5. Bulgarian National Bank Forecast of Key Macroeconomic Indicators for 2015–2017[1]

Global economic growth started to slow down in 2015 as a result mainly of lower growth in developing economies. In 2016 and 2017 growth in developing economies is expected to rise, pushing up global growth. Significant declines in international commodity prices, especially in crude oil prices in 2015 were due to sustained high production and inventories amid weakening demand. Downward price trends are projected to be reversed no earlier than the second half of 2016 under the influence of recovering growth in developing countries. International commodity prices may be expected to begin rising in 2017.

Over 2015 economic activity in Bulgaria accelerated, and real GDP growth is expected to reach almost 3 per cent. In 2016 growth will slow down to 2.1 per cent, with lower government investments acting as a specific factor for this year. In 2017 a new acceleration in real GDP growth to 2.8 per cent is forecasted. Risks to this outlook are assessed as broadly balanced.

Due to the open character of the Bulgarian economy and significant commodity and fuel imports, international price developments have a substantial effect on domestic prices. With the projected stabilisation of global commodity prices in 2016, deflationary trends in consumer prices would be discontinued, and inflation would start to accelerate slowly in 2017, provided that global price rise assumptions materialise. There are risks for inflation to be lower than projected, if international price dynamics is below our expectations.

Forecast

The trend of slowing growth in China and developing economies, which were negatively affected by strong commodity price declines, continued in 2015, resulting in lower global growth than in the previous year. Based on ECB and IMF forecasts on world economic outlook, in 2016 and 2017 global economic growth is expected to accelerate slightly in line with higher growth in developing countries and moderate increases in US and euro area GDP.

Demand for commodities and fuels contracted in 2015 following the economic activity slowdown in developing economies, especially China. The high level of inventories and output led to a decline in their prices throughout 2015. These trends are expected to continue in the first half of 2016, with international prices of commodities and fuels likely to stabilise only in the second half year under the influence of increasing demand amid higher growth in developing countries. More notable rebalancing of demand and supply in commodity markets, which may lead to a rise in energy and non-energy product prices, may be expected in 2017.

Bulgaria's economic growth accelerated substantially in 2015, exports contributing most significantly (a positive contribution to real growth of about 1.7 percentage points) despite the slowing global economic growth. Government investment was another important GDP component with a positive contribution to the 2015 growth, reflecting implementation of EU-funded projects concentrated from 2013 to 2015 for the 2007–2013 programme period. Slower growth in disposable income as a result of a lower increase in compensation *per* employee amid very weak employment growth was a factor behind low growth rates of private consumption and its insignificant contribution to real GDP growth for 2015.

Domestic demand will drive economic activity developments in 2016 and 2017. Private consumption will continue to rise amid increased real disposable income and will be a key factor for growth. An important assumption in this forecast is that private investment will discontinue its downward trend and start to recover as a result of both high levels of capacity utilisation and positive effects of public investment on growth. A specific factor for 2016 contributing to the economic growth slowdown will be lower

[1] This projection is based on data as of 15 December 2015.

year-on-year government investment (its volume under the BNB forecast is consistent with MF estimates as of October 2015). The projected private investment growth in 2016 would not be sufficient to compensate for the lower volume of government investment and will therefore lead to a decline in gross fixed capital formation in real terms. In 2017 this effect is likely to fade away, and total investment to increase due to both continuing growth in private investment and increased government investment.

In 2016 and 2017 the positive contribution of net exports to GDP growth is expected to gradually contract compared with its relatively high level in 2015. Real export growth in 2016 is anticipated to slow down compared with the previous year before it starts to accelerate consistent with the dynamics of external demand for Bulgarian goods and services. Imports of goods and services will also slow down in 2016 and will recover its rate of real growth in 2017 along with gradually accelerating domestic demand.

Given the above assumptions, economic growth is expected to moderate to 2.1 per cent in 2016 and to accelerate again to 2.8 per cent in 2017.

If the forecast of international price dynamics materialises, the terms of trade (measuring the change in export prices against import prices) are expected to remain favourable for Bulgaria in the 2016–2017 period and to contribute to lower balance of payments trade deficit. On the other hand, given the worsening economic activity in trading partners important for Bulgaria's tourist sector such as Russia and Greece, revenue from exports of services are expected to be lower in 2016 and correspondingly the positive balance on services to decrease as a share of GDP. With the recovery of economic activity in Bulgaria companies' profits will start to increase which may boost payment of dividends and distributed profit to non-residents, and correspondingly increase the deficit of the balance of payments primary income account. In the 2016–2017 period net secondary income will remain almost unchanged. Between 2016 and 2017 the balance of payments current account will remain positive and as a share of GDP will hover around 2015 values.

