SHORT-TERM FORECAST FOR ECONOMIC GROWTH

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One of the key preconditions for monetary policy decision-making is up-to-date information on real economy development, above all on the development of gross domestic product (GDP). It is statistical practice to publish such information, although the data cannot be analysed in real time since there is always a certain time shift. The statistical practice in Slovakia is to publish a flash estimate of GDP within 45 days after the end of the quarterly reference period. The flash estimate gives information about the pace of economic growth, not including GDP structure. Adjusted data on the pace of economic growth, as well as on its structure from the supply, demand and income aspects at current prices, and from the supply and demand aspects at constant prices, is published within 70 days of the reference period, in other words more than two months later. The fact that it is impossible to work with the data in real time gives cause to seek other indicators which would predict or identify economic growth with only a short time delay.

This article aims to summarise the results of an analysis of the ways in which available statistical data may be used to estimate GDP development in the previous quarter and to predict it for the next quarter. The source for the analysis was the data published by the Statistical Office of the Slovak Republic (Štatistický úrad Slovenskej republiky – ŠÚ SR). For the purposes of testing, a total of 94 explanatory variables were selected. The final results of the analysis are regression equations representing the development of GDP and some of its components (domestic demand, consumption demand, private consumption, investment demand). We will only look in greater detail at approaches to estimating GDP as a whole.

Depending on which explanatory variable is used, the results reached with the regressive equations may be separated within the GDP forecast on the basis of:

- conventional indicators (hard, quantitative data), measuring quantifiable volumes (for example, production, receipts);
- confidence indicators (soft, qualitative data), measuring opinion (on, for example, the potential development of business activities);
- composite indicators;
- special indicators.

1. Conventional indicators

Conventional indicators are published by the ŠÚ SR on a monthly basis and usually within 40 days from the end of the reference period. The ŠÚ SR uses as the material for its calculations the statistical statements submitted by enterprises from individual economic industries.

1.1 Industrial production index

The industrial production index (IPI) is seen as one of the most important cyclical indicators in market economies. In accordance with the 1998 European Council Regulation, the IPI is calculated on the basis of statistics for industrial product production and is in character an index of physical volume. The index is based on the change in volume of selected products using a two-stage weight system. The index shows the change in industrial production for any month in relation to the average period of the base year.

The IPI base period for Slovakia is 1998. It is calculated from the results of statistical surveys conducted in enterprises whose activities are predominantly industrial and which employ at least 20 people and in selected enterprises employing up to 19 people, or in selected enterprises with a substantial volume of industrial production, regardless of their industrial affiliation. The eventual IPI is an expression of the development in industry, which accounts for approximately one-third of the economy's value added and an almost identical share of employment. Industry is at present a significant importer and a key producer of exports, which account for more than 90% of GDP. Despite industry's major position in the economy, the IPI has not up to now developed significant meaningfulness in relation to GDP development, and almost lost it completely in 2004 as the result of substantial changes in one branch of industry (the manufacture of transport means). That reflected its character as index of physical volume, which was able to shed only a limited light on value added creation in an economy showing both structural changes and the fluctuation of value added as a share of total production. It was clear from the regressive analysis that IPI was an inadequate independent variable for GDP. It is, howe-

ver, necessary to monitor the IPI for its potential use in predicting future turning points in GDP.

1.2 New orders

Another common cyclical indicator in market economies is new orders. In the context of Slovak statistics, they are the financial expressions of orders for industrial products and work in selected industrial branches: the manufacture of textiles and clothing; manufacture of pulp, paper and paper products; manufacture of chemicals and chemical products; manufacture of metals and metal products; manufacture of electrical and optical machines and equipment; and manufacture of motor vehicles and other transport equipment. The selection of the industrial branches narrows the indicator's coverage to between 13% and 14% of the value added creation in the Slovak economy. The reduced scope of the indicator and restructuring movements in industry are likely reasons for why not even this conventional indicator adequately represents the development of economic growth in Slovakia..

