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Session:  
Composite and Leading Indicators

## **A New System of Cyclical Indicators for Russia**

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### **Abstract**

The experimental system of leading indicators for Russia, which we developed as long ago as 2000 and since then have been operating monthly for the following years, has lost, in the course of time, its ability to meet practical needs. In the first place, the period of economic growth has been so long – almost eight years have passed since the late 1998 – that it was considered appropriate to shift attention from the concept of “business cycle” to the concept of “growth cycle”, and consequently, from alternative phases of growth and decline in output to alternative phases of faster and slower growth. In the second place, exclusive reliance on the index of industrial production as a reference index turned out to be unproductive, because this series was subjected to frequent revisions, and moreover, the role of this sector in the Russian economy gradually reduced. Finally, some components of the old system of indicators were no longer published regularly, which made the old system completely inapplicable, once and for all.

The new system of cyclical indicators has been developed with consideration for the experience that we gained in the course of monthly monitoring of current business situation over all previous years. This system is based on the concept of “growth cycles” and includes not only leading, but also coincident and lagging indicators.

Key Words: Cyclical Indicators, Leading Indicators, Russia

JEL Classification: E32 - Business Fluctuations; Cycles

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## **Introduction**

The experimental system of leading indicators for Russia, which we developed as long ago as 2000<sup>1</sup> and since then, with some modifications, have been operating monthly for the following years, has lost, in the course of time, its ability to meet practical needs.

In the first place, length of the period of economic growth – almost eight years have passed since the late 1998 – called for shifting our attention from the concept of “business cycle” to the concept of “growth cycle”, from alternative phases of growth and decline in output to alternative phases of faster and slower growth. In the second place, exclusive reliance on the index of industrial production as a reference index turned out to be unproductive, because this series was subjected to frequent revisions. Moreover, the role of this sector in the Russian economy gradually reduced. Finally, some components of the old system of indicators are no longer published regularly.

The new modified system of cyclical indicators has been developed with consideration for the experience that we gained in the course of monthly monitoring of current business situation over all previous years. This system is based on the concept of “growth cycles” and includes not only leading, but also coincident and lagging indicators.

## **Coincident Indicators and the Composite Coincident Index**

For coincident indicators, we took indexes of physical output in the following industries:

- Mining;
- Manufacturing;
- Agriculture;
- Construction;
- Freight transportation;
- Retail trade;
- Paid services.

These industries account for about a half of Russia’s GDP.

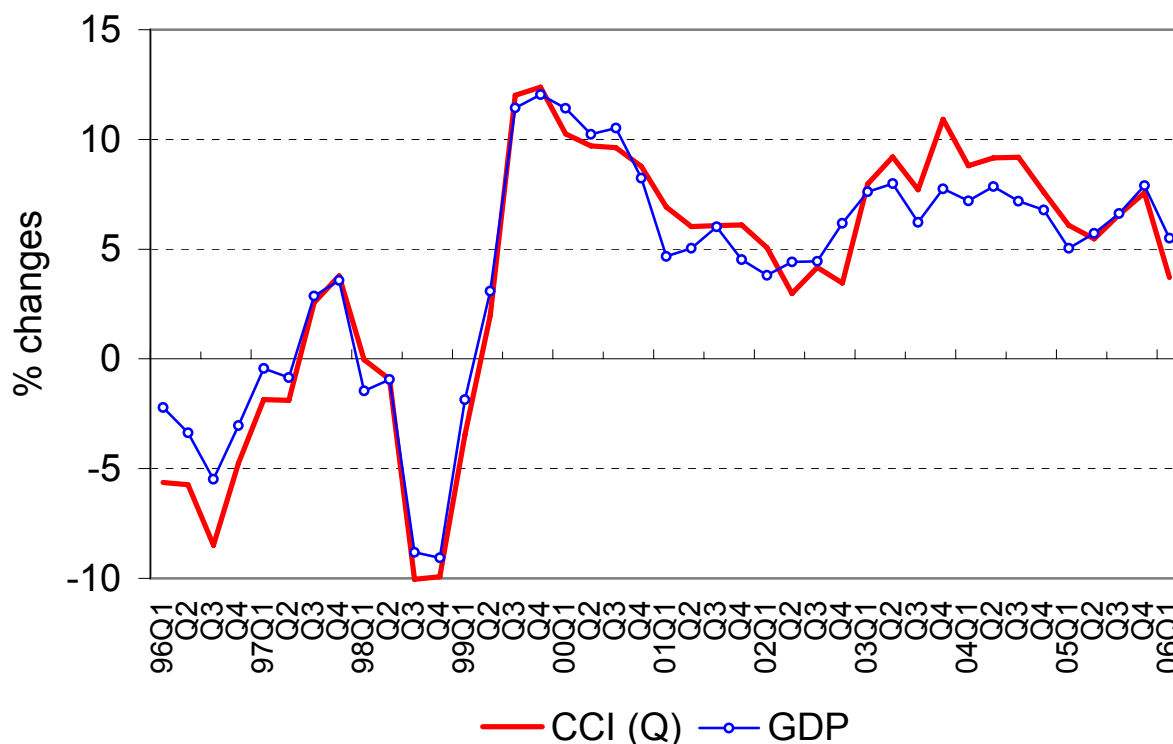
At first, each time-series was adjusted for seasonal fluctuations.<sup>2</sup> After that, we calculated a weighted average of seven basic indexes using shares of the relevant industries in the 2003 GDP as weights. Finally, for each month we calculated a year-on-year percent change of this composite index. It may be found that the dynamics of this indicator, averaged by each quarter, fairly accurately replicates the dynamics of real GDP growth and their turning points (see Figure 1). Consequently, the obtained index can be quite adequately used as a *composite coincident indicator*. It is available on a monthly basis with just a three week delay after the end of each month, while GDP is calculated only on a quarterly basis and has a two or three month lag after the end of each quarter.