Employment will continue to increase in 2016 though at a slower pace than in 2015 due to the slowdown in economic activity. Companies will remain cautious in opening new jobs, optimising their labour costs. In 2017 employment growth is expected to slightly accelerate. In 2016 and 2017 the unemployment rate is expected to decline further. Given the expected slow employment growth, labour productivity will largely follow the pattern of the real GDP dynamics. With the acceleration of compensation per employee growth to the rate of labour productivity growth unit labour costs are expected to grow by around 2 per cent in 2016 and 2017.

The expected stabilisation of international prices of crude oil, food and commodities as of mid-2016 will contribute to the turnaround of the deflationary trend in the harmonized index of consumer prices in Bulgaria, and the annual inflation is anticipated to reach 1 per cent by the end of 2016. Following the international price dynamics inflation in Bulgaria will continue to slowly increase until the end of 2017. The rise in some administratively controlled prices, reflecting changes in tax legislation, will have a positive contribution to inflation. The forecast takes into account the impact of higher road fees since early 2016 and the rise in tobacco excise duties in the 2016 and 2017. Core inflation is expected to reverse its deflationary trend due to the positive contribution of services prices. Services inflation will be driven by consumer expenditure of households in the context of ongoing labour market improvement and increased real disposable income.

The expectations for the high savings rate of households to be sustained despite declining deposit interest rates will contribute to further growth of deposits to the non-government sector and keeping high liquidity in the banking system. In the 2016–2017 period the annual rate of private sector deposit growth is projected to range between 5 and 6 per cent. The projected smooth acceleration of private consumption and private investment will contribute to the gradual recovery of credit growth in the 2016–2017 period. The continuous decline in lending rates, driven by a deposit inflow in the banking system and interest rate conditions in the euro area, is expected to have a positive effect on demand for loans by non-financial corporations and households. The negative interest rate on banks' excess reserves with the BNB will have some additional impact pushing down deposit rates and consequently lending rates.

Risks to the Outlook

Risks to this outlook of economic growth are balanced. The risk of slower than projected global economic growth in the 2016–2017 period is offset by the possibility of domestic demand private components increasing more dynamically as compared with the baseline scenario. Higher economic growth in 2016 and 2017 is also possible in case of international environment improvement, weakening of geopolitical tensions, or higher than projected growth in the euro area and in developing countries. Growth may be also higher if domestic demand increases at higher than projected pace, reflecting both the stronger increase in private consumption and private investment, and eventually lower than expected public investment decline in 2016.

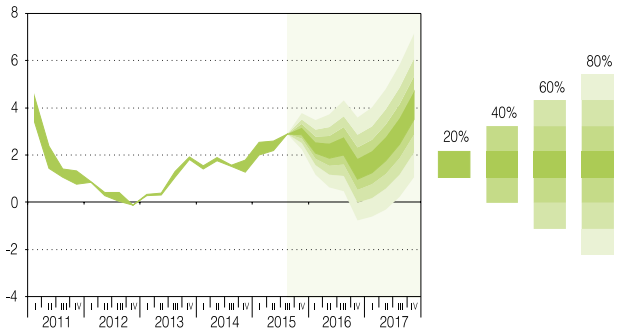
Uncertainty to the outlook for a particular indicator may be graphically illustrated by means of the so-called fan chart[2]. Chart bands set an interval in which with a certain probability the projected value is expected to fall (for further details see the note to the chart on GDP growth). Each interval widens with the increase in the forecast horizon, reflecting the increasing uncertainty further into the future. The fan chart on the annual GDP growth in 2015 shows that growth is most likely to range from 1 per cent to 3 per cent.

However, risks to the inflation forecast are shifted to lower inflation compared with the baseline scenario. The main factor impacting the inflation is the rate of change in international commodity and fuel prices. In particular, fuel prices may continue to decline faster than expected or for a longer period of time. As a result, besides direct deflationary effects second-round deflationary effects will also occur due to a decline in production costs. Uncertainty to the outlook relates to possible changes in some administratively controlled prices due to side effects of falling oil prices (heating and gas supply). The balance of risks to inflation is graphically shown in the fan chart below.

The external environment, and notably the economic activity in Bulgaria's major trading partners, remains the major source of uncertainty to the balance of payments projection. If the external demand for Bulgarian goods and services is lower than projected a higher trade balance deficit and lower surplus on the services balance may be expected, which will result in a lower current account balance.

