CENTRAL BANK OF MONTENEGRO

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1. INFLATION INDICATORS

Consumer prices in Montenegro continued previous year growth in the first two quarters of 2018. During this period, annual growth rates of consumer prices were recorded in all months, and positive annual inflation rates were recorded in all countries in the region and in most EU countries.

Inflation in Montenegro recorded quarterly growth of 0.5% in Q2 2018, which is largely the result of price increase in the category of hotels and restaurants, transport, and food and non-alcoholic beverages. Observation of consumer prices monthly trends shows that the price increase was recorded in all three months of Q2, specifically 0.1% in April, 0.3% in May and 0.2% in June. Average consumer prices rate (the first six months of 20187 in relation to the same period of 2017) amounted to 3%, while at the annual level, prices increased by 3.4%.

Table 1

Inflation, %						
	2017				2018	
	III	VI	IX	XII	III	VI
Change in relation to the previous year-end	0.5	0.5	2.2	1.9	1.5	2.0
Annual change	2.7	2.1	2.8	1.9	2.9	3.4

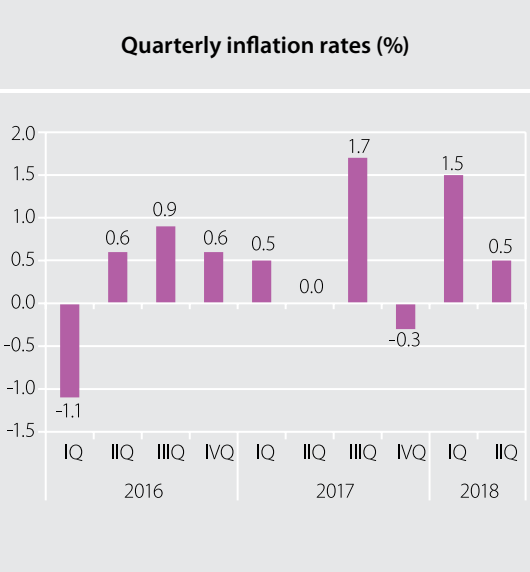
Source: MONSTAT

In the second quarter, price growth in Montenegro was recorded in four of the twelve categories that account for 53.9% of the consumer basket (Table 2). The contribution to total inflation was recorded in the category of *transport* of 3.9%, mostly as the result of price increase in fuels and lubricants for motor vehicles (7.9%). Price increase in fuels was the result of the depreciation of euro against the US dollar and of increased oil price at international market. Prices under *hotels and restaurants* (growth of 5.6%) and *food and non-alcoholic beverages* (growth of 0.7%) gave the most significant contribution of 0.3 percentage points. As usual at the start of the summer season, the price in prices of accommodation of 13.1% contributed the most to the price increase under hotels and restaurants, while respective price increase in vegetables, fish and sea food, fruit, and milk, cheese and eggs of 5.1%, 1.9%, 1.8%, and 1% recorded the highest price increase under food and non-alcoholic beverages. Prices under *alcoholic beverages and tobacco* recorded price increase of 0.2%, due to price increase in alcoholic beverages of 0.7%.

The decline in prices was recorded in categories of *clothing and footwear* and *housing, water, electricity gas and other fuels* by -2.1% and -1.2%, respectively, which gave the largest negative contribution to total inflation of -0.2 percentage points each). During the reporting period, price decrease was recorded in: *furnishing, household equipment and routine household maintenance* (-0.4%), *recreation and culture* (-0.3%), *communications*, and *miscellaneous goods and services* (of -0.2%). Prices under *health* and *education* remained unchanged in Q2 2018.

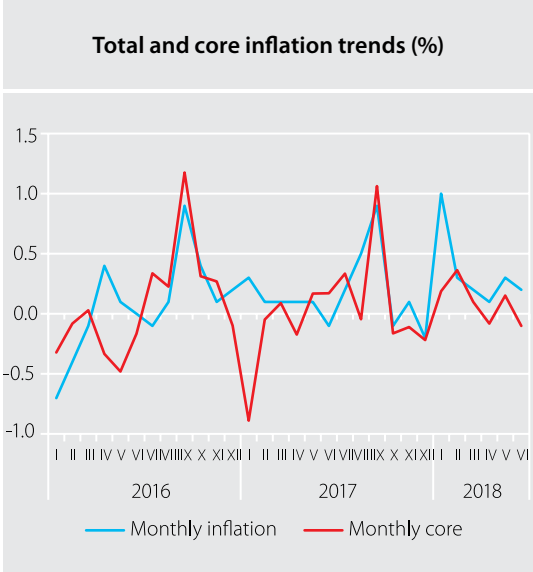
During the Q2 2018, the *monthly core* inflation in all three months (April, May, and June) 2018 was lower than the official monthly inflation. The core inflation had a negative rate during April and June, while it was positive in May (Graph 2).

Graph 1



Source: Monstat and CBCG calculations

Graph 2



Source: Monstat and CBCG calculations

The annual core inflation rate in June 2018 amounted to 1.4% and was lower by 2 percentage points than the total inflation. The increase in the prices of certain agricultural products, tobacco, electricity and fuels, which are excluded from the calculation of core inflation, made a significant contribution to the growth of total inflation. Annual core inflation was lower than total inflation for three months and had

Table 2

Share of selected categories in total inflation[1]

	Weights	VI 18 / III 18	Growth rate	Contribution
TOTAL	1000	100.5	0.5	0.5
Food and non-alcoholic beverages	341,1	100.7	0.7	0.3
Alcoholic beverages and tobacco	40.4	100.2	0.2	0.0
Clothing and footwear	86.1	97.9	-2.1	-0.2
Housing, water, electricity gas and other fuels	154.0	98.8	-1.2	-0.2
Furnishing, household equipment and routine household maintenance	39.4	99.6	-0.4	0.0
Health	40.8	100.0	0.0	0.0
Transport	109.4	103.9	3.9	0.4
Communication	48.5	99.8	-0.2	0.0
Recreation and culture	32.0	99.7	-0.3	0.0
Education	18.7	100.0	0.0	0.0
Hotels and restaurants	47.6	105.6	5.6	0.3
Miscellaneous goods and services	42.0	99.8	-0.2	0.0

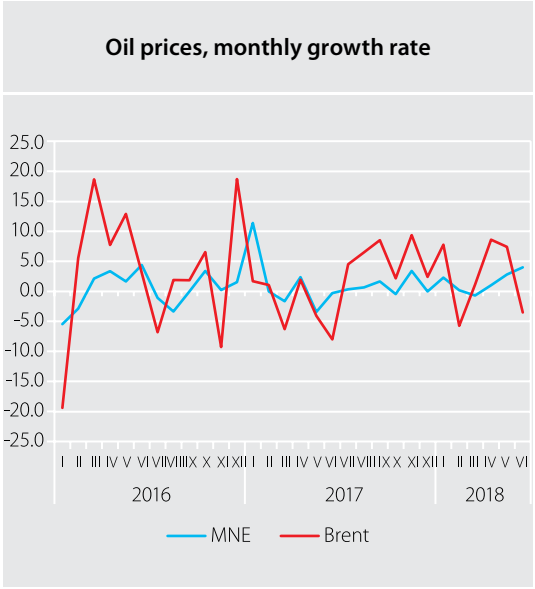
Source: MONSTAT and CBCG calculations

[1] It should be noted that, regardless of the index changes, due to the weight structure, the contribution of the share of certain categories is not recorded before the second, i.e. third decimal.

a positive rate during all three months of the second quarter, as well as official monthly inflation.

