Box 5. Corroborative evidence on the degree of economy overheating

Overheating of an economy occurs when short-term aggregate demand exceeds long-term aggregate supply. In other words, in the case of the economy as a whole, the output gap is positive, with the ensuing excess demand exerting, *ceteris paribus*, inflationary pressures. At the same time, overheating implies imbalances across most of the economic sectors. This box presents a statistical analysis[1] corroborating the analyses relying on macroeconomic models regarding the current cyclical position of the economy used by NBR. According to these models, there are signals of overheating of the Romanian economy at this moment.

Corroborative assessment rests on a portfolio of relevant variables. The signal strength is set by the position of the signal value for each variable relative to a number of thresholds, using the following classification: (i) lack of signals from the indicator when the signal value is below the historical average; (ii) moderate signals from the indicator when it is placed between the mean and the first threshold; (iii) strong signals from the indicator when it lies between the two thresholds; and (iv) severe signals when the indicator exceeds the second threshold. The signal value is calculated as a mean of the four latest available quarterly values[2] and the two thresholds result from adding 0.5 and 1.5 standard deviations respectively to the historical average[3]. Hence, a probability distribution for each indicator is displayed, its reference values being the historical average and the two thresholds respectively, placed on the right side of the historical average for most of the variables. For the unemployment rate, risk premium and the percentage of firms citing insufficient demand as a factor limiting production in industry and services, the thresholds are symmetrical, being calculated on the left side of the historical average. Looking at the deviations from target of CPI and adjusted CORE2 inflation rates, net of the first-round effects of VAT rate cuts, the thresholds were set at +1 percentage point and +2 percentage points respectively. For the general government deficit, the first threshold was set at 3 percent, i.e. the reference value for the relevant nominal convergence criterion concerning the sustainability of public finances, as stipulated by the Maastricht Treaty.

Table A shows how the strength of overheating signals evolved over time. The current assessment reflects intensifying signals from output gap, industrial production, the percentage of firms citing insufficient labour force as a factor limiting production in the services sector and the composite index of economic activity[4]. At the same time, worth noting is the density of moderate or strong overheating signals coming from the following sectors: labour market (in particular, the degree of its tightening, the public sector gross wage), real sector (industrial production, residential property

1 The methodology used herein is similar to that implemented by the IMF in its *World Economic Outlook* (April 2013). A comprehensive set of indicators is also monitored in the scoreboard for the surveillance of macroeconomic imbalances – *Macroeconomic Imbalance Procedure Scoreboard,* MIP – developed and updated by the EC.

2 For the variables expressed as a percentage of nominal GDP (4-quarter cumulated values), the signal value is the latest available figure.

3 For most of the variables, the historical average is calculated for the period 2005 Q3 – 2017 Q2, i.e. after inflation targeting was introduced. Residential property prices and new loans are, however, available for a shorter period.

4 It captures information on the cyclical components of certain macroeconomic variables such as the number of employees in the economy, industrial production or net real wage.

prices[5], economic sentiment indicator – ESI, the percentage of firms citing insufficient demand as a factor limiting production in industry and services[6]), and fiscal policy. Concurrently, the new all-time low in unemployment rate (ILO definition) is indicative of labour market tightening and, in turn, overheating signals.

Table A. Developments in signals relative to overheating indicators

	Indicator	2016			2017	
		Q2	Q3	Q4	Q1	Q2
	Output gap (% of potential GDP, NBR assessment)					
	Deviation from target of annual CPI inflation, net of VAT effect (pp)					
	Deviation from target of annual adjusted CORE2 inflation, net of VAT effect (pp)					
Real sector	GDP (%, qoq, real change)					
	Industrial production (%, qoq, real change)					
	Capacity utilisation in industry (%)					
	Turnover volume of retail trade, excluding motor vehicles and motorcycles (%, qoq, real change)					
	Construction works (%, qoq, real change)					
	Residential property prices (%, qoq, real change)					
	Economic sentiment indicator – ESI (points)					
	Percentage of firms citing insufficient demand as a factor limiting production in industry					
	Percentage of firms citing insufficient demand as a factor limiting production in services					
	Percentage of firms citing insufficient labour as a factor limiting production in industry					
	Percentage of firms citing insufficient labour as a factor limiting production in services					
Labour market	Labour market tightness indicator					
	ILO unemployment rate (%)					
	Gross wage, private sector (%, qoq, real change)					
	Gross wage, public sector (%, qoq, real change)					
	Unit wage costs in industry (qoq, nominal change)					
Fiscal policy	General government deficit (% of nominal GDP)					
	Fiscal impulse (NBR assessment)					
Financial sector	Credit to private sector (% of nominal GDP)					
	New consumer credit, households (% of nominal GDP)					
	New housing loans, households (% of nominal GDP)					
	New loans to non-financial corporations (% of nominal GDP)					
	Bucharest Stock Exchange index, BET (%, qoq change)					
	Risk premium, OAS (basis points)					
External position	Current account deficit (% of nominal GDP)					
	Deficit on trade in goods (% of nominal GDP)					
	Financial account (% of nominal GDP, "+" inflows)					
Composite indices	Composite index of economic activity (NBR assessment)					
	Business conditions indicator (NBR assessment)					

