CENTRAL BANK OF MONTENEGRO

INFLATION REPORT
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Central Bank of Montenegro
Bulevar Svetog Petra Cetinjskog 6
81000 Podgorica
Telephone: +382 20 664 997, 664 269
Fax: +382 20 664 576

WEB SITE: http://www.cbcg.me

DESIGNED BY:

Andrijana Vujović
Nikola Nikolić

TRANSLATED BY: Translation Services Division

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1. INFLATION INDICATORS

Growth in consumer prices in the previous year continued in the first quarter of this year, as a result of the increase in excise taxes on tobacco products, global oil price growth, which also affected the rise in fuel prices in Montenegro, as well as the increase in the VAT rate. Inflation in Montenegro in March 2018 compared to December 2017 amounted to 1.5%, which is largely the result of price increase in the category of *alcoholic beverages and tobacco* (14%), *transport* (2.2%) and *food and non-alcoholic beverages* (0.8%). Observation of consumer prices monthly trends shows that the price increase was recorded in all three months, specifically 1% in January, 0.3% February and 0.2% in March. Average consumer prices rate (the first three months of 2017 in relation to the same period of 2016) amounted to 2.7%, while at the annual level, prices increased by 2.9%.

Table 1

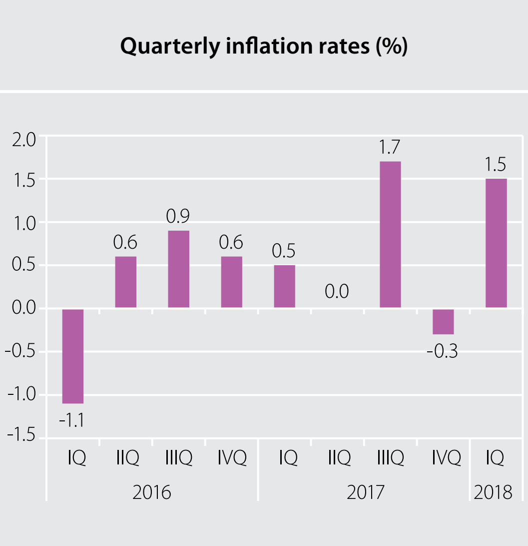
Inflation, %

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

Source: MONSTAT

In the first quarter, in Montenegro, prices were recorded in nine of the twelve categories (Table 2). The highest increase in prices was recorded in the category of *alcoholic beverages and tobacco* of 14%, which contributed the most (0.6 percentage points) to total inflation. The growth in this category was mostly influenced by the increase in tobacco prices by 17.7%, as a result of the increase in excise taxes in accordance with the Law on Amendments to the Law on Excise Taxes[1]. A significant contribution of 0.3 percentage points was given by the prices in *transport*, *food and non-alcoholic beverages*. In the category food and non-alcoholic beverages, the prices of fruits (4.9%), non-alcoholic beverages (4.5%), fish and seafood (2.9%) and vegetables (2.5%) increased the most, oil and fats prices (-1%) decreased the most, while the

Graph 1

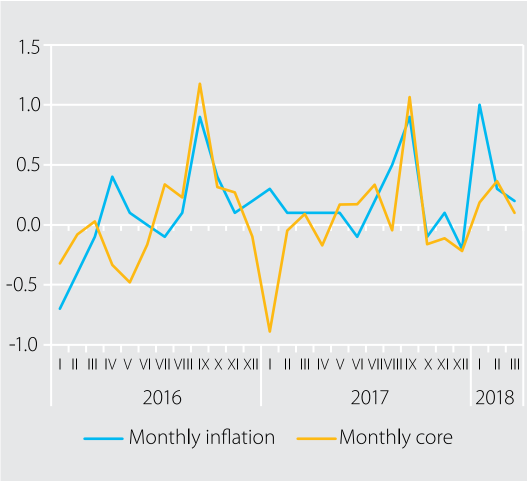


Source: Monstat and CBCG calculations

[1] OGM, 050/17 of 31 July 2017

Graph 2

Total and core inflation trends (%)



Source: Monstat and CBCG calculations

increase in prices of fuels and lubricants for personal transport equipment of 1.8% mostly affected the increase in prices in transport (2.2%). During this period, prices also increased in the following categories: *furnishing, household equipment and routine household maintenance* (1.9%), *communications* (1.5%), *hotels and restaurants* (1%), *other goods and services* (0.8%), *health* and *recreation and culture* (0.1% each). The decline in prices was recorded in categories of *clothing and footwear* and *housing, water, electricity, gas* and other fuels by 0.3%. In March 2018, prices under education remained unchanged relative to December 2017.