Risks to the monetary sector outlook relate to lower than expected economic growth and weaker than expected decrease in interest rates on funds extended by commercial banks which will result in a slower recovery of loans to the private sector.

Fan Chart of the Expected Annual Rate of Change of GDP



Note: The fan chart shows the expert views of the forecasters on the uncertainty surrounding the projected value based on a probability distribution. The reporting period shows revisions of GDP growth estimates. The middle band of the chart, depicted in the darkest colour, includes the central projection and the probability distribution shows 20 per cent probability for the actual value to fall in this band in each of the quarters. If neighbouring bands (in the same brighter colour) are added to the middle band, there would be a 40 per cent coverage of the probability mass. Thus, by adding each same colour couple of bands, the probability for the value to fall there would be increased by 20 percentage points to reach 80 per cent. The probability for the value to remain outside the coloured part of the chart is 20 per cent based on the distribution chosen.

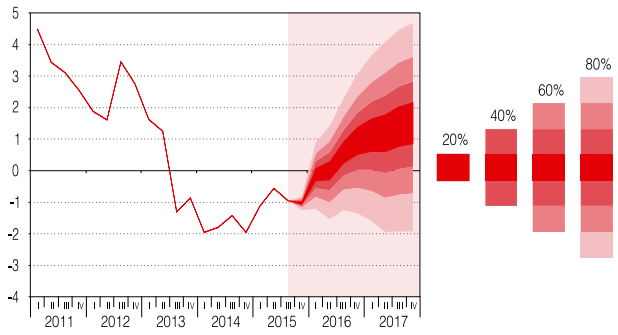
Source: BNB.

BNB Forecasting Function

One of the key central bank activities, supporting decision-making and preparing positions on the economic policy, is forecasting of key macroeconomic indicators describing the country's economic development. Through this activity central banks obtain an up-to-date view of both the expected economic developments and risks to their future dynamics. Usually central bank forecasts are based on macroeconomic models the results of which are supplemented by expert estimates. The models represent major linkages in the economy and experts add specific information and knowledge which is difficult to be formalised within a model.

[2] The use of fan charts is discussed in details in the box entitled 'Measurement and Presentation of Uncertainty in Forecasting Economic Indicators', Economic Review, 1/2012.

Fan Chart of the Expected Annual Rate of Change in Inflation at the End of the Period



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Source: BNB.

Forecast of Key Macroeconomic Indicators for 2015–2017

(per cent)

	2013	2014	2015	2016	2017
(annual rate of change)					
GDP at constant prices	1.3	1.5	2.9	2.1	2.8
Private consumption	-1.4	2.7	0.5	2.3	2.4
Government consumption	2.2	0.1	1.0	1.4	2.1
Gross fixed capital formation	0.3	3.4	2.2	-2.2	3.1
Exports (goods and services)	9.2	-0.1	7.1	3.7	4.3
Imports (goods and services)	4.9	1.5	4.2	2.3	4.0
HICP at end period*	-0.9	-2.0	-0.9	1.0	1.6
Core Inflation	-0.7	-1.6	-0.3	0.2	1.0
Energy	2.2	-13.9	-10.5	5.1	7.7
Food	-0.3	-0.7	0.9	0.5	0.9
Goods and Services with Administratively Controlled Prices and Tobacco Products	-3.0	1.2	-0.7	1.8	1.3
Employment	-0.4	0.4	0.4	0.2	0.5
Unit Labour Costs	7.0	4.4	-0.6	2.2	1.9
Labour productivity	1.7	1.2	2.6	1.9	2.3
Unemployment Rate (share of labour force)	12.9	11.4	9.4	8.5	7.9
Claims on Non-government Sector	0.3	-7.7	-1.6	1.5	3.4
Claims on Corporations	0.3	-12.0	-1.6	1.5	3.4
Claims on Households	-0.2	-1.6	-1.3	1.4	3.2
Deposits of the Non-government Sector*	8.7	1.5	10.6	5.9	5.7
% of GDP					
Balance of Payments Current Account	1.8	1.2	1.8	2.2	1.9
Trade Balance	-6.9	-6.4	-4.0	-2.9	-2.5
Services, net	6.5	5.9	5.2	5.0	5.1
Primary Income, Net	-3.5	-2.1	-3.3	-4.0	-4.2
Secondary Income, Net	5.7	3.8	3.8	3.9	3.5
(annual rate of change)					
External Assumptions					
External demand	2.4	3.2	1.5	3.4	4.5
Average Annual Brent Oil Price (in USD)*	-2.8	-9.1	-47.1	-12.3	16.0
Average Annual Price of Non-energy Products (in USD)*	-6.1	-8.6	-19.9	-9.5	3.2
Brent Oil Price at the End of Period (in USD)*	-0.9	-30.5	-42.9	10.9	12.5
Price of Non-energy Products at the End of Period (in USD)*	-7.0	-13.3	-20.4	-0.2	3.1

Reporting data for 2015.