1.3 Receipts from own performance and goods

The analysis showed that the conventional indicator which most reliably describes the current economic development in Slovakia is receipts from own performance and goods. Receipts from own performance and goods includes receipts from the sale of own products, receipts from the sale of services and receipts from the sale of goods, which represent the receipts enterprises earn on all of their activities. The data is aggregated according to the main economic activity of enterprises and does not include value-added tax or consumption tax. The indicator receipts from own performance and goods is harmonised with the EU standard for short-term indicators and with the standard for the annual structural survey.

It is evident from the analysis that the following quantitative indicators manage to represent with acceptable reliability the development of GDP, or rather, its selected components:

- receipts from own performance and goods in industry (to illustrate, the value added creation in industry at the time when the analysis was being made accounted for 28% of GDP);
- receipts from own performance and goods in manufacturing (24% of GDP);
- receipts in construction (4% of GDP);
- receipts in market services (40% of GDP);
- receipts from the sale and maintenance of motor vehicles and receipts in retailtrade (total, together with wholesale, 13-14% of GDP);
- receipts in transport and storage (around 7% of GDP)
- receipts in hotels and restaurants (less than 1% of GDP)
- receipts in real estate, renting, business activities and other services (up to 11% of GDP)
- receipts in posts and telecoms (up to 3% of GDP)

Despite the fact that certain industries, e.g. construction, account for a low share of overall GDP, they are fairly reliable in showing both the direction and level of overall economic growth. The indicator receipts from own performance and goods may be used to estimate GDP development for the previous quarter. It has limited use, however, as a means to forecast growth for the next quarter.

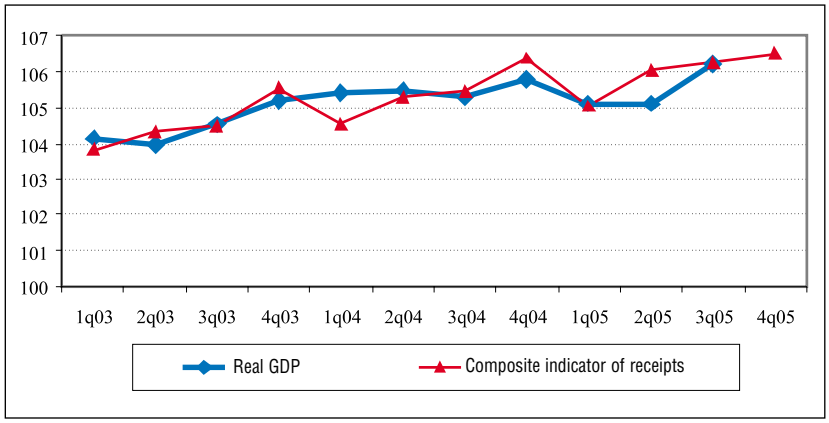
1.4 Composite indicator of receipts

In order to estimate GDP for the previous quarter, we use internally our own composite indicator of receipts, being a weighted arithmetic average of the results of the selected simple regressions mentioned in part 1.3, where the weights are coefficients for the determination of the simple regressions. The results of the GDP estimate, based on the composite receipts indicator, are made available:

a) within 45 days from the end of the quarter, in other words approximately one month before the publication of the GDP data, where the data for a full quarter (three months) is processed; the advantage is the greater reliability of the estimate while the disadvantage is the time lag, corresponding as it does to that of the flash estimate.

b) within 15 days from the end of the quarter, where the data for an uncompleted quarter (two months) is processed; the advantage is the promptness of the GDP estimate, which may be worked with one month prior to the publication of the flash estimate, while the disadvantage of the estimate is its lower reliability.

Chart 1 Forecast for GDP development based upon quantitative indicators



The results of estimates for GDP development made on the basis of the composite receipts indicator for an uncompleted quarter are shown in Chart 1.

2 Confidence indicators

The ŠÚ SR publishes confidence indicators on a monthly basis with the data for a full quarter made available 2-3 days before the end of the reference quarter. The materials used for their calculation comprise qualitative statements and opinions of respondents in selected industries or sectors. The respondents, drawn from the managers of non-financial corporations and consumers, evaluate the situation or their expectations as either favourable, neutral, or unfavourable. Since these are sensitive assessments of the economic and other conditions – based on which company managements decide about economic activities and consumers about how to dispose of their income – the answers can give a picture of the direction in which the economy is heading. According to studies carried out abroad, confidence indicators have a preferential role in determining turning points in development – the bottom or peak in the economic cyclus. The monthly-prepared confidence indicators at present provide the most up-to-date source of information on what is happening in industries and sectors.