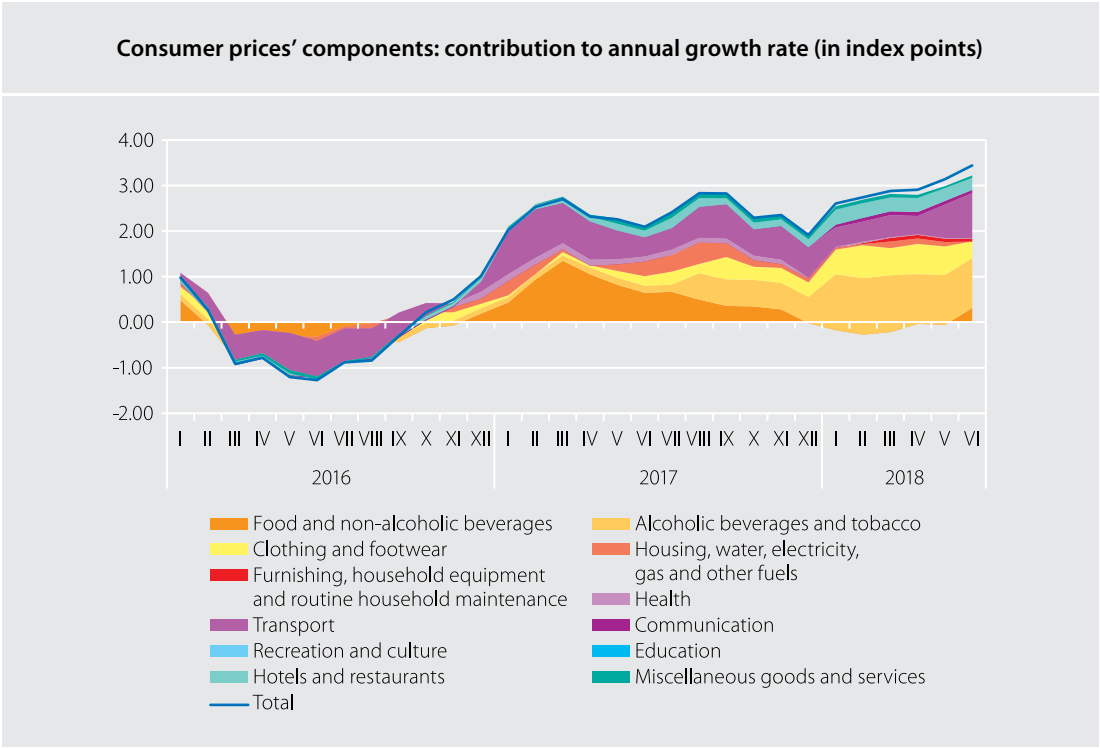
In Q2 2018, the oil prices at global markets recorded significant quarterly increase. The average price of the OPEC reference basket in Q2 2018 amounted to 71.9 USD/barrel, which is an increase of 11.2%% in relation to Q1 2018, and the highest one since Q4 2014 (73.4 USD/barrel). The average Brent price in the second quarter was 74.2 USD/barrel, or 11.2% more than the average price from the previous quarter, which was largely the result of the USA exit from the Iran's Nuclear Agreement[2] and the announced sanctions to Iran that would limit the Iranian export of crude oil. In its latest report *Global Economic Prospects* of June 2018, the World Bank forecasted the average oil price of 70 USD/barrel which was above the first forecasts.

Graph 3



Source: Monstat and "Monthly Oil Market Reports", OPEC

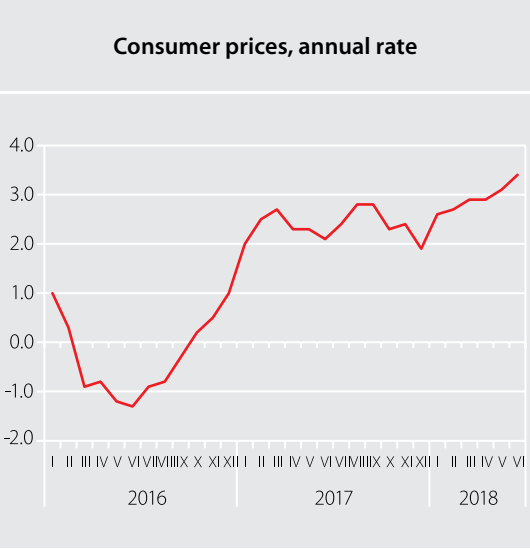
Graph 4



Source: Monstat and CBCG calculations

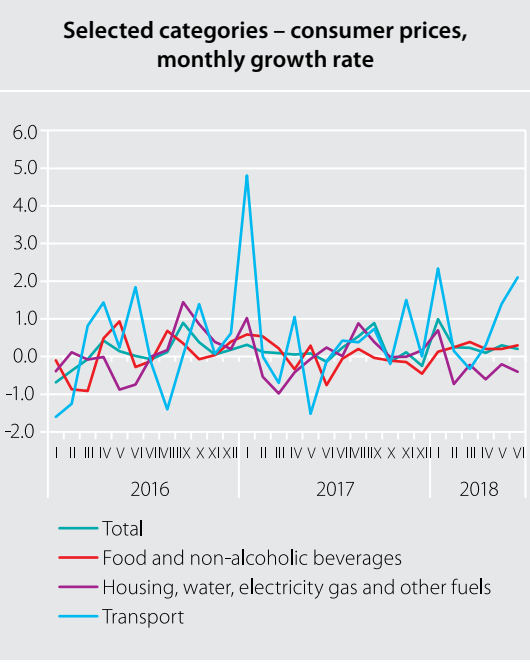
[2] Iran's Nuclear Agreement - signed on July 2015 between Iran and the five standing members of the United Nations Security Council and Germany.

Graph 5



Source: MONSTAT

Graph 6



Source: MONSTAT

Annual prices growth of 27.1% in the *alcoholic beverages and tobacco* category gave the largest contribution to the increase (1.1 percentage points) in the total annual inflation rate of 3.4%. Annual price growth was also recorded in the following categories: *transport* (9.2%), *hotels and restaurants* (5.6%), *clothing and footwear* (4.3%), *furnishing, household equipment and routine household maintenance* and *communications* (1.5% each), *miscellaneous goods and services* (1.3%), *food and non-alcoholic beverages* (0.9%), and *health* (0.2%). The annual fall in prices was recorded in the categories *recreation and culture* (-0.3%) and *housing, water, electricity gas and other fuels* (-0.1%), while prices in the category *education* remained unchanged.

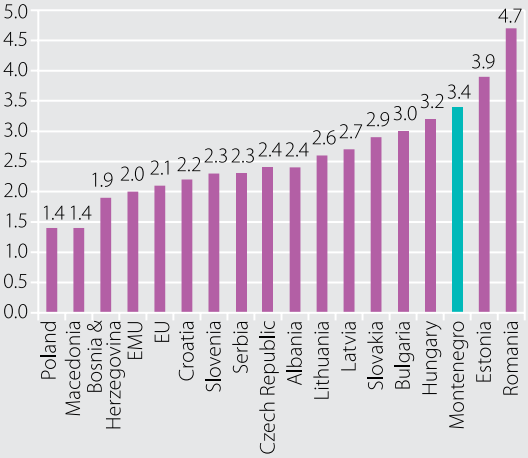
In June 2018, **producers' prices of manufactured products** recorded 2.2% growth in relation to December 2017. This was due to the growth recorded in all three sectors: electricity, gas and steam supply of 4.4%, mining and quarrying sector (1.4%) and manufacturing industry (1.2%). On the annual level, producers' prices of manufactured products increased by 2.1%.

Comparison of annual inflation recorded in Montenegro with the inflation recorded in selected countries shows that, in addition to Montenegro, all the selected countries recorded positive inflation. The highest positive annual inflation rate was recorded in Romania (4.7%) while Poland and Macedonia recorded the lowest annual inflation rate (1.4% each).

The annual HICP inflation rate reported in the euro area amounted to 2%, CPI inflation in Montenegro amounted to 3.4%, while annual HICP inflation in Montenegro was 3.6%.

Graph 7

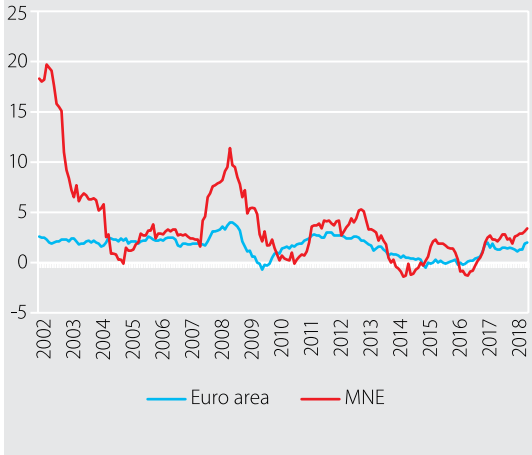
Annual inflation rate in selected countries, June 2018



Source: National Statistical offices and Eurostat

Graph 8

Inflation in the euro area (HICP) and Montenegro (CPI)[3] since the introduction of euro (annual rates)



Source: Monstat and Eurostat

[3] Costs of living were used for measuring inflation in Montenegro until 2009, after which consumer prices were introduced.

