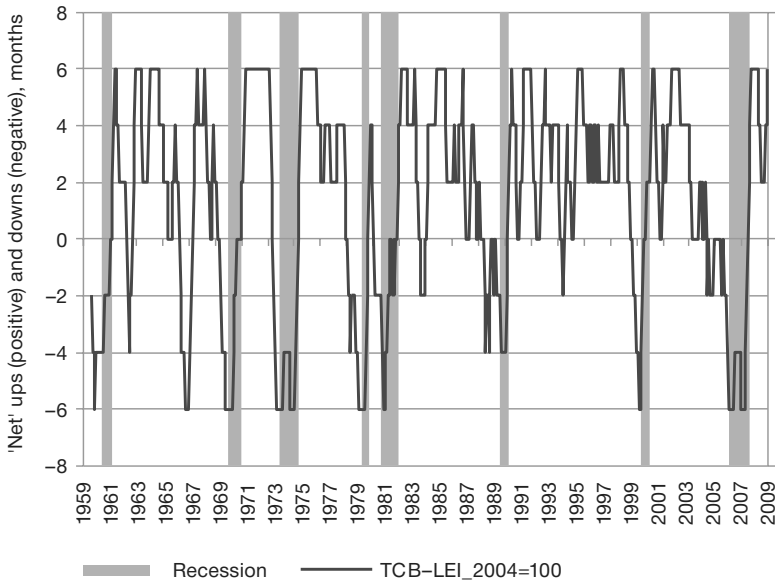
In more formal terms, we may say that in testing a null-hypotheses of no change in trajectory (with an alternative hypothesis of negative/positive tendency) by our "five (minimum)out of six" rule we have a probability of Type I error (erroneous rejection of null hypothesis or a false turning point) equal to 11%. It's only slightly more than the usual threshold in statistical check of hypothesis.¹³

For the subsequent comparisons, we decided to count a 'net' number of months (from a 6 month span) when a cyclical indicator changed in 'proper' direction ('down' before a peak and 'up' before a trough). If an indicator drops during all six last months it equals to -6 ; if it drops five times and rose only

¹³ Incidentally, we may calculate probabilities of false turning point for various NCD rules. For $N = 2$ it is equal to $1/2^2 = 25\%$; for $N = 3$ it is equal to $1/2^3 = 12.5\%$; and for $N = 4$ it is equal to $1/2^4 = 6.25\%$. Obviously the 2CD rule will give a lot of false signals. It is less obvious for 3CD and 4CD rules but in any case those rules are not sufficient because of their short time spans.

once to -4 ; if there are four downs and two ups to -2 , etc. It may be easily shown (see Chart 1) that such an index really pertains to the NBER's history of business cycles. For example, as concerns for the Leading Economic Indicator (LEI) by The Conference Board each recession of the last half century was evidently accompanied by a slump of the score of the LEI to minus 4 or even less.¹⁴

Chart 1. 'Net' number of Months (from a 6 months span) with ups or downs



Though the charts for other cyclical indicators are not so good in the long-run, we want to compare different cyclical indicators by this criterion for their movements during the 2008–2009 recession – as it looked in real time. We assumed 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.

¹⁴ One must also pay attention to ‘false’ signals in 1962 and 1966 which were accompanied by a sharp decline in real GDP *growth rates*. Sometimes they were treated as true recessions (see [Palash and Radecki, 1985, p. 39]). There also were extensive stabilization measures undertaken at those moments (see [Shiskin, 1970, pp. 108–109]).

Peaks and troughs

According to an old tradition, the turning points (peaks and troughs) for the USA business cycles are defined and announced by the NBER's Business Cycle Dating Committee. This process has very long lags. For example, the peak of December 2007 was announced only in December 2008 (12 months later) and the trough of June 2009 – only in September 2010 (15 months later). One must agree that these are not in 'real time'.

Fortunately we do not have to date a turning point in real time but rather to predict an inevitable approach of such turning point (in fact, leading indicators are usually constructed with this idea in mind). It means, that for our research we have to compare the behavior of various cyclical indicators – according to their historical vintages – in some suburb of turning points as they are dated now (!) by NBER's committee. It could be said that an expert or a decision maker does not need an index which leads to some other index – maybe 'coincident' but subject to several revisions in the future – but an index which makes it possible to predict the approaching of a turning point which would be approved at some point in the future. That is why we used December 2007 and June 2009 for our comparisons (the peak and the trough of the last American cycle as dated by NBER). We suppose that various cyclical indicators had to point to an imminent turn of the economy but we don't strive for the exact dating of those turning points.

As far as Russia is concerned, there is no common procedure for dating turning points. For this paper we defined May 2008 as a peak and May 2009 as a trough for the last Russian recession resting upon the dynamics of quarterly GDP and the monthly 'basic branches' coincident index.¹⁵ In addition to the peak we suggest to consider the brink in September 2008: only after the Lehman Brothers' bankruptcy in the middle of the month, Russian economy finally dropped into a deep recession.¹⁶

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-

¹⁵ Weighted average of physical output indexes for industry, agriculture, construction, transportation, retail trade, and wholesale trade.