2.1 Industry and sectoral confidence indicators

The ŠÚ SR publishes qualitative results for industries and also the population sector. Business tendency surveys are used to calculate confidence indicator's values in selected industries: in industry, construction, retail and services. The sectoral source is the consumer barometer with the research carried out on a representative sample of the population. Both sources prepare answers on two types of question. One type is focused on how managers and consumers evaluate the current development, which may be used as an estimate of the expected current situation. The second type of question aims to find out about expectations for the next three months and, in the case of consumers, for the next year, which in turn may serve as material for making forecasts. The results are expressed by means of a balance that represents the difference between the positive and negative evaluations in percentage terms. The partial results in the consumer barometer represent the positive and negative responses as shares of the total number of responses to each question.

Not only were the results of the confidence indicators tested as independent variables, so were the responses to questions in the individual industry and sectoral indicators. It was, in our view, also appropriate to test individual questions in order to verify the quality of the correlation between the responses of managers and the actual development in the industries. Altogether we tested 55 qualitative indicators. As the regression analysis shows, the only indicator that manages to represent GDP development with acceptable reliability is the construction confidence indicator, while among the individual balances, only the responses to the four questions do so. The questions, three from the construction industry and one from retail, concern:

– the level of construction demand,
– the economic situation in construction,
– the trend in construction activity,
– goods inventories in retail.

Among confidence indicators, as among the conventional indicators, construction had key meaningfulness for future economic growth. The increase or slowdown in construction activity correlates strongly with overall economic development due to the construction's multiple effects.

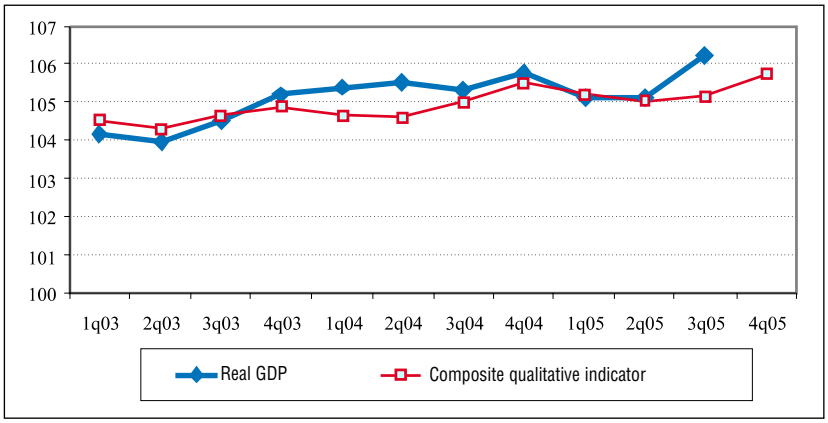
2.2 Composite qualitative indicator of the ŠÚ SR

A composite qualitative indicator also calculated by the SÚ SR is the Economic Sentiment Indicator (ESI), an umbrella indicator of the current expectations of economic entities in industry, construction, retail and the expectations of consumers. It is published in the form of a three-month moving average. We tested the ESI as another potential explanatory variable for GDP. The regression analysis confirmed the ESI as an acceptably reliable basis for estimating and predicting GDP.

2.3 Composite qualitative indicator

The reliability of estimates and predictions for GDP based on confidence indicators is increased where the ESI is assigned the other five qualitative indicators mentioned in part 2.1 (the construction confidence indicator and the responses on the level of construction demand,

Chart 2 Forecast for GDP development based upon qualitative indicators



the economic situation in construction, the trend in construction activity, and the goods inventories in retail). Six selected qualitative indicators are incorporated into the composite qualitative indicator, which we use to make internal forecasts for the current quarter and the next quarter. A longer time shift reduces the reliability of the forecast. The results of the GDP estimate based on the composite qualitative indicator may be made available by the end of the reference quarter. Assuming that the selected sample is representative and that the opinions of the respondents are sufficiently representative, then the results of confidence indicator processing provide information on economic activities in real time.