2. INFLATIONARY EXPECTATIONS

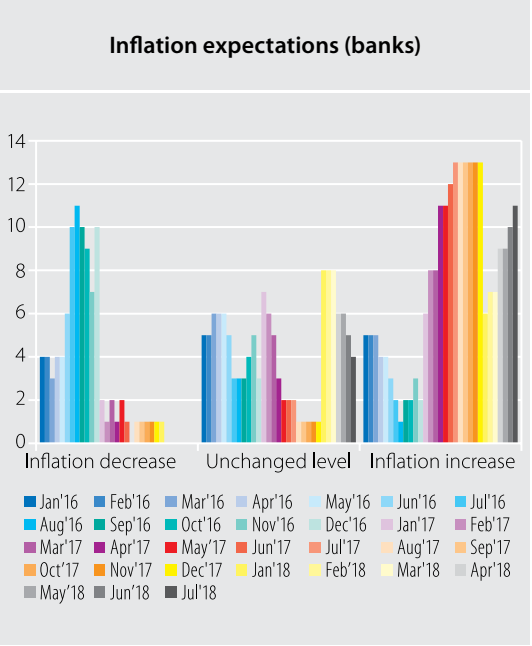
2.1. Banks' expectations

In reference to inflation expectations of banks, based on the survey conducted in July this year, eleven banks expect inflation to grow, four banks expect inflation at the same level as in 2017, while none of the banks expect inflation to decline in relation to 2017 (Graph 9).

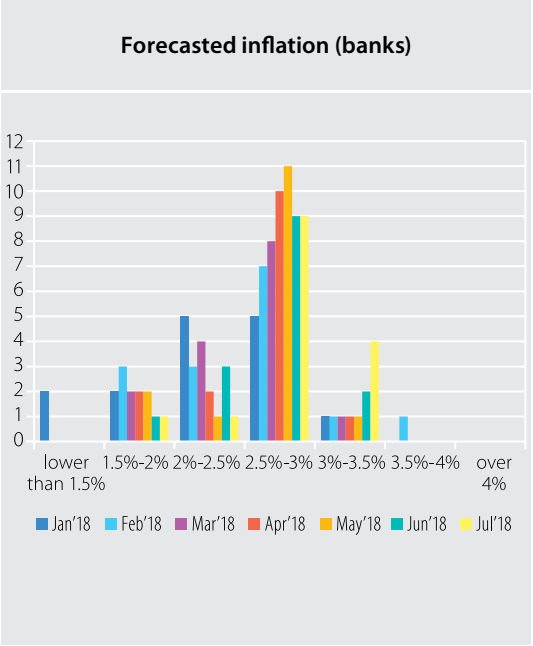
Banks have different expectations regarding inflation levels. Nine banks expect the level of inflation in the range of 2.5% and 3%, four banks expected inflation to range between 3% and 3.5%, while one bank each expected respective inflation between 1.5% and 2%, and between 2% and 2.5% (Graph 10).

Concerning the expectations on the nominal lending interest rate trends, nine banks expect this rate to decline, six banks expect to remain at the same level, and none of the banks expects the nominal lending interest rate to increase. The banks expected the same regarding the effective interest rate.

Graph 9

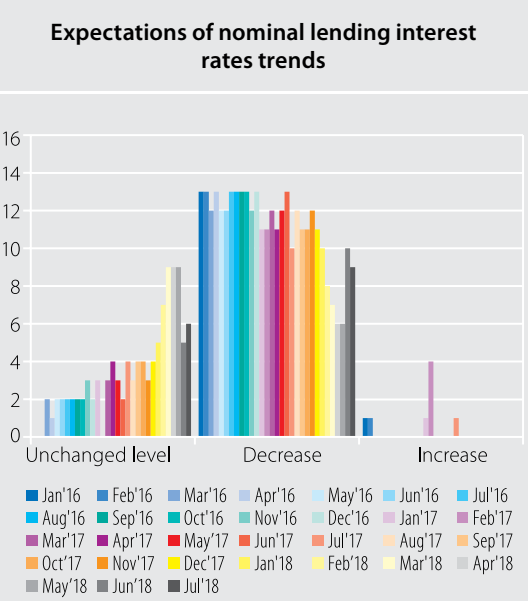


Graph 10

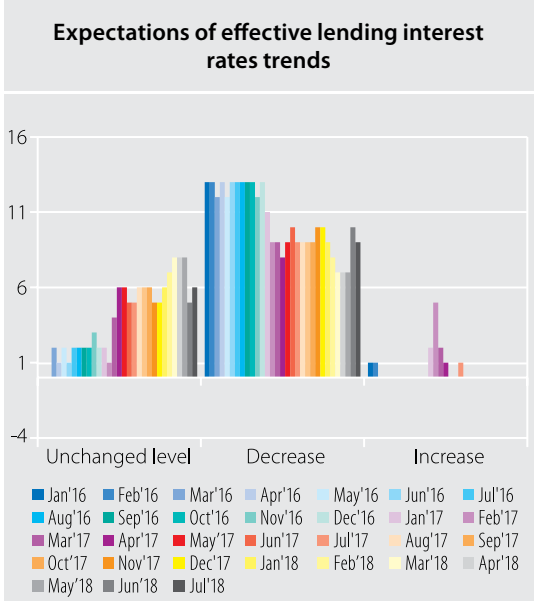


In reference to deposit interest rates trends, seven banks expect them to decline, eight banks expect no change, while none of the banks expects an increase in deposit interest rates.

Graph 11

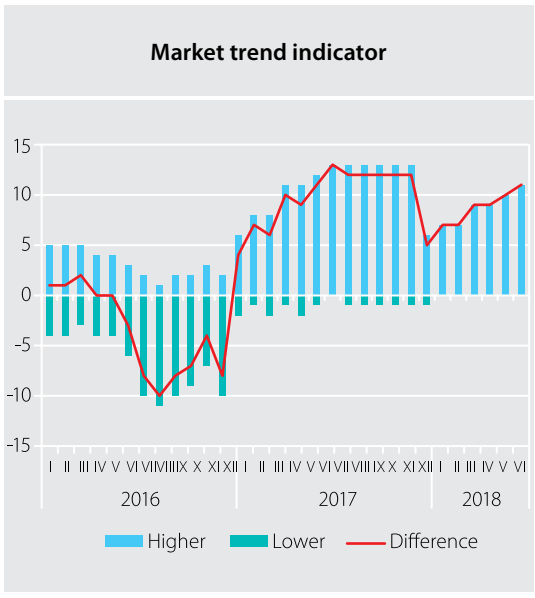


Graph 12



For the purpose of calculating inflation forecasts we use market trend indicator (line in Graph 13). It is calculated as the difference between the number of banks expecting an inflation growth and the number of banks expecting inflation decrease. If the market trend indicator has a negative value, a decrease in the inflation rate is expected in the upcoming period. If it has a positive value, then an increase in the inflation rate can be expected. If it has a zero value, an unchanged inflation rate can be expected in the upcoming period. The more negative its value is, the lower the inflation forecast is, and vice versa, higher positive value means higher inflation level forecasts. In 2017, inflation forecasts were significantly high, with some oscillations, while they continued their positive trend over the first seven months of 2018.

Graph 13



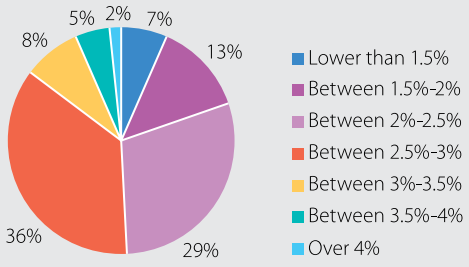
2.2. Expectations of economy (except banks)

Inflation

Out of total surveyed companies, the largest number (36%) expected that inflation in 2018 would range between 2.5% and 3%. Inflation in the range of 2% to 2.5% is expected by 29% of companies, while 13% of surveyed companies expect the inflation to range between 1.5% and 2%. Some 8% of companies expected inflation to fluctuate between 3% and 3.5%. Inflation rate lower than 1.5% in 2018 was expected by 7% of respondents, 5% predicted inflation between 3.5% and 4%, while 2% expected inflation higher than 4% (Graph 14).