¹⁶ One may find more details for our dating procedure in Appendix 3.

time (with preliminary data) and quite a different one – in historical retrospective (with revised data and adjusted methodology). This problem is well known; it was dealt with from time to time by various authors (e.g. see: [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, 2010] and others). 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). Our aim here is to check the real-time qualities of several cyclical indicators during the last recession; this way we are not interested in their historical merits as they look now.

We couldn't investigate all historical data vintages and all the movements of all available cyclical indicators. This procedure would be too costly and time-consuming. Rather, we analyzed only those time-series (vintages) which had corresponded to the moments of cyclical turning points. Of course, in real time nobody knew that the economy is just around the corner. But did the indicators tell us that this change is approaching? In other words, our aim would not be to predict the exact moment of a turning point in real time, but rather to reveal a change of cyclical trajectory to the opposite direction.

4. Did the leading indicators give signals in advance in the USA?

Leading indicators for USA economy

There are a lot of cyclical indicators for the USA based on very different concepts and techniques. For the surveys of their behavior during various American business cycles one may see: [Alexander, 1958], [Hymanis, 1973], [Stekler and Schepsman, 1973]; [Stock and Watson, 1989]; [Emery and Koenig, 1992], [Nazmi, 1993], [Boldin, 1994], [Lahiri and Wang, 1994], [Mo-

staghimi and Rezayat, 1996], [Filardo, 1999], [Birchenhall et al., 1999], [Del Negro, 2001], [Diebold and Rudebush, 2001], [Filardo, 2004], [Peláez, 2005], [Chauvet and Piger, 2008], [Harding and Pagan, 2010], [Hamilton, 2010], [Levanon, 2010], [Berge and Jordà, 2011]. Usually, the LEI (Leading Economic Indicator) by The Conference Board (or its predecessors) were the focus of researchers' attention. ECRI's coincident, leading and long-leading indicators were studied in: [Layton, 1996], [Layton, 1998], [Layton and Katsura, 2001]. The cyclical properties of PMI by ISM (previously named NAPM) were analyzed in: [Torda, 1985], [Harris, 1991], [Dasgupta and Lahiri, 1993], [Estrella and Mishkin, 1998], and especially in [Koenig, 2002]. One may also see [Nakamura and Trebing, 2008] for PhilFed usefulness; [Novak, 2008] for State coincident index; [Nilsson and Guidetti, 2008] for OECD CLI; [Brave, 2008], [Brave, 2009] and [Brave and Butters, 2010] for Chicago Fed National Activity Index.

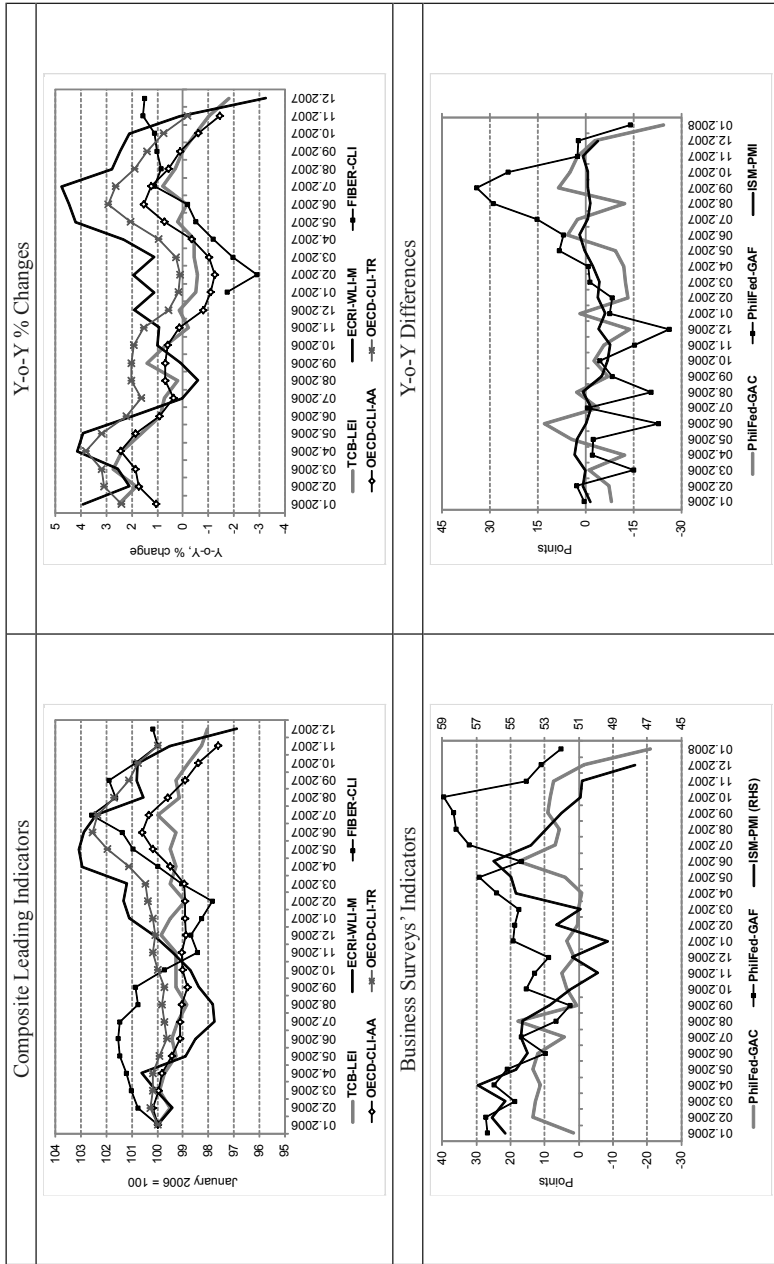
For our purposes, we chose more than a dozen well-known and regularly available indicators (see Appendix 1). Almost all of them are monthly. There are only two exceptions in our list: first, daily Aruoba-Diebold-Scotti (ADS) index, and second, Weekly Leading Index (WLI) by ECRI. For comparability with other indicators we took ADS index for the last day of each month and WLI for the last week of each month.¹⁷