During the first quarter the monthly core inflation in January and March 2018 had a lower level than official monthly inflation, being slightly higher in February. Core inflation had a positive rate during all three months of the first quarter, as well as the official monthly inflation (Graph 2).

The annual core inflation rate in March 2018 amounted to 1.7% and was lower by 1.2 percentage points of total inflation. The increase in the prices of certain agricultural products, tobacco, electricity and

Table 2

Share of selected categories in total inflation[2]

	Weights	III 18/XII 17	Growth rate	Contribution
TOTAL	1000	101.5	1.5	1.5
Food and non-alcoholic beverages	341.1	100.8	0.8	0.3
Alcoholic beverages and tobacco	40.4	114.0	14.0	0.6
Clothing and footwear	86.1	99.7	-0.3	0.0
Housing, water, electricity gas and other fuels	154.0	99.7	-0.3	0.0
Furnishing, household equipment and routine household maintenance	39.4	101.9	1.9	0.1
Health	40.8	100.1	0.1	0.0
Transport	109.4	102.2	2.2	0.3
Communication	48.5	101.5	1.5	0.1
Recreation and culture	32.0	100.1	0.1	0.0
Education	18.7	100.0	0.0	0.0
Hotels and restaurants	47.6	101.0	1.0	0.1
Miscellaneous goods and services	42.0	100.8	0.8	0.0

Source: Monstat and CBCG calculations

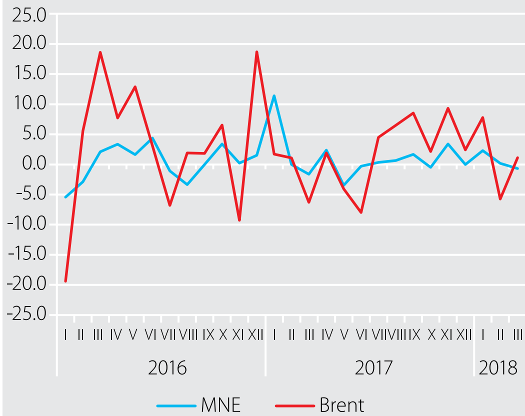
[2] It should be noted that, regardless of the index changes, due to the weight structure, the contribution of the share of certain categories is not recorded before the second, i.e. third decimal.

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

In Q1 2018, the oil prices at global markets increased in relation to Q4 2017. The average price of the OPEC reference basket in Q1 2018 amounted to 64.7 USD/barrel, which is an increase of 8.9% in relation to Q4 2017. The average Brent price in the first quarter was 66.7 USD/barrel, or 8.8% more than the average price from the last quarter of 2017, which was largely the result of a decrease in US oil stocks, a forecast for growth in demand for this energy generating product and the intensification of geopolitical tensions.