Graph 14

Expected inflation in 2018 in relation to 2017

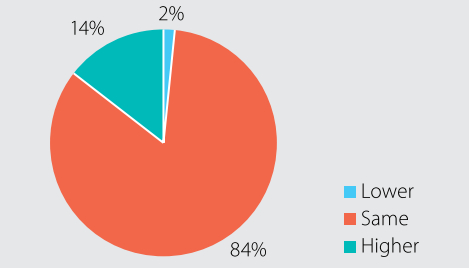


As much as 84% surveyed companies expect wages and salaries to remain unchanged in 2018, 14% of the surveyed companies expected them to increase, while 2% expected wages and salaries to decline. With regard to the number of employed persons, 64% of surveyed companies expect it to remain unchanged, 31% expect this number to increase, and 5% expected it to decrease.

The majority of surveyed companies (44%) expected the prices of production inputs to remain unchanged, and 23% expect the prices of their products (services) to trend up in 2018.

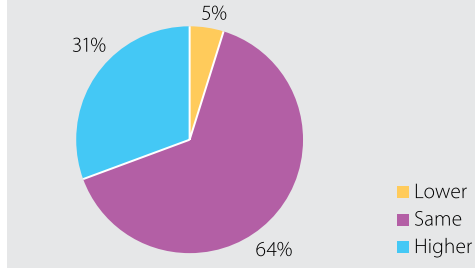
Graph 15

Expected wages and salaries in 2018 in relation to 2017

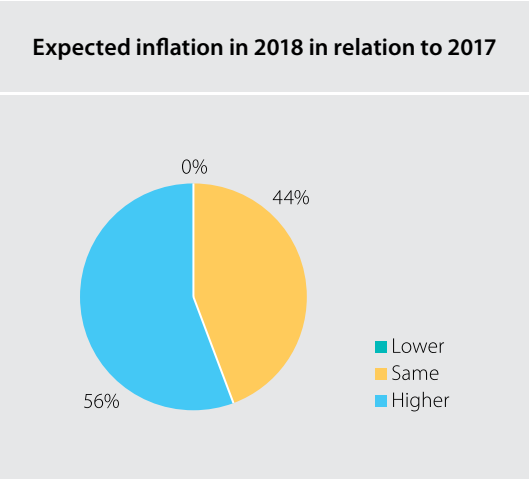


Graph 16

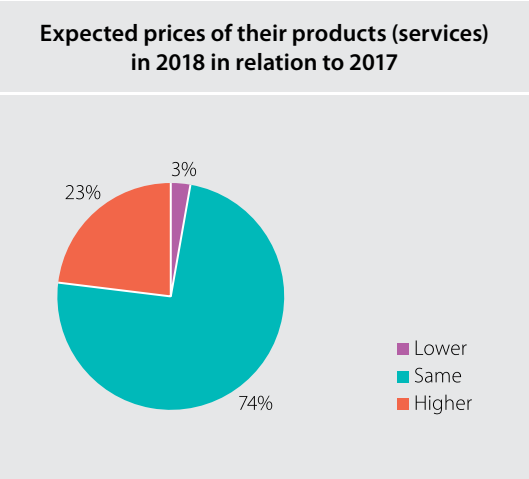
Expected number of employees in 2018 in relation to 2017



Graph 17



Graph 18

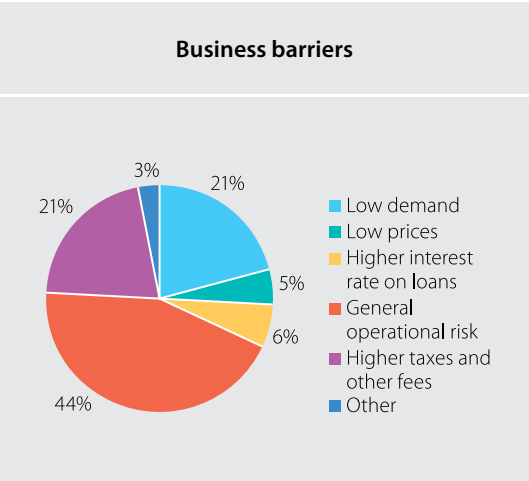


Business Environment

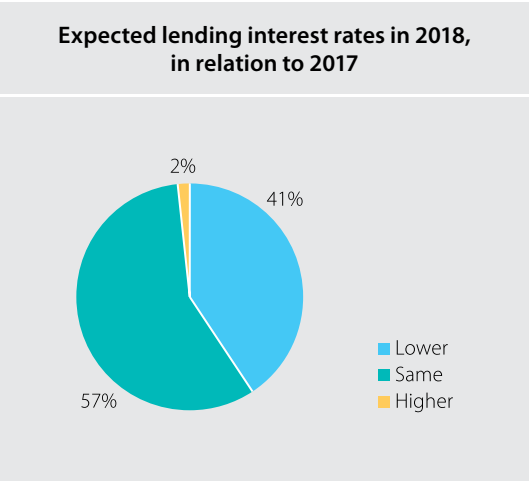
Concerning the business barriers, survey results showed that most of the surveyed companies saw general operational risks (44%), and low demand and high taxes and other forms of duties (21% each) as main obstacles.

With regard to lending interest rates, 57% of surveyed companies expected unchanged level, 41% expected them to decline, while only 2% expected higher lending interest rates in 2018 relative to 2017.

Graph 19



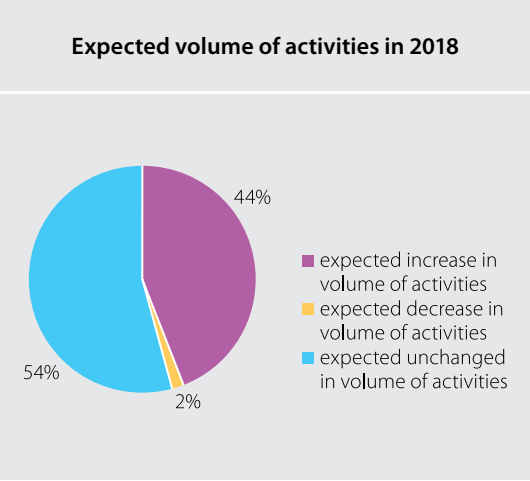
Graph 20



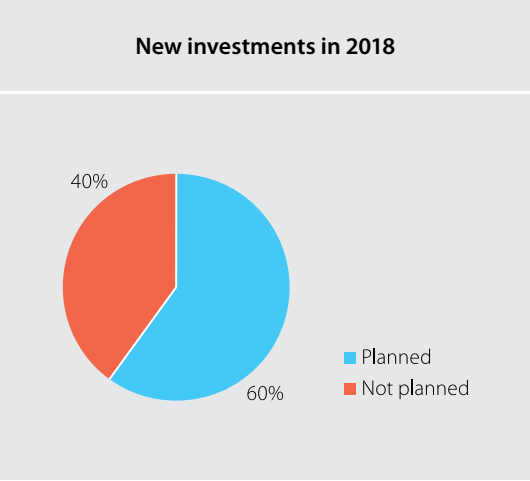
Investments

Out of the total number of surveyed companies, 44% planned the increase in the volume of activities in 2018, while 60% planned new investments. Most investments (50%) referred to the increase in fixed assets, while high interest rates and unfavourable conditions for capital borrowings, insufficient exploitation of existing capacities, and low demand were described as main barriers to new investments.