Predicting the 'peak' of December 2007

'Real-time' picture for all selected indicators on the eve of the recession is shown on Chart 2 and most general notes are summarized in Table 1. The preliminary conclusions are quite obvious. The most well known coincident (not leading!) indicators based on business surveys' (ISM-PMI and PhilFed-GAC) as well as less known (and also coincident) state diffusion index (PhilFed-StateDII) and National Activity index by ChicagoFed (CFNAI-MA3) gave the most drastic signal for the economical drop in real time. Three composite leading indexes (by OECD, ECRI and The Conference Board) also gave strong reasons for anticipations of decline. At last, the new indicator by Marc Wildi – which had not been introduced at the moment – could clearly point to the recession. All other indicators gave little ground for predicting a recession at its very threshold.

¹⁷ ECRI also has a monthly composite leading index but it is not available for non-subscribers.

Chart 2. The USA Cyclical Indicators and Their Y-o-Y % Changes (Differences) as They Were on the Threshold of the Peak of December 2007



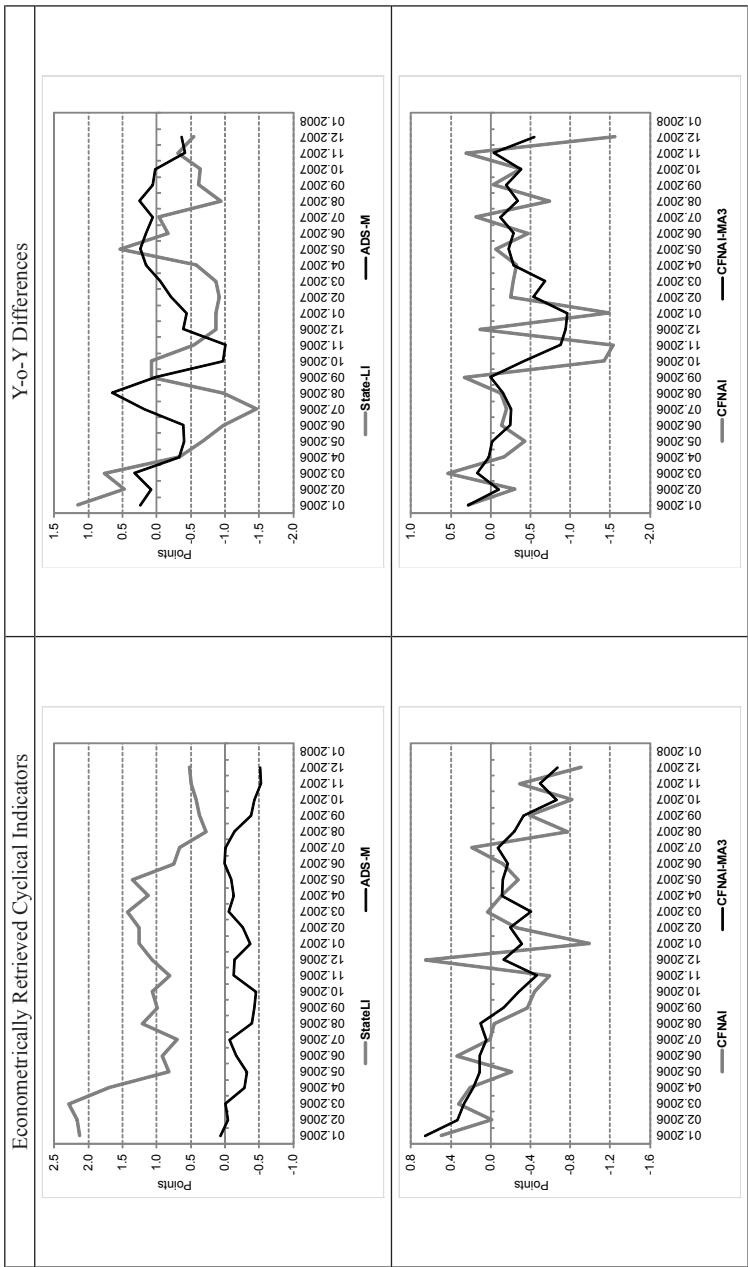
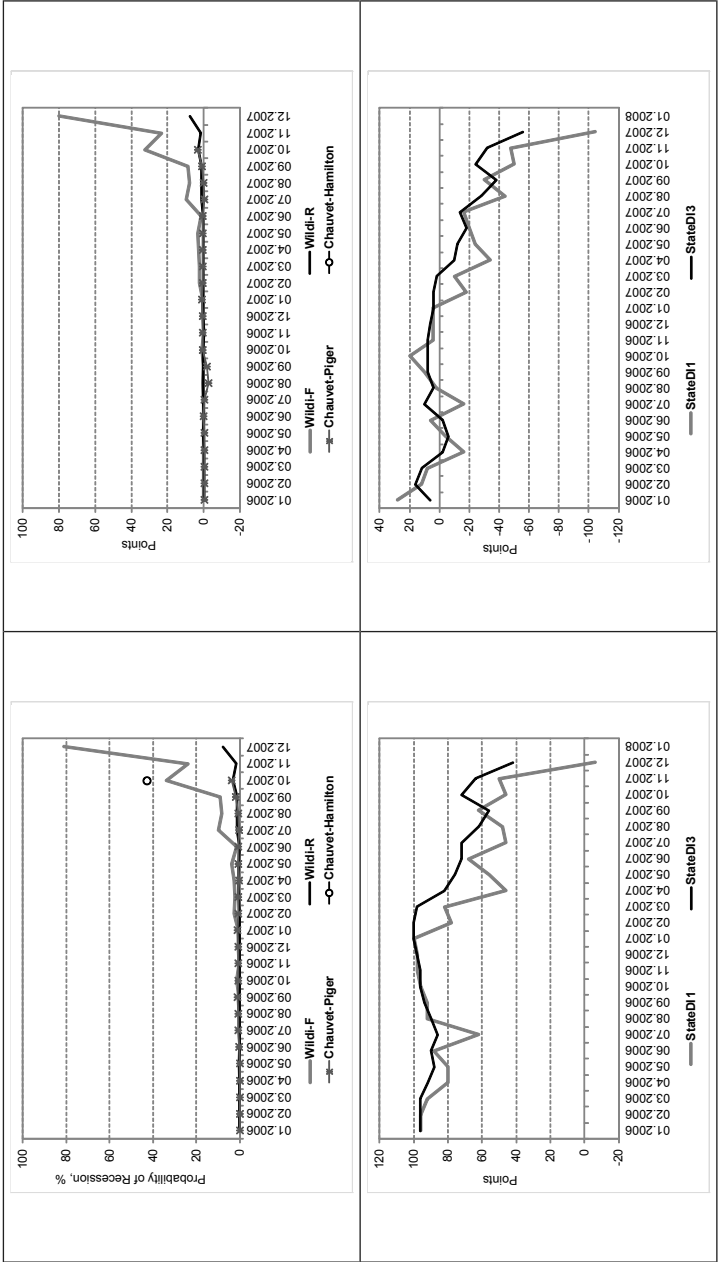


Chart 2 continued



Note: See Appendix 1 for sources and comments.

Table 1. The USA: 'Net' Score of Ups and Downs on the Threshold of the Peak of December 2007 (a 6 months span)

Indicator	Date of release	Initial Index		Y-o-Y		Anamnesis
		R-T	R	R-T	R	
Composite Leading Indicators						
TCB-LEI	18.01.08	-2	-4	-4	-4	The real-time net score for the initial TCB-LEI is not too impressive; for the Y-o-Y % changes it is more significant. The TCB-LEI dropped below the 'support level' of the two-years flat trend in November-December of 2007.