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<sup>1</sup> For details, see Smirnov (2000, 2002).

<sup>2</sup> Adjustment for seasonal fluctuations was made with the Demetra Program (X-12-ARIMA procedure), which was elaborated in the Eurostat.

Figure 1 Real GDP and Composite Coincident Index (CCI), Y-o-Y % Changes



Sources: Rosstat; The Development Center

Turning points of the composite coincident index in the time span between January 1996 and December 2005 and the subsequent phases of an economic cycle in Russia are given in the Table 1. Leading and lagging indicators were chosen on the base of the turning points revealed there.

## Leading and Lagging Indicators

For leading indicators, we found the following seven series:

- Average monthly price of Urals brand crude oil;
- The share of enterprises facing increased or stable domestic demand (IET Surveys);
- The share of enterprises having no excessive inventories of finished goods (IET Surveys);
- Money aggregate M2X which includes both ruble and foreign currency components;
- The (reverse) index of real effective exchange rate of the ruble calculated by the Bank of Russia against a basket of currencies of Russia's trade partners;
- The RTS stock price index;
- Interbank interest rates (MIACR-overnight)
- Average Y-o-Y % change in output of three industrial goods with typically leading dynamics (trucks, synthetic resins and plastics, lumber).

**Table 1 Phases of an economic cycle in Russia, 1996–2005**

Turning points	Date	Comments
Trough	June 1996	End of the “frontal” recession that was related to transformation from a planned to a market-oriented economy. This was also the moment when Boris Yeltsin started his second presidential term, which was the point of no return to the former economic system.
Peak	November 1997	The echo of the Asian crisis comes to Russia, and a short-lived upswing is over. Outflow of capital begins, aggravated by falling oil prices and a decline in fiscal revenue.
Trough	September 1998	The economy hits a bottom after the sovereign default in August 1998. An upswing follows, supported by substitution of imports that became too expensive after a 2-3-fold devaluation of the ruble against the dollar.
Peak	September 1999	The period of particularly high growth on import substitution is over, the economy enters a slowdown.
Trough	May 2002	The world economy “warms up” and creates higher external demand for Russian raw materials. The economy gets in “steady-state conditions”: booming exports supports high rates of growth in GDP. At the same time, imports crowd out domestic products from the internal market (largely due to ongoing real revaluation of the ruble, which is eroding competitive power of Russian producers).
Peak	December 2003	First an acceleration of imports (2004), and then a slowdown in exports (2005, possibly partly related to destruction of Yukos), as well as a certain slowing in consumer and investment demand, bring a deceleration in the growth of GDP.
Trough	May 2005	A short period of slowing in consumer and investment demand comes to an end, and a consumer boom rebounds. The rate of export growth has declined, although exports still make a substantial contribution to the increase in GDP. A revival begins in the sector of domestic enterprises producing for internal market.

For lagging indicators, we took the following six items:

- Average price of dwelling space per 1 square meter in Moscow (in US\$);
- Average price of domestic car VAZ-2110 charged by five large-scale Moscow dealers (in US\$);
- Number of officially registered unemployed;
- Fixed capital investments;
- Credits to enterprises and organizations;
- Foreign currency reserves of the Bank of Russia (excluding gold).

