

Valentina Potapova and Konstantin Styrin

Constructing a Leading GDP Indicator for Russia

In December 2009, the New Economic School and Renaissance Capital, a leading Russian investment bank, started to produce a short-term GDP forecast labeled as the RenCap-NES Leading GDP Indicator. The forecast is constructed using information that is more readily available compared with official GDP figures whose earliest estimates are normally released no sooner than 1.5 months after the end of the respective quarter. The goal of the new index is to measure the current stance of economic activity in Russia. Potential audiences that it targets include government officials, analysts, investors, and business people.

RenCap-NES Leading GDP Indicator

The RenCap-NES Leading GDP Indicator exploits about 100 economic and financial time series at monthly frequencies. Part of them is official statistical data provided by Rosstat, a state statistical agency. They cover national accounts aggregate data, industrial output by sector, labor market variables, retail and wholesale sales, prices, cargo shipment, production volumes of most important items such as crude oil and natural gas, etc. Another group of variables, about one third of total, come from enterprise surveys run by the Russian Economic Barometer, an independent research entity. A panel of executives are questioned about the current state and expectations of demand for their company's products, condition of inventories, order books, costs, etc. Finally, our dataset includes commodity prices, foreign currency exchange rates, domestic and foreign interest rates, and stock market indices.

Our forecast methodology is based on the Dynamic Factor Model (DFM). We assume that all variables in our sample are driven by a relatively small number of common shocks. Conceptually, this is exactly how mainstream macro tends to view real-life economies. Well-known examples are shocks in monetary and fiscal policy, productivity, terms of trade, etc. The assumption about common shocks imposes a factor structure on our variables. Factors serve as sources of shocks. We estimate common factors as the first few principal components of data.

GDP summarizes the stance of economic activity in a country. Therefore, one can expect that a significant proportion of variability of this variable is cap-

tured by the common factors. This simple consideration suggests using factors extracted from data as GDP predictors. In a sense, factors accumulate predictive power of all variables from our sample.

The factor-based approach to macro forecasting in general and the particular methodology that we use (DFM) is not new. Rather, it has been exploited by economists of Federal Reserve System and European Central Bank for a while for the purposes of short- and medium-term forecasting. It has been demonstrated in the literature that factor-based forecasts tend to outperform alternative statistical methods that operate with many predictors (such as Bayesian model averaging or simple forecast combination).

Competing GDP indicators

A number of short-term forecasts of Russian GDP have been available to the public. The best known ones are (i) monthly GDP estimates produced by the Ministry of Economy and Development (MED), (ii) the GDP indicator produced jointly by VTB Capital, an investment bank, and Markit Economics, a London-based research firm, and (iii) the Composite Leading Indicator by Development Center (CLI-DC), a think tank. The first two indices are survey-based. The MED estimate is obtained from surveying a panel of manufacturers that account for a significant share of GDP. It is typically released in 3 weeks after the end of the respective month. For every quarter, three GDP estimates are constructed, one for each of its three months. The earliest possible GDP estimate for a given quarter thus becomes available only around the middle of that quarter. Updates of the GDP Indicator by Markit/VTB become available sooner, within a week after the end of the respective month. The idea behind CLI-DC is very close to the way earlier generations of CLI's were constructed for the US and other countries. One needs to identify a few time series that lead GDP based on their cross-correlations with GDP at various lags and leads and then compute a weighted average of those variables where weights are exogenously set.

Unlike CLI-DC, the Ren-Cap NES Leading GDP Indicator does not require pre-determining which variables are worth including into the sample and which are not. The method is capable work with tens

and hundreds of time series. Furthermore, it does not impose any a priori restrictions on the set of weights. Instead, the weights are determined endogenously, i.e. through the application of particular statistical procedures, principal components and OLS. Unlike MED or Markit/VTB indices, RenCap—NES forecast does not need to run expensive monthly surveys and relies only on publicly available information (also including some survey data available publicly). In that respect it is much cheaper compared with the two survey-based rivals. In a sense, it gives a picture of economic activity from a different angle and thus should be viewed as a complement rather than a substitute for existing alternatives. In principle, one could think of combining the four competing forecasts (MED, CLI-DC, Markit/VTB, and RenCap-NES) in attempt to raise the overall quality of the resulting forecast over its four ingredients.

Data selection issues

A word of caution needs to be said about the composition of the sample of predictors. Despite there is no necessity to pre-select variables (e.g., based on their ability to lead GDP as in the CLI-DC case), some simple but important considerations should be taken into account. It is conceivable that one group of common factors determine mainly the time evolution of real variables, including GDP, while another group affect mostly financial market variables without strong short-term influence on GDP. If our sample of predictors is biased towards financial time series while real activity indicators are underrepresented then the first two or three principal components that are typically picked to serve as predictors in the GDP forecasting equation are very likely to be of little value for this job. In other words, the relevant factors that are important for explanation and forecasting the GDP dynamics are likely to be missing since there is no sufficient information in the dataset to estimate them well enough.

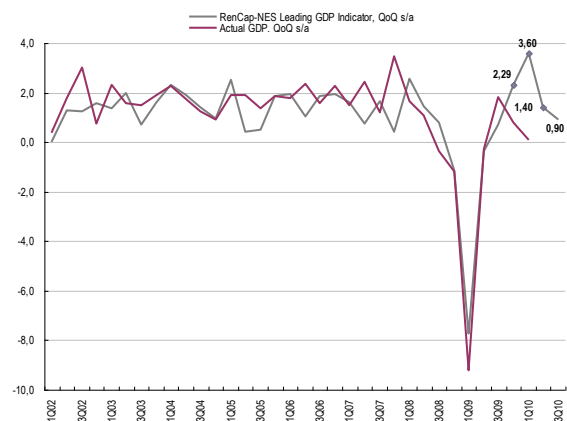
Two sets of methods have been developed in the literature to address the problem of the dataset composition. First, one should be interested in removing too noisy predictors, with a tiny fraction of variance explained by common factors. One should also avoid variables with highly correlated idiosyncratic terms (i.e. parts unexplained by common factors). A potential problem is that the positive correlation will magnify the contribution of noise thus deterioration the quality of estimates.

Second, the panel of predictors should be balanced in the sense that all main (from general economic considerations) blocks of variables should be equally represented: activity by sector, labor market series, prices, interest rates and stock market indicators, survey expectations, etc.

These considerations were taken into account in constructing the RenCap-NES Leading GDP Indicator. In terms of the (pseudo) out-of-sample performance, the RenCap-NES Leading GDP Indicator has done well compared with its rivals. Performance of naïve benchmarks such as the random walk and auto-regressions proved even worse.

The RenCap-NES Leading GDP Indicator available at <http://fir.nes.ru/en/science/Pages/indicator.aspx> and http://research.rencap.com/eng/RenCap-NES_Leading_GDP_Indicator.asp is updated monthly. On the 10th day of each month, we release two GDP forecasts, one for the current quarter and the other for the next one. In other words, we revise our forecast as long as a new portion of monthly data arrives. Our final revision forecast thus becomes available well in advance, in more than a month, before the first (and most preliminary) publication of official GDP data.

Figure 1 GDP growth, % on previous quarter, seasonally adjusted, actual and forecasted values



Valentina Potapova, CFA, is Quantitative Analyst at Renaissance Capital and Konstantin Styryn is Assistant Professor of Economics at NES, Moscow.