ECRI-WLI-M	NA	NA	-4	NA	-4	The real-time values of the ECRI-WLI-M are not available to us. The net score for the historical time-series and for their Y-o-Y % changes is quite high. But the declines of the ECRI's index in the second half of 2006 were almost of the same magnitude and no recession following them. Only in December 2007 the index fell below the mid 2006 level.
FIBER-CLI	NA	NA	0	NA	+2	Real-time values of the FIBER-CLI are not available to us. The net score for the historical time-series is quite low and the net score for their Y-o-Y % changes is, in fact, positive. Despite the FIBER-CLI does have slightly negative dynamics since August 2007 it is not very stable; 2007 levels are still higher than 2006 because of a sharp drop at the turn of 2006-2007.
OECD-CLI-AA	11.01.08	-4	-4	-4	-2	The real-time net score for the OECD-CLI-AA (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.
OECD-CLI-TR	11.01.08	-4	-4	-4	-4	The general picture for the OECD-CLI-TR is the same as for the OECD-CLI-AA but the drop is slightly less visible as the figure for November 2007 is still higher than the ones at the beginning of the year (for OECD-CLI-AA it is lower).
Business Surveys' Indicators						
PhilFed-GAC	17.01.08	-4	-2	-4	-4	The real-time net score for the PhilFed-GAC (as well as for its Y-o-Y differences) is quite high. The sharp drop of the index in January 2008 to the minimum level since 2001 is also very impressive (one additional observation is available for the index if one should compare it with any other indicator except the PhilFed-GAF).