**Table 2** Leading over (-) or Lagging behind (+) the CCI, months\*

Indicators, Y-o-Y % changes	Peaks (P) and troughs (T) of the CCI, 1995-2005							Average lag
	T	P	T	P	T	P	T	
	06/96	11/97	09/98	09/99	05/02	12/03	05/05	
Crude oil price, Urals Brand	-	-13	+3	+5	-6	-10	-15	-6.0
Share of enterprises with increased or steady demand	-	-9	0	0	0	-9	0	-3.0
Share of enterprises without excessive stocks of finished goods	-	-7	-5	-2	-5	+1	-3	-3.5
Money supply M2X (by monetary survey methodology)	-	-1	-1	-1	+5	-3	-8	-1.5
Real effective rate of the ruble	-	-18	-15	-8	-13	-10	-12	-12.7
RTS stock price index <sup>(1)</sup>	-	-9	0	+4	-14	+3	-2	-3.0
MIACR-overnight <sup>(1,2)</sup>	-	-5	0	0	-5	-10	+6	-2.3
Average Y-o-Y % change of the three products with leading dynamics <sup>(3)</sup>	-	-2	-2	-1	-10	+1	-4	-3.0
The Composite Leading Index (CLI)	-	-9	-2	-2	-10	-5	-4	-5.3
Average price for housing in Moscow	+6	+8	+11	+29	+6	+5	-	+10.8
Price for Russian autos (VAZ 2110 model)	+6	+1	+3	+16	+5	+1	-	+5.3
Number of registered unemployed <sup>(2)</sup>	-	+5	+5	+8	+4	+4	-	+5.2
Fixed Investments	0	-1	+4	+11	-3	0	-	+1.8
Credits to enterprises	-	+1	+3	+14	+7	0	-	+5.0
International reserves of Bank of Russia, excl. gold	+9	-1	-1	+12	+3	+16	-	+6.3
The Composite Lagging Index (CLGI)	+1	+1	+7	+14	+5	+3	-	5.2

\* – the available time series are not sufficiently long for defining troughs in all leading and some lagging indicators that preceded the trough in CCI in June 1996, as well as troughs in the lagging indicators that followed the trough in CCI in May 2005.

1. The indicator has one “extra cycle” (with the peak on 04/02 and the trough on 03/03 for RTS stock price index, and with the trough on 05/04 and the peak on 10/04 for MIACR-overnight). 2. Before dating of turning points, the indicator is taken with a reversed sign. 3. Trucks, synthetic resins and plastics, lumber.

Theoretical grounds for inclusion of all these indicators into the system of cyclical indicators are well known, so we don't repeat them here.<sup>3</sup> The procedure for calculation of the two composite indexes (the leading and the lagging one) is based on computation a Y-o-Y % change for each component (and every month) and on further averaging of these changes using the weights that are inversely proportional to their volatility.<sup>4</sup>

<sup>3</sup> For instance, see Smirnov (2000), Kitrar, Pogossova and Nilsson (2003), Nilsson and Brunet (2006)

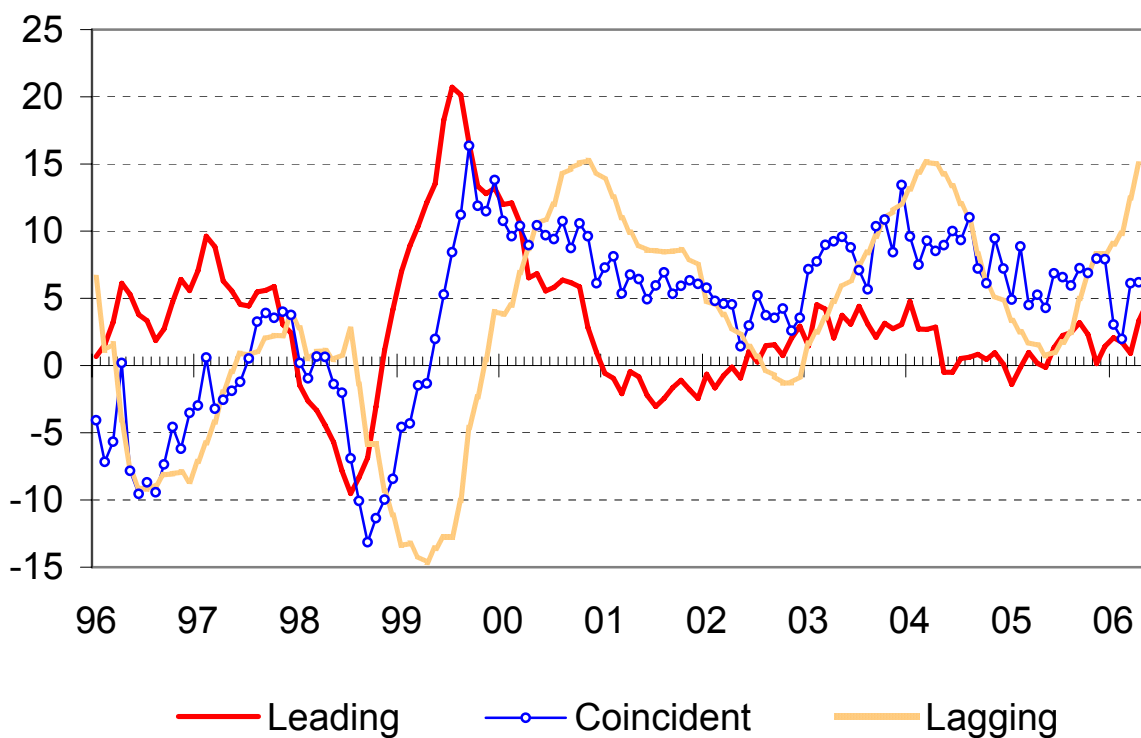
<sup>4</sup> Technically the procedure of calculation is like more old one discussed in Smirnov (2000). A full description can be send upon request.