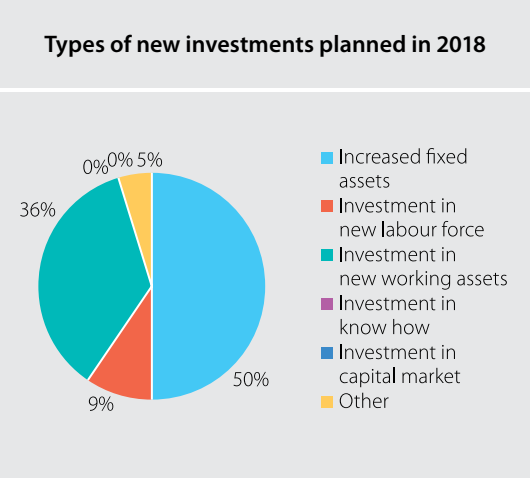
Graph 21



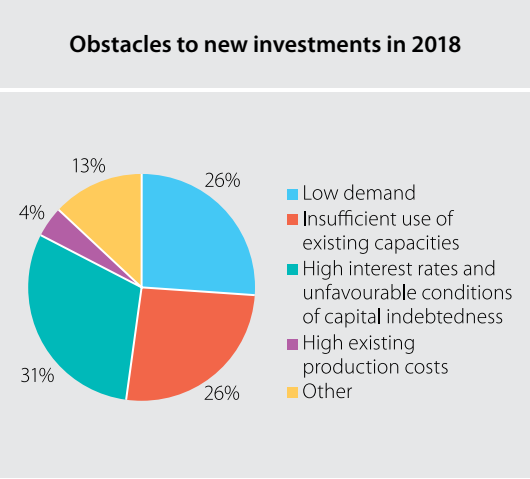
Graph 22



Graph 23



Graph 24



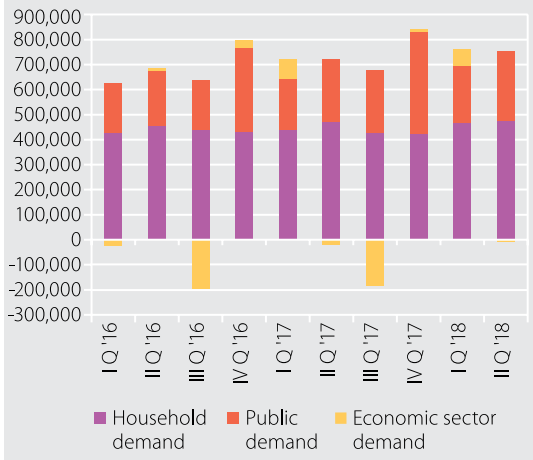
3. INFLATION DETERMINANTS

3.1. Demand

As per preliminary data, in Q2 2018, the aggregate demand recorded a y-o-y increase, yet a decline in relation to Q4 2017. Taking into account the level of total demand in Q2 2018 in relation to Q4 2017, household sector demand increased, while corporate sector and government spending declined.

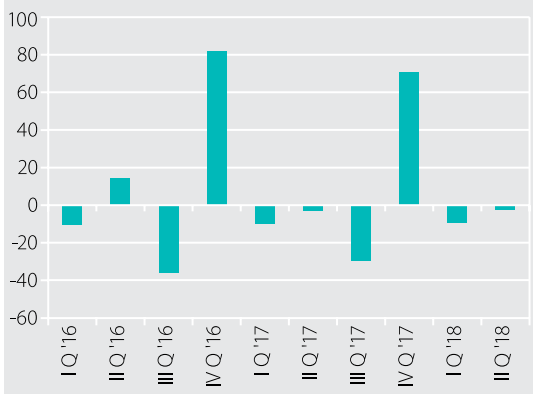
Graph 25

Aggregate demand, in thousand euros



Graph 26

Quarterly aggregate demand rates



Box 1 - Aggregate demand calculation methodology

For the purpose of complete monitoring of aggregate demand as a determinant of inflation, the CBCG has developed the aggregate demand calculation methodology. The starting point of this methodology states that the aggregate demand represents the sum of the demand of three sectors: personal spending (households), investment spending (corporate sector), and public spending. However, taking into account the lack of numerous data necessary for calculating the aggregate demand, the existing data should not be treated as the indicator of the exact amount of aggregate demand, but as an indica-

tor showing the aggregate demand trend. In the existing methodology, a number of substantial data were not available, such as: corporate investments, revenues from share sales, non-market income, non-observed economy revenues, and the like. Methodology of aggregate demand calculation is expressed by the following equation:

$$AD = C + I + G$$

C = sum of paid salaries + sum of paid pensions + paid frozen foreign currency deposits + net compensations to households – net household savings (savings – loans granted)

I = net savings of economy (deposits – loans)

G = public consumption – paid pensions – salaries paid from the budget – net Government savings (deposits – loans – Treasury bills)

AD – aggregate demand, C – personal spending, I – investment spending, G – public spending

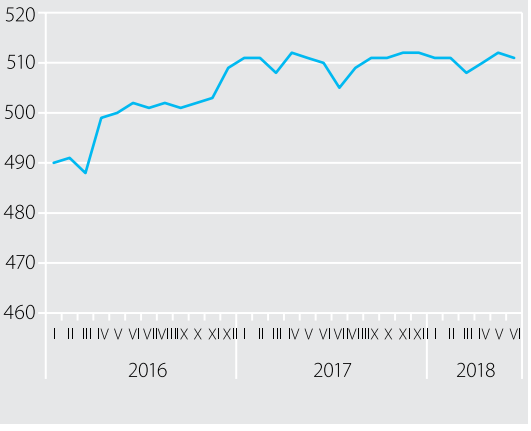
3.1.1. Salaries and other available demand determinants

In Q2 2018, an average gross salary in Montenegro amounted to 767 euros, while an average salary without taxes and contributions amounted to 511 euros. In relation to Q1 2018, average gross salary increased 0.3%, while net wages and salaries increased by 0.2%.

Taking into account the consumer prices, i.e. trends in wages and salaries in real amounts, it can be concluded that real wages and salaries in Q2 2018 reported the highest growth in April and May, while they recorded decline in June.

Graph 27

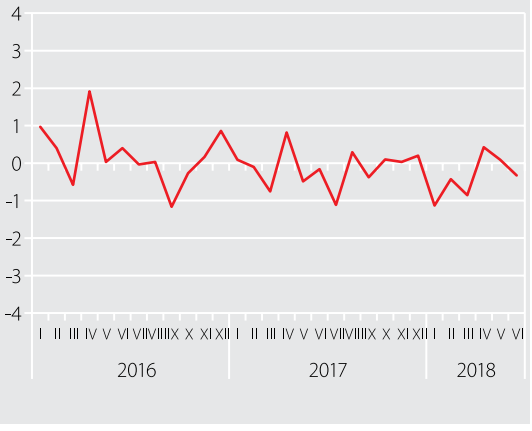
Average wages and salaries without taxes and contributions in Montenegro



Source: MONSTAT

Graph 28

Real wages and salaries (monthly growth rate)



Source: MONSTAT

During the first six months of 2018, the average monthly growth of retail[4] loans was 1%, while the growth at the average rate of 1.1% was recorded in the same period of 2017. At the end of Q2 2018, total household sector loans amounted to 1,189 million euro, or by 72.1 million euro or 6.5% more than at the end of 2017, i.e. by 112.3 million euro or 10.4% more than in same period of 2017 (Graph 29).

At end-June 2018, debt per capita[5] amounted to 1,910 euros, recording an increase of 116 euros in relation to end-2017, and a y-o-y increase of 180 euros.

Total MFIs loans disbursed to households amounted to 61.9 million euro at end-June 2018 which was 4.2 million euro or 7.3% more than at the end of 2017, and 5.7 million euro or 10.1% higher compared y-o-y.

At end-June 2017, retail sector deposits deposits amounted to 1,259.5 million euro, which is by 27.7 million euro or 2.2% more than at the end-2017, or by 115.9 million euro (10.1%) more than in the same period of the previous year.

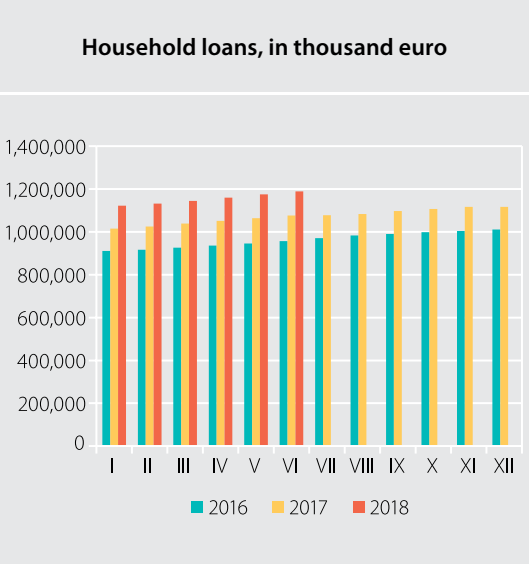
Loans to deposits ratio for this sector amounted to 0.94 at end-June 2018, being at a lower level than in the previous year end (0.91), and remaining at the same level as in June 2017.