Table 1 continued

Indicator	Date of release	Initial Index		Y-o-Y		Anamnesis
		R-T	R	R-T	R	
						Composite Leading Indicators
PhilFed-GAF	17.01.08	+2	+2	-2	0	This indicator was not very useful for detecting turning points in real time. This means that managers felt fine with their current situation but could hardly predict business cycle's turning points.
ISM-PMI	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.
						Econometrically Retrieved Cyclical Indicators
StateLI	-	NE	+2	NE	0	The StateLI was introduced only in June 2010 so there was no information in real time. Revised time series doesn't give a useful signal about the approaching recession: net score of the StateLI is positive because the index had grown for four months before December 2007. In addition, the StateLI itself remains positive which points to a continuation of economic growth (the StateLI predicts the six-month growth rate of the coincident index).
ADS M-Index	-	-4	0	-2	-2	The ADS index was introduced only in December 2008 so we took the December 5, 2008 release (almost a year after the event) as a 'quasi' real-time data. Net score of the index in December 2007 is quite satisfactory (-4) but a signal for the recession is hardly clear: the ADS index usually fluctuates in the interval [0, -0.5] since February 2006.
CFNAI	22.01.08	0	0	0	0	Although the net scores for December 2007 for CFNAI and CFNAI-MA3 were pure, a 'risky' expert could forecast an approaching recession as the level of the indicator had an evident negative tendency after the end of 2005. On the other side, there were several false signals of recession in the past just around the current levels of CFNAI or CFNAI-MA3.
CFNAI-MA3	22.01.08	-2	-2	0	-2	

Table 1 continued

Indicator	Date of release	Initial Index		Y-o-Y		Anamnesis
		R-T	R	R-T	R	
Composite Leading Indicators						
Wildi-F	-	NE	-2*	NE	-2*	Those indexes (“the probability of a recession in the current month”) were presented by Marc Wildi (ZHAW-IDP Institute) in June 2009. The net scores are not impressive but ‘quasi’ real-time “fast” index gives a strong signal: 81% probability of a recession. Though the ‘reliable’ one is only equal to 8%.
Wildi-R	-	NE	0	NE	-2*	
Chauvet-Piger	01.01.08	-2*	-6*	-2*	-6*	The revised time-series are much better than the real-time estimates. The evident shortage of this indicator is the only available October 2007 figure in January 2008 (not December figure as in almost all other cases). For real-time analyses the two months additional lag is too much.
Chauvet-Hamilton	01.01.08	NA	NA	NA	NA	The real-time series are not available. The revised series begins from October 2007, so it’s not enough to tell anything about predicting quality of this indicator.
StateDI1	26.01.08	0	-4	0	-4	Net score for DI1 and DI3 is not too high in December 2007. However, one may note that the DI1 was below 50% since July 2007. In historical perspective this threshold always lead the peaks dated by NBER.
StateDI3	26.01.08	-4	0	-2	-2	

Notes: * – as the indicator grows with increasing likelihood of a recession, we changed the sign of the net score to the opposite for comparability with other indicators in our table

NA – not available; NE – not exists; R-T – real time (January 2008); R – revision of January 2011. See Appendix 1 for the decryption of indexes’ abbreviations.

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

Four indexes (see Chart 3 and Table 2) gave the most prominent signals for the end of the recession in real time (July 2009). They are: ISM-PMI, ADS M-Index, CFNAI-MA3, and the new indicator by Marc Wildi (WILDI-F). On the other hand, their signals were not indisputable. The ISM-PMI was still below ‘critical’ 50% level (in fact it was even below 45% level); the ADS M-Index had given a sudden leap some months ago (in October 2008) so it was too risky to rely on the index to a full extent; the CFNAI-MA3 was still much lower than the “-0.7 threshold”; and one from the pair of the Wildi’s indexes (WILDI-R) still showed high probability of a recession (94%).

The growth of the index of anticipated business conditions (PhilFed-GAF) was not very stable (net score for a 6 months span is only +2) but was very impressive in its scale (more than 60 points). On the contrary, the index of current business conditions (PhilFed-GAC) which had been quite informative before the recession in the end proved to be practically useless before the recovery.

All composite leading indexes (by OECD, ECRI, The Conference Board, and FIBER) as well as the state leading index (StateLI) by FRB of Philadelphia 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.

5. Did the leading indicators give signals in advance in Russia?

Leading indicators for Russian economy

As cyclical indicators for Russia are less known than for the USA, we compiled a full list of twelve available Russian indexes (see Appendix 2). A brief overview of them suggests that only five are meaningful for evaluation and comparison with each other: one is a ‘classical’ Purchasing Managers’ Index (PMI); three correspond well to ordinary logic of Composite Leading Indexes (CLI); and one is similar to the European Commission’s confidence index. All others are not fully suitable for business cycle monitoring simply because there are no available, comparable, and regularly published monthly figures for them.