Source: BNB.

Supplementing of the results of the macroeconomic model by expert analysis allows for preparing realistic views of future economic development taking into account the uncertainty surrounding the forecast.

Central bank forecasting is aimed mainly at providing clear and consistent story of the most probable future economic developments. The forecast is an economically justified most probable (from the point of view of the forecasting team) trajectory of future economic developments, with this trajectory being surrounded by a number of other possible states of the economy which are likely to materialise with a certain probability. These circumstances require as a good practice in preparing and presenting forecasts the main forecast (baseline scenario) to be accompanied by an analysis identifying the attendant risks. Risks may, on a case-by-case basis, be described or presented verbally or graphically[3], and in case of higher degree of uncertainty – in the form of alternative scenario of future economic developments.

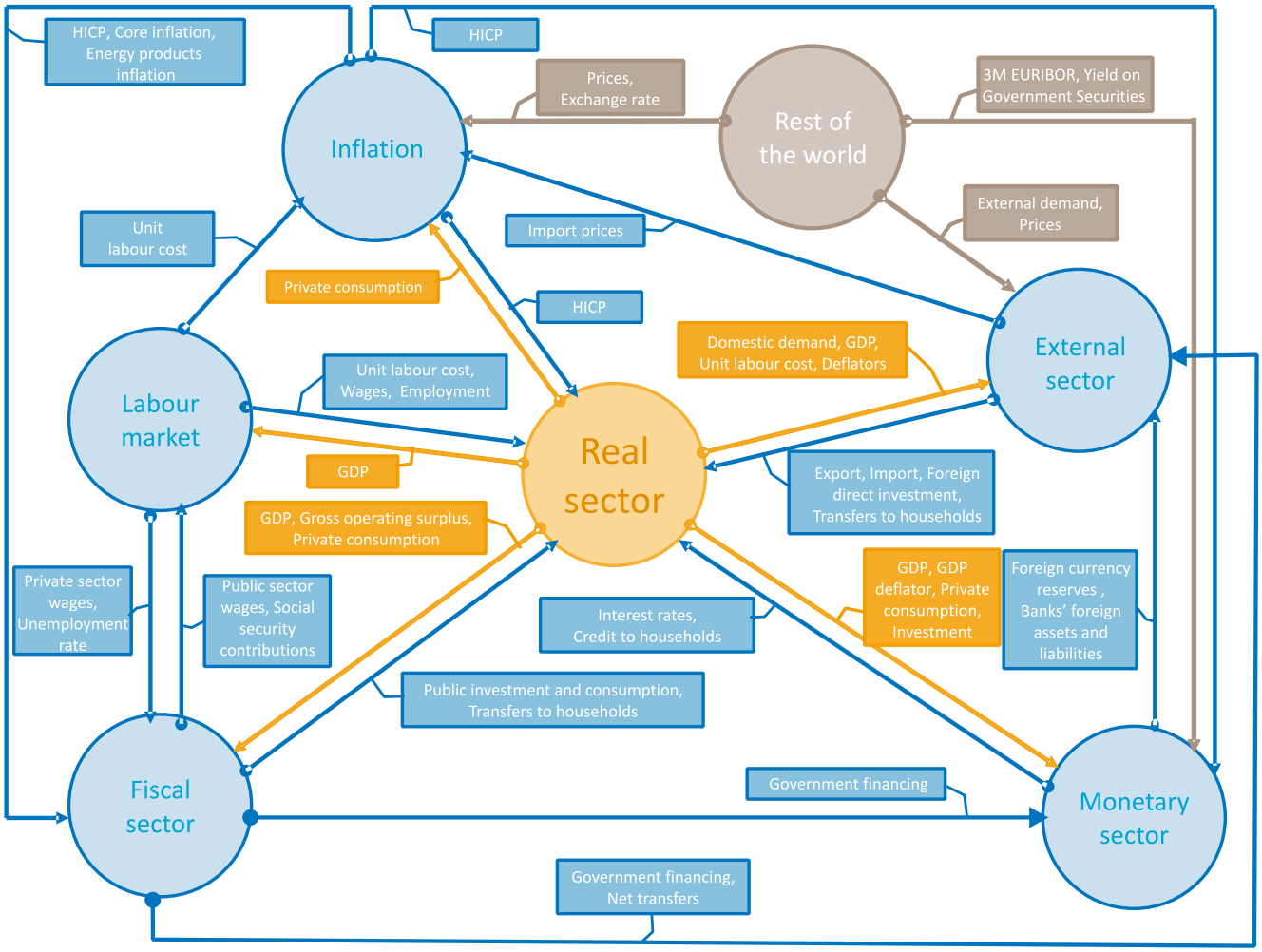
Similar to other central banks, BNB macroeconomic forecast is a result of a macroeconomic model used and an expert estimate of the most probable scenario of future economic developments in Bulgaria. The forecasting model used by the BNB employs data of quarterly frequency and belongs to the group of macroeconometric forecasting models. It is the BNB's major tool for preparing forecasts and simulations of effects of economic shocks. The system of