3. Composite indicators

In order to evaluate and forecast the economic reality, particular institutions are accustomed to constructing their own composite indicators containing data from various sources. Besides the outputs from business tendency surveys, these can include conventional indicators of the real economy, financial indicators, monetary aggregates, prices and other indicators from the external environment depending on the considerations and needs of the institutions. The mathematical form and composition of the composite indicators is not determined by standards to any great extent, but rather by the remit of the processor and user. Among the most used are the OECD Composite Leading Indicator, Handelsblatt Indicator, Euroframe Indicator, EuroCoin Indicator, and the Euro Area GDP Indicator of the European Commission.

Finding a suitable combination of components for an indicator, so that it predicts Slovak economic growth with sufficient accuracy, assumes a certain level of stability in an economy with a developed financial markets, standardised sectors with stable behaviour, minimal administrative interference in the economy and so on. At this point, we consider it appropriate to test two composite indicators: the composite indicator of value added and taxes, which is designed to forecast GDP; and the composite indicator of consumer expectation and wages, representing household final consumption. These composite indicators require a longer testing period.

The composite indicator of value added and taxes is based on the calculation of GDP as the sum of created value added and indirect taxes less subsidies. It represents a composite of data from two sources. From the quantitative statistics (published by the ŠÚ SR), it draws data on receipts volume, and from the state budget (the Ministry of Finance of the Slovak Republic) it uses data on the volume of selected domestic taxes on goods and services. The estimate result for the previous quarter and the forecast for the next quarter are made available:

a) within 45 days from the end of the quarter, in other words approximately one month before the publication of the GDP data, where the data for a full quarter (three months) is used;

b) within 15 days from the end of the quarter, where the data for an uncompleted quarter (two months) is used.

For the purpose of estimating private consumption, the most reliable of the tested indicator combinations seem to be the indicator of consumer expectations and wages comprising the following components:

- real wage index (from the quantitative statistics of the ŠÚ SR),
- consumer expectations (from the qualitative statistics of the ŠÚ SR):

1) expectations for the financial situation, calculated from the positive responses given as a share of the total number of responses,

2) expectations for the overall economic situation, expressed as the balance of the qualitative statements (positive, neutral, negative),

3) the projection for future financial expenditure, expressed as a share of the positive responses,

4) the projection for future investment expenditure, expressed as share of positive answers.

The estimate results for the previous quarter and the forecast for the next quarter may be made available within 45 days from the end of the reference quarter. Among the partial findings to come out of the consumer barometer analysis is the mismatch between statements on expected fixed investments and their actual development. The relatively clear definition of the questions intended to document the development of household fixed investments (car, house, chalet, cottage, larger modification to an apartment or house) demonstrated a significant relationship not with the household fixed investments actually recorded but with consumption.

4. Special indicators

In some countries, use is made of special indicators which give an indirect indication of GDP development through, for example, electricity consumption, the flight price index, car sales, or transport prices. In Slovakia, the indicator for the number of newly-registered motor vehicles has proven to be a suitable special indicator for estimating and predicting economic growth.

Conclusions

1. The following indicators, classified according to the time of their availability, may be used to estimate GDP

for the previous quarter as part of the internal forecasting process:

- the composite qualitative indicator for an uncompleted quarter: one month before the end of the reference period;
- the composite qualitative indicator for a completed quarter: at the end of the reference period;
- the composite indicator of receipts for an uncompleted quarter: within 15 days from the end of the reference period;
- the composite indicator of receipts for a completed quarter: within 45 days from the end of the reference period – corresponding to when the ŠÚ SR publishes the flash estimate;
- the ŠÚ SR publishes the adjusted GDP estimate within 70 days from the end of the reference quarter.

2. The individual partial estimates based on the above-mentioned indicators should be seen as indications that will only acquire a settled economic value with a sufficiently reasoned economic interpretation. Given the structural shifts in the Slovak economic area, the reforms taken and the external effects on the small and open economy, the forecast results need to be supplemented with a consistent economic interpretation.

3. The next stages in the development of internal approaches to the short-term forecast of economic growth should be aimed at the construction of composite indicators made up of several information sources.