Retail sector reported total net savings in the amount of 70.5 million euro in end Q2 2017, which represented a decrease of 44.5 million euro or 38.7% compared to end-2017, yet a y-o-y increase of 3.6 million euro or 5.4%.

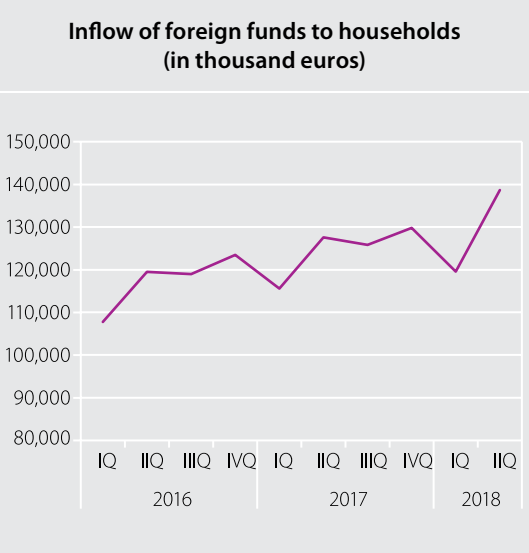
In Q2 2018, the balance of payments statistics show a quarterly increase in the inflow of remittances in favour of domestic natural persons.

Observation of the total household demand by quarters shows that household demand in Q2 2018 was higher compared to the previous quarter and compared y-o-y.

Graph 29



Graph 30

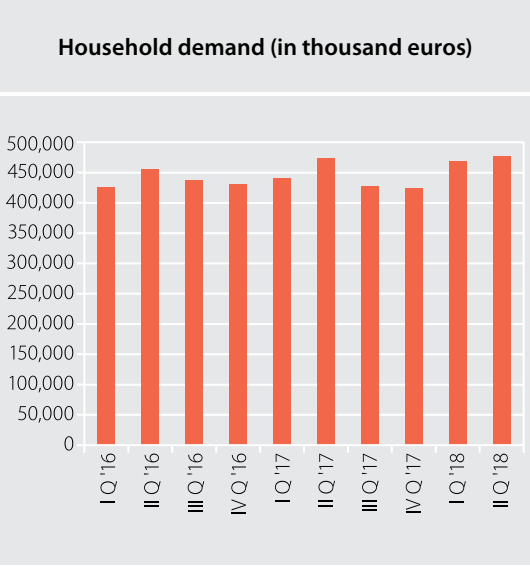


Source: CBCG

[4] The retail sector includes resident natural persons and entrepreneurs.

[5] Population estimate for 2018: Estimate as at 1 January (2018), Source: Monstat

Graph 31



3.1.2. Budgetary analysis

According to Ministry of Finance preliminary data, total revenues[6] of the Budget of Montenegro amounted to 1.05 billion euro in H1 2018.

Source revenues amounted to 763.8 million euro or 17.2% of projected GDP[7], and they increased insignificantly in relation to the plan, and recorded a y-o-y increase of 12%. In the structure of source revenues, tax revenues accounted for the main share of 64.2%, followed by contributions with 28.5%, other income with 2.2%, donations with 2%, fees with 1.6%, duties with 0.9%, and receipts from loan repayment and funds transferred from the previous year with 0.6%.

Tax revenues amounted to 490.2 million euro, recording a y-o-y increase of 11.6%, yet being by 1.3% below the plan. Other than revenues from other state taxes, all other taxes increased compared to H1 2017. Nominally, the highest y-o-y increase of revenues was recorded in value added tax, amounting to 34.6 million euro or 14.3% as a result of the increase of the standard VAT rate (from 19% to 21%), and with corporate income tax amounting to 10.4 million euro or 26.7% resulting from increased economic activity.

Revenues arising from contributions amounted to 218.1 million euro being 1.7% above planned, and recording a y-o-y growth of 7.6%.

In the six months of 2018, *consolidated budget expenditure* amounted to 849 million euros or 19.2% of GDP. Compared to the plan for the six months of the current year, the expenditures were lower by 4%, yet being higher by 7.9% or 61.9 million euro y-o-y, mainly due to the increased capital budget

[6] Revenues include source revenues (direct and indirect taxes and non-tax revenues), borrowings and loans, and revenues from sale of property.

[7] Source: Ministry of Finance, Estimated GDP for 2018 amounts to 4.430.9 million euro

by 38.1 million euro and transfers to the institutions, individuals, NGOs and the public sector by 21.5 million euro.

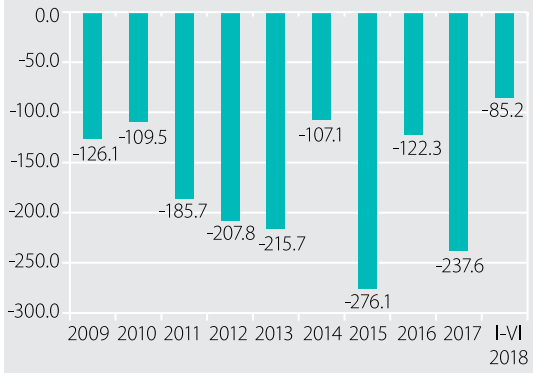
During the reporting period, current budget expenditure amounted to 395.3 million euro and were higher than planned by 6% as a result of an increase in interest rates by 15.7 million, while the most significant y-o-y increase in expenditure was recorded in subsidies, capital expenditure in the current budget and expenses for services by 88.1%, 48.3%, and 30.5%.

Montenegro's capital budget amounted to 79.2 million euro or 1.8% of GDP.

The deficit[8] of the Budget of Montenegro in H1 2018 was estimated to 85.2 million euro, or 1.9% of GDP.

Graph 32

Budget surplus/deficit in the period 2009 – June 2018, in million euro



Source: Ministry of Finance

3.1.3. Nonfinancial sector[9]

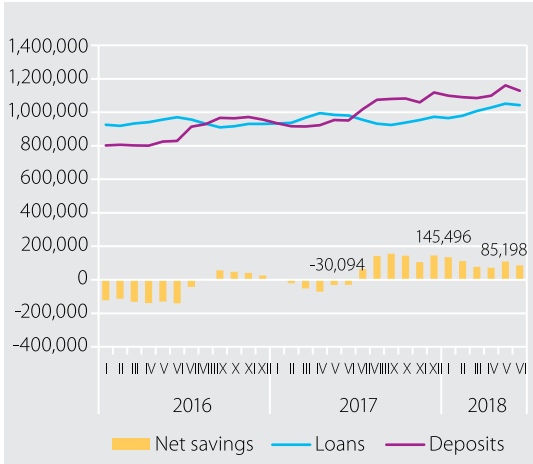
Due to the lack of data on investments in the nonfinancial sector, we can use the net indebtedness of the nonfinancial sector as an approximation.

In the first six months of 2018, loans to nonfinancial sector were lower than this sector's deposits. In June 2018, the net savings of the nonfinancial sector amounted to 85.2 million euro (Graph 33).

Long-term loans accounted for the main share of 74.3% in the structure of loans to the corporate sector, which indicates that loans to this sector were mainly used for increasing economic activity volume.

Graph 33

Net indebtedness of the nonfinancial sector, in thousand euro



[8] Methodology of calculating surplus/deficit, OGM 53/09. Deficit means the difference between source revenues and consolidated expenditures

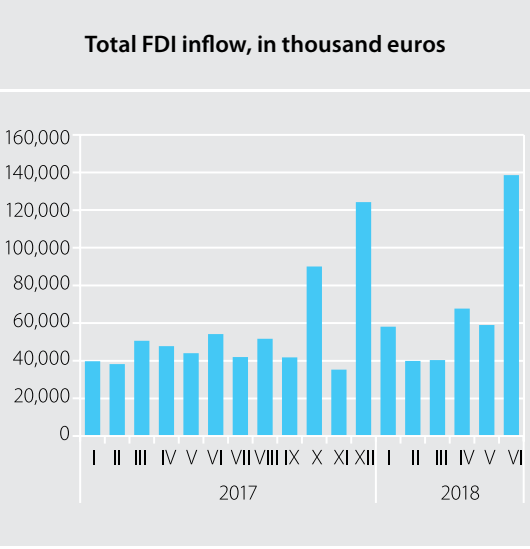
[9] The nonfinancial sector includes state companies and private companies.