Predicting the ‘peak’/’brink’ of February/May/ September 2008

The only indicator which produced a definite signal for the recession in real time was the Purchasing Managers’ Index (PMI) by Markit Economics (see Chart 4 and Table 3). It has declined since February 2008 and after June the negative tendency became quite clear; in August-September Markit-PMI fell below 50, the level which is usually considered as a critical one.

Composite Leading Index (CLI) by Development Center (one of the Russian think-tanks) dropped to the seven-years minimum in September but the recession was doubtful as there was no recession in Russia seven years ago. Industrial Confidence Index (ICI) by Higher School of Economics (HSE) was even worse: the index fell for several months before September but the amplitude of these fluctuations was quite ordinary and gave no reasons to forecast the beginning of a recession.

At last, Composite Leading Indexes (CLI) by OECD was completely useless in real time – both in amplitude adjusted and in trend restored forms. In fact, they rather pointed to a growth, not decline of the economy. Note, that for the revised CLIs the opposite is the case: the OECD’s CLIs in their present state gave the alarm signal not only for September 2008 but for May 2008 also. One may guess that the radical revision of the OECD’s CLI for Russia made in February 2010 (it included a new set of components) was the main cause of the improvement.

One way or another, there was not any indicator which could point to the peak of February/May 2008 in real time.

Russia: predicting the ‘trough’ of May 2009

CLI by DC, PMI by Markit, and ICI by HSE all gave more or less clear signal for the forthcoming trough in real time. The most definite warning came from CLI by DC but PMI by Markit and ICI by HSE were also acceptable. This can’t be said for CLIs by OECD: in real time they rather pointed to a further decline of the Russian economy not to its bottoming. The picture changed significantly after the revision in February 2010, but the question about the usefulness of OECD’s CLIs for Russia is still open (for example the revised indexes did not give proper signals for deceleration of the growth in Summer and Autumn 2010).

Chart 3. The USA Cyclical Indicators and Their Y-o-Y % Changes (Differences) as They Were on the Threshold of the Trough of June 2009

