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Some issues of GDP estimation and forecasting

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1. The task of GDP assessment according to the current situation and short-term forecast

The first quarterly GDP assessment is usually performed by Rosstat by the end of the second month following the sample period.

Moreover, full assessment of the current situation is required in the monitoring process.

The Russian Ministry of Finance requires such GDP assessment for budget income estimating and planning, the Government requires it for decision making and economic policy efforts' correction.

Accordingly, the Ministry of Economic Development of Russia monthly performs GDP operational estimation and also its short-term forecast.

Employed methods of assessment include:

Integration and balancing of operational estimates within the framework of a single model;

GDP calculation with production approach and adjustment of other elements;

Use table elements' consideration;

Assessment of real GDP growth seasonal factor excluding as for constituent parts so for aggregated GDP assessment.

An important question, especially during surmounting the crisis period is assessment of real GDP growth excluding seasonal factor. Such well-known programs as X12-ARIMA, TRAMO/SEATS are widely used for that purpose along with homemade programs. For example, together with mentioned above programs national development - model of seasonal factor foregrounding – SR-program is used in the Ministry of Economic Development. This program introduces a certain permitted limit of violation of the strict seasonal character and actualizes seasonal wave in respect to the latest period of observations, based on the coefficient of the last process forgetting.

2. Accuracy of measurements and GDP forecast

Accurate volumetrics determination in economics, a sufficient time interval is required, particularly for complete information collection and processing. Elaboration of volumetric determinations often takes place a year after the first account. But in this case, when elaborating the indicator's growth rate for the previous period, the estimation accuracy of indicator's change rate for the current period impairs: while other periods are indicated in comparable methodology, methodological comparability of the current and previous period is violated. Such a violation occurs regularly during the overestimation moment. That regular shift allows making corrections of GDP rate assessment that are often confirmed later at overestimation stages.

Forecast uncertainty is formed of the following components:

Uncertainty and insufficiency of information, which are common for large scale system observations without any considerable intrusions in its activity. This component of uncertainty attributed to the lack of information is often taken into account by statisticians with the help of probabilistic intervals. It is rather troublesome to shorten the interval of this uncertainty. Interference to the system's activity by means of control survey strengthening may not always improve accuracy of the system's parameter representation. This fact is well known as an indeterminacy principle in the conduct of large scale system (analog of Heisenberg's principle in quantum mechanics);

Further on, indeterminacy connected with a wide range of uncontrollable elements existence, first of all external conditions in which the system will be developing (it brings necessity in scenario approach to conditions' forecast). In this case, accuracy of forecast splits into accuracy of forecast by fulfillment of given conditions and foreseeing accuracy of conditions themselves. The latter usually turns out to be rather complicated and ungrateful task.

Present principle indeterminacy increases indeterminacy in the future. It is way harder to predict system development due to crises and bifurcations, because of alternative exit from the state of bifurcation and considerable structure change in after-crisis period.

3. Items of short-term and middle-term GDP forecast

Independent forecast of GDP real growth indicator excluding seasonal factor on the basis of probabilistic distribution of this indicator during previous years allows building confidence intervals for GDP growth trajectory for a short period of time, for instance, till the end of the year.

More accuracy may be gained, in case of foregrounding major components of the indicator of real growth excluding seasonal factor, and first of all – conjunctural, substantial and cyclical.

Foregrounding conjunctural and substantial components is done on the basis of factorial models while foregrounding the seasonal component is done on the basis of spectral analysis technique.

The forecast of conjunctural component is performed on the basis of conjunctural factor; and forecast of substantial component – by its extrapolation with regard to strengthening role of intensification and efficiency improvement factors.

Thus, conjunctural component provided 4.5 percentage points out of 7-8 percent rate of Russian GDP growth or more than half of increment rate in years 2004-2008. Taking into account predicted oil prices' growth dynamics in the nearest years and rise in Russian exports, conjunctural component contribution will be not more than 1.5 GDP percentage points; while substantial component contribution with account of increase of production factors' efficiency improvement may rise from 3 percentage points to 3.5 percentage points i.e. without accounting cyclical component, medium-term growth ratio of Russian economics may be about 5 percent.