3.1.4. External demand and the current account

According to preliminary data, the current account deficit amounted to 612.6[10] million euro in H1 2018 recording a y-o-y increase of 8.1%, which is a consequence of the deepening of the imbalance on the goods account, and of decreased surplus at primary income account.

The increase in the deficit on the goods account continued in H1 2018 (by 10.4%), despite the faster growth of visible exports than imports (25.9% compared to 12.9%). Total visible exports amounted to 209.5 million euro, while visible imports amounted to 1.2 billion euro. On the other hand, an increase in the surplus on the services account by 23.3% (to 197.8 million euro) was recorded as a result of the significantly stronger growth of exports than imports of services (19.6% compared to 17%). The increase of tourism revenues by 12.7% contributed significantly to this. The surplus in the primary income account was 31 million euro, being 7.4% less than in 2017 and is the result of an increase in expenditures based on employee compensation, paid dividends and interest payments. Secondary income account ran a surplus of 120.8 million euro, or 8.6% more than in 2017, as the result of increase in remittances to households and transfers to the state from IPA funds.

Graph 34



Source: CBCG

Preliminary data show that net foreign direct investments inflow in the period January-June 2018 amounted to 153.6 million euro, and were lower by 30.4% y-o-y, which is the result of a decrease in equity investments, and at the same time with significantly higher outflow from intercompany debt repayment, and the decrease in equity investments. Total FDI inflow amounted to 403.6 million euro, of which equity investments amounted to 231.7 million euros, while the inflow in the form of intercompany debt amounted to 165 million euro. In the total FDI inflow structure, income from intercompany debt amounted to 40.9%, followed by investments into companies and banks (38.1%), while investments into immovable properties amounted to 19.3%. Total FDI outflow amounted to 250 million euro, being significantly higher compared y-o-y (53.8 million euro). In the outflow structure, outflow from residents' investments abroad amounted to 29.8 million euro, while withdrawal of non-residents' funds invested in Montenegro amounted to 220.2 million euro.

In H1 2018, *portfolio investments* account recorded net inflow of 117.3 million euro, while the net inflow in the *other investments* account amounted to 305.8 million euro. The developments in this account are characterized by the increase in liabilities of other sectors (corporate sector) based on bor-

[10] Montenegro's balance of payments' data published in accordance with the new IMF methodology (IMF Balance of Payment Manual, sixth edition - BMP 6)

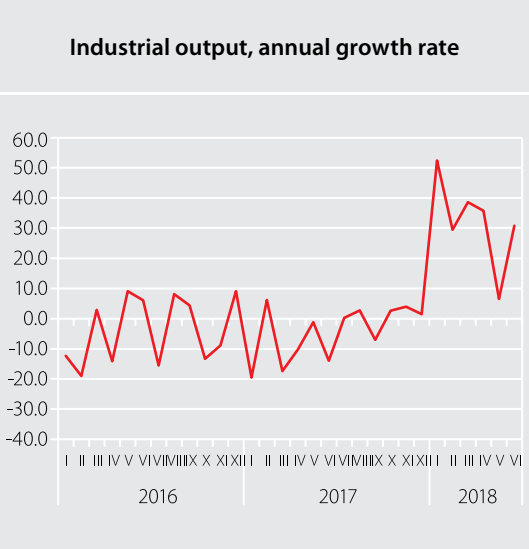
rowings, with simultaneous increase in borrowing by the state and other sectors, and the increase in deposits of local banks' abroad.

3.2. Supply and demand

In H1 2018, industrial output recorded a y-o-y growth of 31.6% due to the growth recorded in the manufacturing industry and electricity, gas and steam supply sectors of 2.3% and 117.8%, respectively. Output decrease of 16.6% was recorded in the mining and quarrying sector. Observation of monthly data on the industrial output trends in Q2 2018 shows that growth was recorded in June (13.4%), while the respective decline was recorded in April and May of -16.3% and -17%.

During the six months of 2018, some 406,786 tourists stayed in collective accommodation establishments, which is a y-o-y increase of 16.5%. The number of domestic tourist arrivals in collective accommodation establishments increased by 8.7%, while the number of foreign tourists grew 17.7%. Tourist nights amounted to 1.4 million, which is a y-o-y increase of 11.7%.

Graph 35



Source: MONSTAT

In H1 2018, forestry recorded a total of 110,516 cubic metres of forest assortments, which is a y-o-y decrease of 0.3%[11].

The value of executed construction works amounted to 330.8 million euro in H1 2018, recording a 40.4% y-o-y growth, and construction activity measured by effective working hours grew by 20.3%.

In the first six months of 2018, air passenger transport recorded a y-o-y increase of 15.2%, while air freight transport increased by 6.3%. In Q2 2018, railway passenger transport recorded y-o-y decrease of 0.7%[12], while railway freight transport decreased by 32.5%[13]. In Q2 2018, road passenger transport recorded y-o-y increase of 1.1%[14], while road freight transport decreased by 0.2%[15] y-o-y.

[11] Expressed by weighted index, while expressed by non-weighted index production increased by 0.7% over the same period.

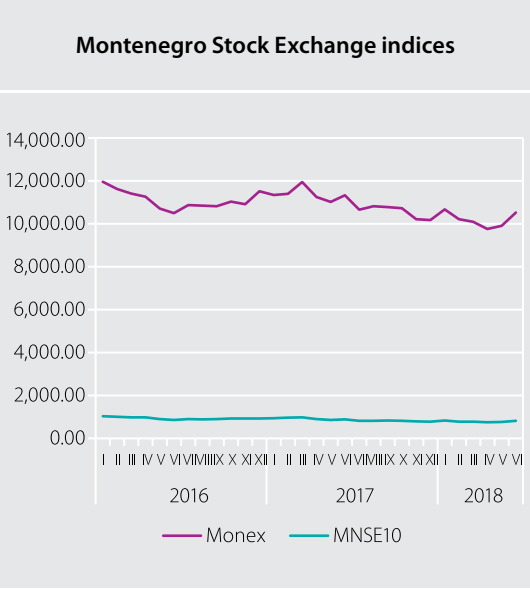
[12] Presented through number of passengers in thousands, while it increased by 7.7% presented through passenger kilometres.

[13] Presented in thousand tonnes, while it decreased by 22.8% presented passenger tonnes.

[14] Presented through number of passengers, while it increased by 4.1% presented through passenger kilometres.

[15] Presented through transported goods in thousand tonnes, while it increased by 16.3% presented in tonne kilometres.

Graph 36



Source: Montenegro Stock Exchange

3.3. Stock exchange indices

At end-Q2 2018, both indices dropped both in relation to end-2017 and compared y-o-y (Graph 36).

At end-June 2018, SE index Monex amounted to 9,904.04 recording a decrease of 271.4 index points or 2.7% in relation to end-2017, and a y-o-y decrease of 1,424.5 index points or 12.6%.[16]

MNSE10[17] index stood at 770.24 at end-Q2, and recorded a decrease of 6.5 index points or 0.8% compared to end-2017, while it was also lower y-o-y by 114.5 index points or 12.9%.

[16] MONEX is a general (benchmark) Montenegro Stock Exchange index aimed at precise describing of the trends in the prices of shares in the official and the free market of Montenegro Stock Exchange Podgorica. With the new Methodology, the legal heir of the MONEX20 index - MONEX index - has more companies in its index basket.

[17] MNSE10 is the blue-chip index at Montenegro Stock Exchange and it is aimed at precise describing of the trends in the prices of the most representative shares in the official and the free market of Montenegro Stock Exchange Podgorica. It is composed of the top ten companies in the Montenegrin market.