Main results of a comparison of turning points of the selected cyclical indicators with turning points of the composite coincident index (CCI) are given in Table 2.

All indicators more or less accurately follow the dynamics of the composite coincident index (CCI). As a rule, turning points of leading indicators forerun the turning points of CCI, and turning points of lagging indicators usually follow them. None of the indicators has a “missing” cycle, and only two have one “extra cycle” each.<sup>5</sup>

On the other hand, there is no single partial indicator, which could “correctly” lead or lag in absolutely all occasions. Only composite indexes have this quality. The composite leading index leads the coincident index in six turning points by 5.3 months “on average” (the lead varies in the range of two to six months), and the composite lagging index lags by 5.2 months “on average” (the minimum lag is one month, and the maximum, 14 months).

**Figure 2 Composite Leading, Coincident, and Lagging Indexes, Y-o-Y % Changes**



Source: The Development Center

Visual examination of dynamics of composite indexes also demonstrates (see Figure 2) that composite *leading* and composite *lagging* indexes reproduce, with sufficient precision, the dynamics of composite *coincident* index (and consequently, of GDP), usually making deviations from it in turning points in the “required” directions.

<sup>5</sup> It goes without saying that such a high quality is most probably typical only for the period under examination (1996-2005), and there is no assurance that it will remain in force.