4. Considering lag characteristics. Cycles in analysis and forecast of GDP

Accuracy of short-term and middle-term forecast increases usage of already formed lag dependencies between factors and production growth. For instance, growth of fixed capital investments, volume reduction of construction in progress, input power, changes in inventories, growth of world market prices on the raw produce etc. by lag dependencies influencing production growth. In this respect publications of RenKap-RES GDP leading indicator might be favorably viewed. By the way, it is a giant source for potential surveys.

One of directions of lag dependencies accounting is analysis and account of cyclical component in GDP growth. From the point of view of the Cycle Theory, majority of factors impact economical growth by forming economical cycles. Among basic factors forming economical cycles, let us enumerate:

Technological modes' change;

Technological impulses (innovations in technologies and production);

Investment impulses (bringing into life large projects);

Consumer interests' change and consumer sentiments' formation;

Internal and external shocks.

Each of these impulses causes a sort of quasi-economic process that develops according to certain logic. It has certain lag that determines rhythm and continues until it works out its potential capabilities. Lag of processes determines their duration. Cycle of vibration T is proportional to $2\pi\sqrt{(m/\kappa)}$ where m – system lag measure, κ - system stiffness coefficient.

Consequently, economic process generally is a sum of long-term trend determined by actions of long-term development potential, and a set of cycles of various duration caused by various impulses at various time periods.

Methodology of cycles' foregrounding on the basis of spectral analysis has been put to an evaluation test by us for the USA and with a considerably lower reliability - for Russia. Let us mark briefly results of performed analysis.

1. At the first stage in the USA GDP dynamics exponential trend and military cycle, connected with arms contracts have been foregrounded.
2. Further on, principal cycles are foregrounded: investment cycle with the period of about 10 years and small innovational cycle with period of 5 years.
3. Kondratiyev type of waves with the period of 34-40 years, characterizing long-term technological tendencies is well shown in the USA economy.
4. Cycles induced by external shocks and connected with Arab-Israeli wars of 1967 and 1973 and followed by oil price boom - are also foregrounded.

The cycle of 1973 is especially distinguished with its period of about 18 years. Based on resource saving technologies it actually forms a new regime for the USA economy. Oil price boom in the beginning of 80s also created a powerful technological impulse that scattered around the world in the second

half of the 80s. The last wave of the 18 year cycle might be considered as a consumer boom.

Since the middle of the 90s three mentioned cycles, especially consumer one, had been supported in the USA by a new factor – a large-scale development of credit system.

5. Financial-economic crisis broken out in 2007 coincided with recession phases of three important cycles: innovative, consumer and Kondratiyev wave; and also with integration of investment cycle to the declining phase.
6. Dynamics analysis of Soviet and Russian economies also proves the existence of certain cyclicality.

In the Soviet economy along with industrial cycles (12-year duration) induced by periods of industrialization in the 30s and in the 50s, a cycle with duration period of about 16-17 years can be foregrounded. It was synchronized with economic reforms' impulses of Malenkov, Kosygin and Gorbachev. The peaks of that cycle are close to significant Russia development dates split by 17-year intervals: 1917, 1934, 1952, 1968, 1985 etc.

7. Cycles also showed up in the post-reform Russia but with insufficient reliability.
8. The crisis of 2008-2009 transforms pre-crisis cycles, suppresses most of them and first of all their amplitude. The shorter cycle period is, the stronger is the suppression.
9. Crisis may give birth to a new cycle, the characteristics of which are hardly predictable.
10. New consumer cycle may start in the world, for instance, on the basis of interest to health and life prolongation. It will be supported by a new investment cycle, based on nanotechnologies, biotechnologies and new energetics.

Supposedly, Russia will also take part in the general investment cycle, by changing its 12-year (eastern) cycle into 10-year (western) and meanwhile preserving some aftershocks of a 17-year cycle; and Russia also will connect to the Kondratiyev cycle wave since the end of 10^{th} year, in case the country manages to prepare for it.