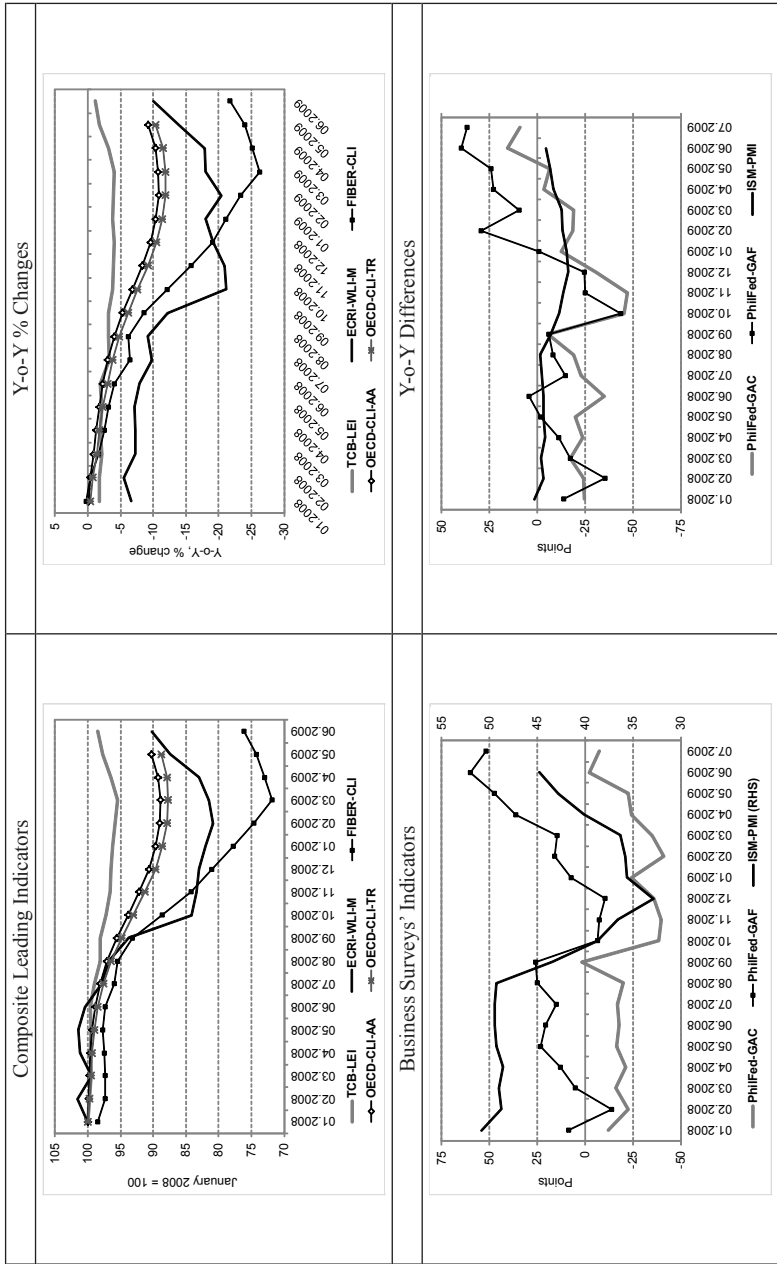


Chart 3 continued

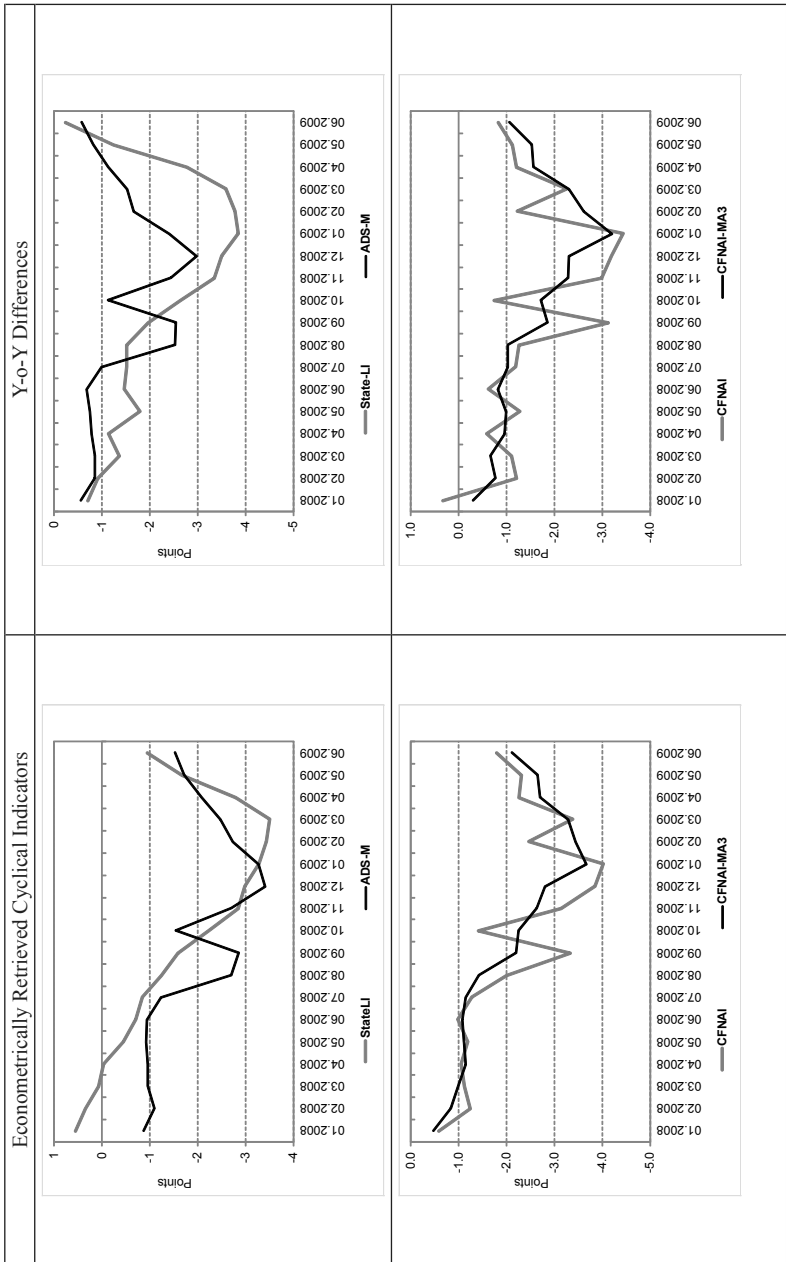
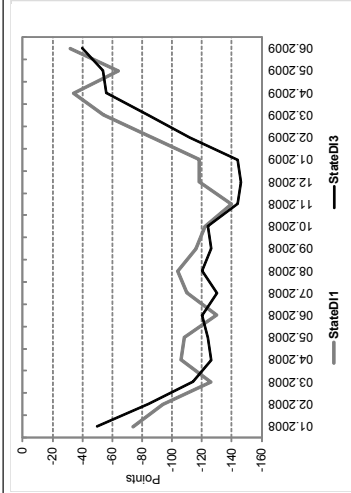
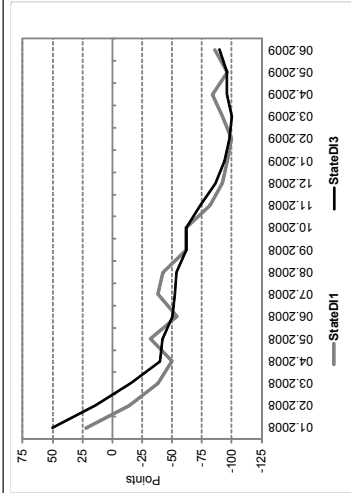
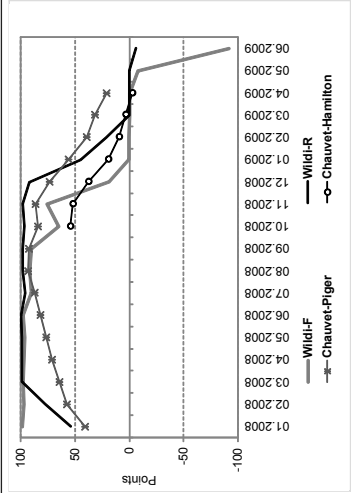
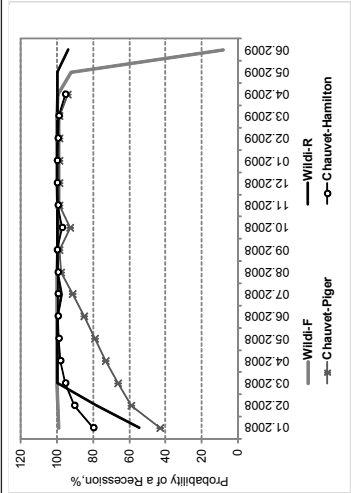