## **Conclusion**

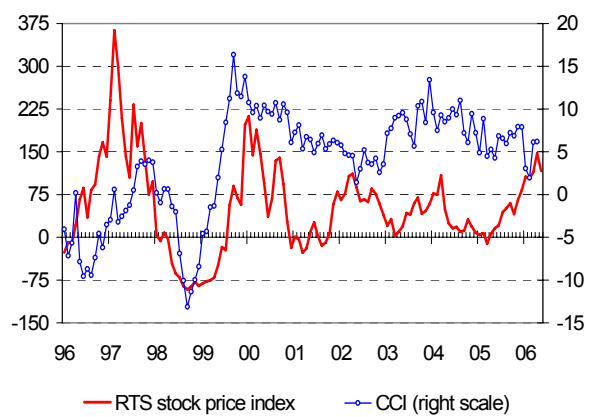
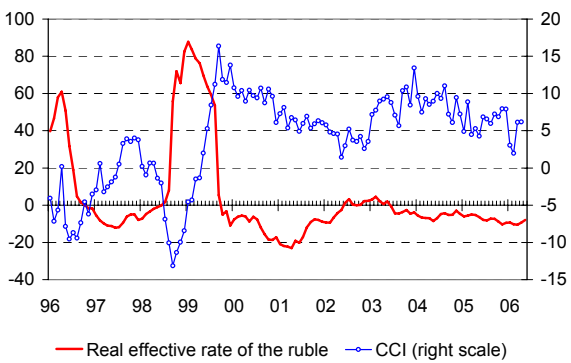
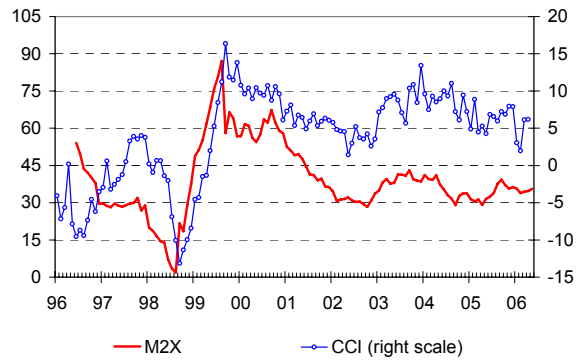
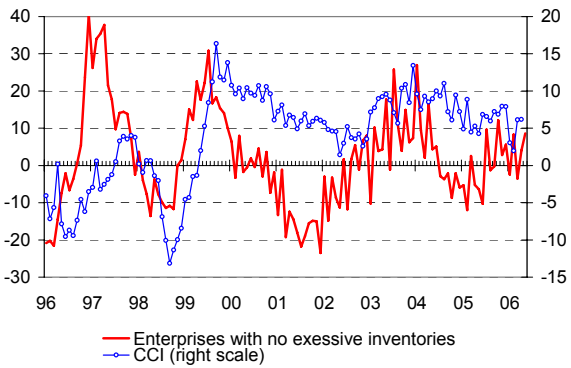
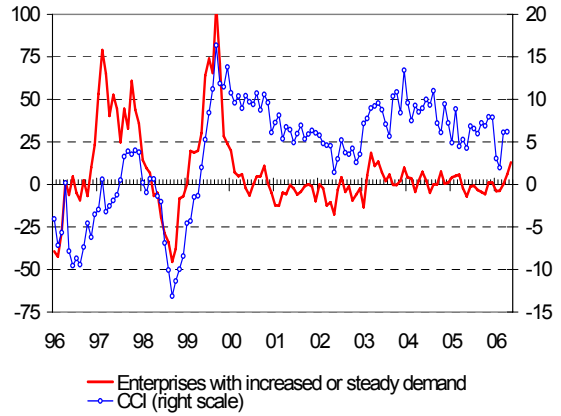
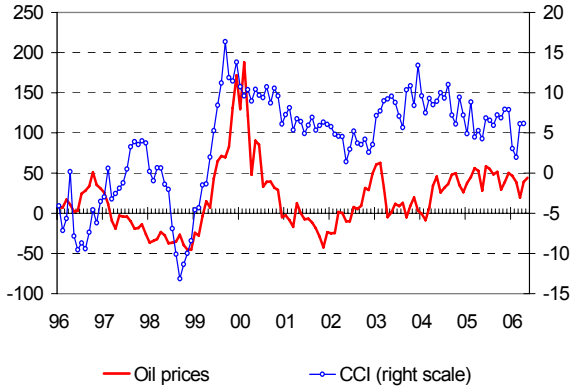
Russia's transition to "market-oriented" economy inevitably made the economy follow a clearly cyclical pattern. On the other hand, it began to generate such signals (values of key indicators), which enable us to assess its condition quite adequately and in proper time. Specifically, they enable us to decide what phase of the cycle the economy is in at any particular moment, and how likely the coming of the next turning point is. The system of cyclical indicators presented here, which is based on the concept of "growth cycle" and includes coincident, leading and lagging indicators, allows us to solve these problems practically on-line.

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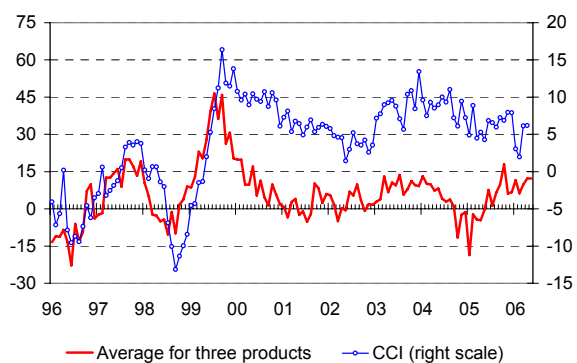
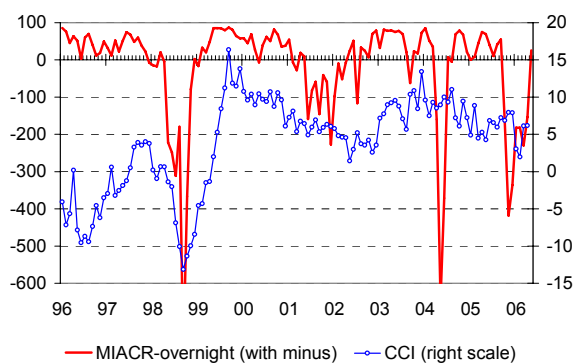
## Appendix 1

### Leading Indicators & CCI, Y-o-Y % changes





*A New System of Cyclical Indicators for Russia*



## Appendix 2.

### Lagging Indicators & CCI, Y-o-Y % changes