4. MONETARY POLICY

During Q2 2018, there were neither changes to the existing decisions nor were new ones passed regarding the Central Bank of Montenegro monetary policy instruments.

5. INFLATION FORECAST FOR 2018 AND TWO QUARTERS OF 2019

5.1. Model assessment

Montenegro's inflation fan chart is a graphic representation of inflation rate forecast probability distribution presented by the consumer price index. In that respect, instead of determining specific points, the fan chart also takes into account potential risks and uncertainties through probability distribution that might influence the inflation trends in the upcoming period. The purpose of the fan chart is to indicate and consider the uncertainties in the real economy flows, which are consequentially reflected in the inflation rate trend (increase in energy prices, increase/decrease in the foreign trade deficit, etc.).

Montenegro's fan chart for 2018 and two quarters of 2019 is based on three estimated constituent parts:

1. **Central projection values**– the values of the fan chart central projection are derived from the ARIMA model;
2. **Degree of uncertainty** – determines the fan chart width. The degree of uncertainty ratios are obtained through analytical assessment and calculation of a relative impact of potential internal and external shocks that are possible in the Montenegrin economy over the one-year period and which are reflected through the "thickness" of the band around the central projection.
3. **Fan chart skewedness** – based on the level of skewedness of the distribution of inflation projection, the fan chart is adjusted to the forecast to show whether the values of the central projections have "overestimated" or "underestimated" inflation rates. The position of the mean value of inflation distribution will depend on this.

Central projection of fan chart - ARIMA model for 2018 and two quarters of 2019

With a view to developing a fan chart, an ARIMA (Autoregressive Integrated Moving Average) model of time series of inflation of Montenegro showed through the Consumer Price Index was developed[18].

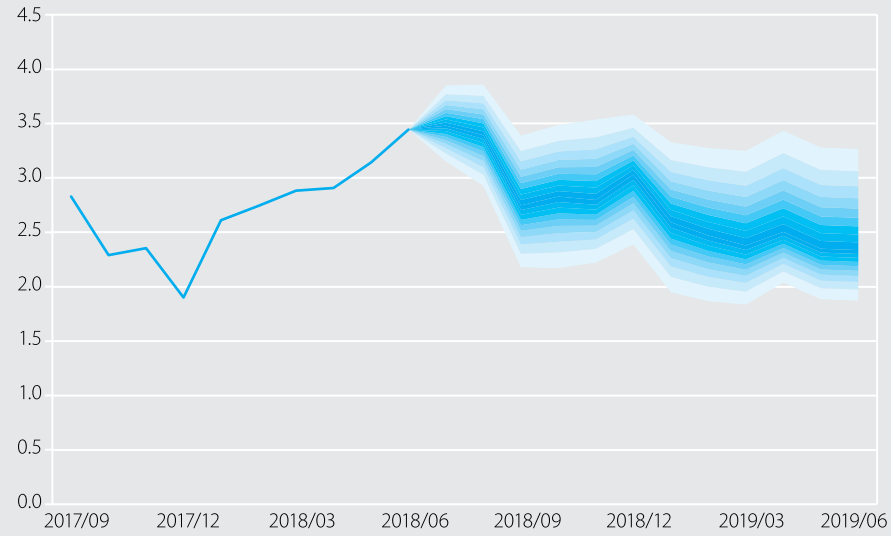
[18] More detailed explanation of ARIMA model of Montenegro was presented in the Central Bank Working Paper 11 **"Inflation forecasting: Empirical research of retail price index of Montenegro for 2007 – implementation of ARIMA model"**.

ARIMA model was used for short term forecasts (12 months), whereby several iterations of ARIMA models were made, which were ranked based on their efficiency and quality of diagnostics. The selected ARIMA model, ARIMA (1,1,11)[19] has sufficient confidence level for forecasts.

The monthly forecasts value was used as the value of central projection of the CPI graph for 2018 and two quarters of 2019. Obtained values represent the distribution mode, i.e. values with the highest frequency in the distribution of this time series.

Graph 37

CPI projections of Montenegro for 2018 and two quarters of 2019



Source: CBCG, 2018

Mean value of the obtained model is 2.8. The value of the coefficient of asymmetry varies in the range of from 0.5 to 1, and the relative standard deviation is 0.25. Model projection of inflation is located in the central span of the distribution. This indicates that the corresponding range of uncertainty of future inflation is symmetrical. The fan chart describes 90% probability of inflation distribution. The central projection is usually in the deepest shade of the fan chart, i.e. in the central 10% of probability.[20] The fan chart has an equal number of bands (eight) on either side of the central band whereby every band of the same colour, both above and below the central band, cumulatively describes the next 10% of inflation trend probability. As uncertainty grows over time, the fan chart spreads.

[19] ARIMA model is generally referred to as an ARIMA (p,d,q) where p represents the number of autoregressive variables, d refers to the level of dependent variable that needs to be made stationary, and q is the number of variables, moving averages, in the certain model.

[20] The mode values (central projection) are usually in the deepest band shade, but in case of a significant risk level, it can happen that the central projection does not cover either of these values. (Britton, E, Fisher, P.G. and Whitley, J.D. (1998), 'The Inflation Report projections: Understanding the Fan Chart', Bank of England, Quarterly Bulletin, 38, pp. 30–37)

The fan chart of inflation in Montenegro based on the ARIMA model assessment for 2017 and Q1 2018 indicates that there is a *90% probability that the CPI inflation will range between 1.8% and 3.9%, depending on the month, with the central projection of 2.8%. Inflation of 3% is forecasted for 2018, while the inflation for December 2018 is forecasted for to range between 2.4% and 3.6%, with the central trend of 3%*. The fan chart central projection (the darkest part) represents a 10% probability span (Graph 36).

The starting assumptions for forecasting inflation in 2018 and two quarters of 2019

The risks related to the projected inflation rate shown on the fan chart have been set symmetrically. Higher rates of inflation than projected ones could be affected by a stronger rise in oil prices in the international market due to geopolitical tensions and strengthening of trade protectionism, as well as unfavourable weather conditions that could affect the rise in food and electricity prices. On the other hand, the risks that would contribute to a lower inflation rate relate to a stronger decline in oil prices, as well as a weaker growth in inflation in the euro area than the projected one.

Internal factors:

- Fiscal consolidation measures (increasing excise duties on tobacco and tobacco products, ethyl alcohol, carbonated drinks with sugar, excise duties on coal as well as the increased VAT rate) will be reflected in the prices increase in 2018. However, the effect of these measures will diminish in the next year.
- Potential increase in electricity prices of 5%;
- A standstill in wages and real estate prices.

External factors:

- Expectations from the forward market point to slowdown in price increase of crude oil in H2 2018. Decrease in average price of crude oil at the international market is expected in 2019.
- Moderate growth of prices of food products in the international market is expected in H2 2018 and 2019.
- Inflation increase in the euro area and its approximation to the objective, fostered by monetary policy measures and stronger economic growth.

Deviation of any of these parameters would require the forecast to be adjusted.

6. EXPECTED INFLATION IN 2018

This year, a higher inflation rate was recorded primarily as a result of internal and external factors. The most important internal factors refer to fiscal consolidation measures that resulted in higher VAT rate and excise duties. Also, the external factors also include the rise in oil prices on global stock exchanges, which have high spillover effect on domestic prices. The core inflation, which was very low and by 2 percentage points lower than total inflation at end-June, points to fact that this was the one-off effect.

Still, the inflation did not deviate strongly than the inflation rate recorded in other transition economies. Most probably, this resulted from the economic growth higher than expected and had anti-inflation effect.

As regards inflation expectations, the most of banks and surveyed companies pointed to the inflation in the range of 2.5% to 3%. Moreover, expectations point to the further decline in interest rates, and growth in output and investments, which will also have anti-inflation effect.

Our model inflation projection predicts inflation for the end of 2018 in the range of 2.4% to 3.6%, with a central trend of 3%. This is similar to our expert projection, which suggests that inflation can range from 2% to 4% with a central trend of 3%.

Table 3

Estimated inflation rate at end-2018		
Optimistic assessment	Realistic assessment	Pessimistic assessment
2%	3%	4%

This assessment is based on the same assumptions as the econometric assessment and the deviation of any of the assumptions would require the revision of the forecast.