lack of signals moderate signals strong signals severe signals

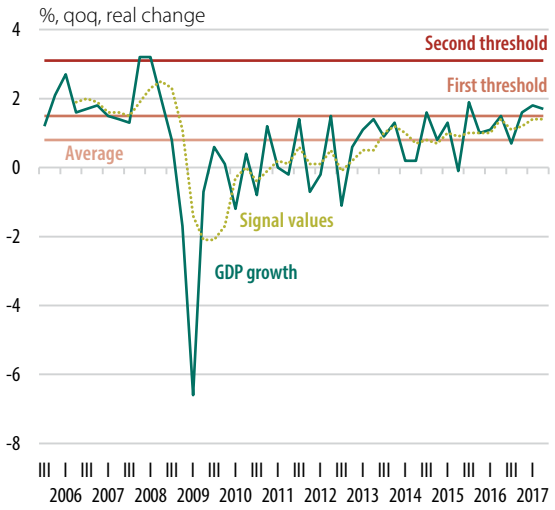
The assessments deriving from the NBR's model for medium term analysis and projection point to an overheating trend, reflected by the output gap performance. As early as 2016, the output gap was estimated in positive territory and was subsequently strengthening. Against this backdrop, the signal value in 2017 Q2 was slightly higher than the first threshold.

5 In 2017 Q2, residential property prices climbed at a quarterly rate of 4.9 percent (a post-crisis high).

6 Over the past two years, the percentage of firms citing insufficient demand as a factor limiting production in industry and services witnessed a decline.

From 2016 Q3 to 2017 Q2, the deviations from target of annual CPI and adjusted CORE2 inflation rates, net of the direct effects of VAT rate cuts, were negative at -1.7 percentage points[7] and -1.2 percentage points respectively, and below their historical averages. Core inflation net of VAT rate cuts followed a downward path over the past years, reflecting the developments in external prices, economic agents' inflation expectations, and the negative output gap (until 2016). Its deviation from the target stayed in negative territory in 2016 Q3 and Q4, a trend that persisted into 2017, in spite of the incipient, albeit gradually rising, excess demand[8].

Chart A. Signal value of quarterly GDP growth against the thresholds



Source: NIS, NBR calculations

In 2016 as a whole, real GDP dynamics hit a post-crisis high of 4.8 percent and continued to expand at a swift tempo in 2017 Q1 and Q2 (1.8 percent and 1.7 percent respectively). The signal value of real GDP growth still points to moderate overheating, exceeding the historical average, but merely 0.1 percentage points below the first threshold (Chart A).

Turning to the labour market, an overheating trend in all of the reviewed indicators is taking shape. The new all-time low in ILO unemployment rate in 2017 Q2 sends a severe signal, while the labour market tightening points to a strong signal. Gross wages (in the private and especially public sectors) have recently seen their average quarterly rates increasing faster than the historical average, having the potential to boost the wage-productivity differential and, implicitly, to exert inflationary pressures.

The fiscal consolidation trend initiated in the aftermath of the global financial crisis was reversed in 2016, when the general government deficit widened to 3 percent of GDP. The position taken by the signal value for the aforesaid indicator, corroborated with that for the fiscal stimulus[9], indicates that fiscal policy played a sizeable part in fuelling the degree of economy overheating.

The developments in financial indicators are usually seen as leading indicators in shaping real sector imbalances, carrying the potential to boost the business cycle noticeably. During 2015-2016, the volume of new loans tended to go up, particularly on the back of mortgage loans ("First Home" programme). As for

7 Over the past four quarters, a similar position had also the deviation from target of the annual CPI inflation rate recalculated at constant taxes (-1.5 percentage points).

8 At present, the weakening relationship between inflation and the positive output gap is one of the factors behind the cited development. For further details, see Box 2 titled "The relationship between economic activity and inflation" in the May 2017 *Inflation Report*.

9 It quantifies the impact of discretionary fiscal policy measures on the economy. In light of the positive output gap in 2017 Q2, fiscal policy is assessed as having a pro-cyclical nature.

consumer credit, the share of the annual flow of borrowings in GDP was close to the historical average in 2017 Q2. On the other hand, new loans to non-financial corporations saw their share in GDP stuck at relatively steady, low levels after the post-crisis decline that lasted until 2012. Risk perception associated with investment in the local economy (approximated based on the option adjusted spreads, OAS), negatively correlated with economic activity dynamics, may, given the low readings recorded over the past quarters compared to the historical average, augment economic agents' buoyancy and, in turn, the degree of economy overheating.

The variables of the external position (i.e. the deficit on the trade in goods, current account deficit and the balance on financial account, as shares of GDP) do not show signs of economy overheating at this moment. Signal values are well below historical averages, the latter being however affected by the major imbalances that had built up in the pre-crisis years. Nevertheless, current account deficit widening on the back of a larger government deficit and the spike in consumption can jeopardise macroeconomic equilibria, even though the current financing structure (consisting extensively of non-debt-creating flows, mostly foreign direct investment, equity, as well as structural and investment funds) is materially different from that seen during the previous economic boom.

The assessment of economic growth and cyclical position based on the output gap can be corroborated with a series of composite indices. The fact that the business conditions indicator[10] stood, over the recent periods, at positive readings, above the first threshold, helps propel economic activity and, in turn, expand excess demand. Moreover, the composite index of economic activity is above the first threshold, hinting at stronger excess demand.

References

National Bank of Romania – *Inflation Report*, May 2017

European Commission – *Scoreboard for the Surveillance of Macroeconomic Imbalances*, 2011

International Monetary Fund – *World Economic Outlook*, 2013

Smădu, A., Stanciu, I., Tănase, A. – "Estimating a Real-time Business Conditions Indicator for Romania", National Bank of Romania, *Occasional Paper* No. 22, 2016

10 For further details, see Smădu *et al*. (2016).