Chart 3 continued



Note: See Appendix 1 for sources and comments.

Table 2. The USA: 'Net' Score of Ups and Downs on the Threshold of the Trough of June 2009 (a 6 months span)

Indicator	Date of release	Initial Index		Y-o-Y		Anamnesis
		R-T	R	R-T	R	
						Composite Leading Indicators
TCB-LEI	20.07.09	0	0	+2	+2	The real-time net score for the initial TCB-LEI and for the Y-o-Y % changes is not significant for a 6 month span. But the TCB-LEI rose during all the last three months since April 2009.
ECRI-WLI-M	NA	NA	+2	NA	+4	Real-time values of the ECRI-WLI-M are not available to us. The net score for the historical time-series is not very impressive; the net score for their Y-o-Y % changes is higher. The ECRI-WLI-M rose during all the last three months since April 2009.
FIBER-CLI	NA	NA	0	NA	0	Real-time values of the FIBER-CLI are not available to us. The net scores for the historical time-series and their Y-o-Y % changes are quite low. But the FIBER-CLI rose during all the last three months since April 2009.
OECD-CLI-AA	10.07.09	-2	0	0	0	The real-time net score for the OECD-CLI-AA 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.
OECD-CLI-TR	10.07.09	-2	-2	0	0	The general picture for the OECD-CLI-TR is the same as for the OECD-CLI-AA.
						Business Surveys' Indicators
PhilFed-GAC	16.07.09	+2	+2	-2	-2	The real-time net score for the PhilFed-GAC (as well as for its Y-o-Y differences) is not high. The value of the index in July 2009 (one additional observation is available for the index) is still below zero.
PhilFed-GAF	16.07.09	+2	+2	+2	0	The real-time net score for the PhilFed-GAF (as well as for its Y-o-Y differences) is not high either. But the overall growth since December 2008 is quite impressive (more than 60 percent points).
ISM-PMI	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.
						Econometrically Retrieved Cyclical Indicators
StateLI	-	NE	0	NE	+4	The State LI was introduced only in June 2010 so there was no information in real time. Revised time series doesn't give significant net score for a 6 month span but since April 2009 began a strong growth of the index.

Table 2 continued

Indicator	Date of release	Initial Index		Y-o-Y		Anamnesis
		R-T	R	R-T	R	
						Composite Leading Indicators
ADS M-Index	16.07.09	+6	+6	+6	+6	The net score of the index in June 2009 is quite satisfactory (+6) but some sudden fluctuations (e.g. in October 2008) hamper definite conclusions.
CFNAI	21.07.09	0	+2	+2	+2	CFNAI-MA3 gives a quite prominent signal for the recovery in historical perspective as well as in real time.
CFNAI-MA3	21.07.09	+4	+4	+4	+4	
Wildi-F	–	NE	+2*	NE	+6*	Those indexes (“the probability of a recession in the current month”) were presented by Marc Wildi (ZHAW-IDP Institute) in June 2009. They give a strong but not an indisputable signal: a ‘fast’ estimate gives only 8% probability of a recession in June 2009 (a drastic drop from the May 92% level); at the same time a ‘reliable’ index is equal to 94% (a high probability of a recession).
Wildi-R	–	NE	+4*	NE	+6*	
Chauvet-Piger	01.07.09	+2*	0	+4*	+6*	Revisions made the trajectory of the indicator better. In real time, the last probability of a recession (for April 2009) was 94%. It’s too much to declare the end of the recession.
Chauvet-Hamilton	01.07.09	NA	+2*	NA	+6*	In real time, the last known figure at the moment was for April 2009 (after all revisions it became equal to 96% probability of a recession). Nothing pointed to the definite end of the recession.
StateDI1	26.07.09	0	-2	+2	+6	Now it’s quite obvious that the StateDI1 and StateDI3 have pushed from the bottom up to this moment. But who could be so wise then, with indexes so close to -100?
StateDI3	26.07.09	-2	-4	+6	+6	

Notes: * – as the indicator grows with increasing likelihood of a recession, we changed the sign of the net score to the opposite for comparability with other indicators in our table

NA – not available; NE – not exists; R-T – real time (July 2009); R – revision of January 2011. See Appendix 1 for the decryption of indexes’ abbreviations.

A positive net score means that the number of ups – during a 6-month span before a turning point – is greater than the number of downs; for a negative score the opposite is the case.