[3] Fan charts published in the Economic Review are one of the standard ways for graphical presentation of risks to a particular forecast.

equations in the model is based on the assumption of available long-term and short-term behavioural economic relationships. It is considered that irrespective of the short-term economic shocks the macroeconomic variables follow their own long-term dynamics, which is ensured in the model through the so-called Error correction mechanism.[4]

The first version of the model was created in 2008[5]. The model has been continuously developed by adding new information in order to more comprehensively take account of behavioural relationships in the economy. Linkages in the model describe main economic mechanisms in the Bulgarian economy and its interaction with major trading partners. The model consists of six interacting blocks: the real sector, consumer prices (inflation), labour market, external sector, fiscal sector and monetary sector. Major linkages between the blocks are shown in Figure 1 below. The model is solved simultaneously for all blocks and the results are subject to an in-depth expert analysis, which is to be incorporated in the final version of the forecast of key economic indicators.

Main Blocks and Linkages in the BNB Forecasting Model



Source: BNB.

[4] Error correction models play an important role in economic literature. One of the main articles on this topic is: Engle, R. and C. Granger (1987). 'Co-integration and error correction: representation, estimation, and testing', Econometrica, (55).

[5] The first version of the quarterly forecast model presented at a conference on the Forecasting Models and Procedures of EU Central Banks on 23 April 2008 in Sofia is published on the BNB website at: http://www.bnb.bg/bnbweb/groups/public/documents/bnb_download/p_e_sc_annual_conf_2008_a5_bg.ppt

This process can be divided into four stages: The first stage starts after the publication of the first NSI official estimates on Bulgaria's quarterly GDP and includes the preparation of data and the working environment of the model. At this stage external assumptions of the model are specified as forecasts based on information from external institutions (*e.g.* the ECB or IMF) about the external demand for Bulgarian goods and services[6] and the dynamics of prices of major commodity groups. Technical assumptions which will be reflected in the forecast are specified, *e.g.* assumptions of no policy change in particular parameters of the economic policy, exchange rates of the Bulgarian lev against the US dollar and SDR, and the gold price, which are fixed at their average value for a period of ten days prior to data loading in the model. The assumptions about EURIBOR are based on the average price of futures contracts with various maturities for a period of ten days prior to data loading in the model. Experts prepare a macroeconomic analysis intended to identify (in the context of the current external economic situation) the initial conditions, in which the Bulgarian economy is at the time of preparing the forecast. The general framework of the forecast baseline scenario is specified and in case of high uncertainty also a framework of an alternative scenario. Usually, alternative scenarios are based on material risks established by experts which cannot be encompassed by the baseline scenario.

At the second stage the model loaded with data is solved and experts analyze the results. In view of the imperfections of macroeconomic models mentioned above, at this stage the solution of the model is subject to an expert analysis in order to correct the results in such a way as to reflect also the view of the team preparing the forecast of expected economic developments.

The third stage relates to the description of the forecast presenting a consistent story of future developments in the Bulgarian economy. The description includes the factors which are expected to drive future developments and risks that may prompt a deviation of reported indicators from their forecast value.

The final stage starts after publishing of reporting data which are compared with forecast values of the corresponding macroeconomic indicators. Experts discuss the factors responsible for deviations of indicators from the forecast, and if deemed necessary, they re-estimate behavioural linkages in the macroeconomic model.

[6] External demand is measured by weighting real imports of Bulgaria's major trading partners.