Graph 3

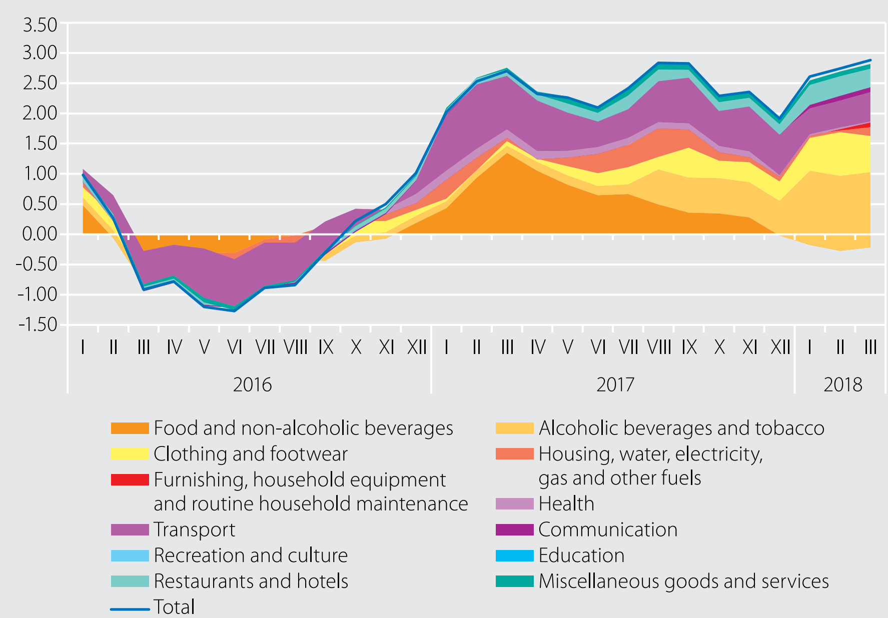
Oil prices, monthly growth rate



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

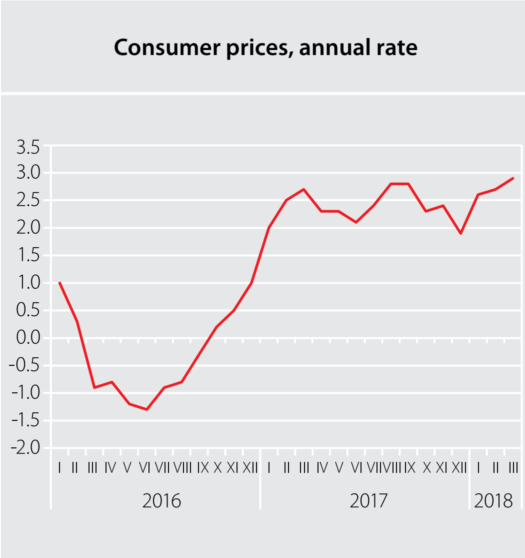
Graph 4

Consumer prices components: contribution to annual growth rate (in index points)



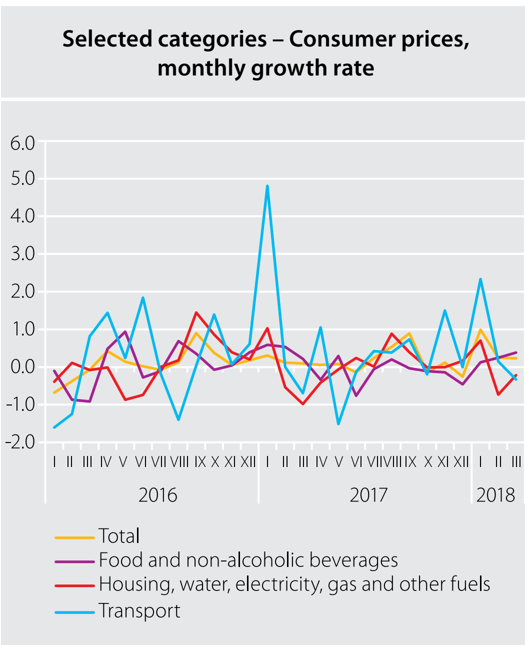
Source: Monstat and CBCG calculations

Graph 5



Source: MONSTAT

Graph 6



Source: MONSTAT

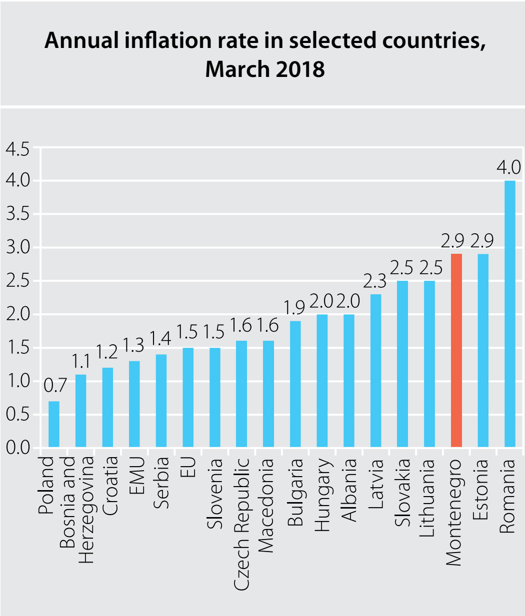
Annual prices growth of 30.8% in the *alcoholic beverages and tobacco* category gave the largest contribution to the increase (1.2 percentage points) in the total annual inflation rate of 2.9%. Annual growth in prices was also recorded in the following categories: *clothing and footwear* (6.9%), *hotels and restaurants* (6.4%), *transport* (4.4%), *furnishing, household equipment and routine household maintenance* (2.0%), *other goods and services* (1.9%), *communications* (1.8%), *housing, water, electricity, gas and other fuels* (0.9%) and *health* (0.3%). The annual fall in prices was recorded in the categories *food and non-alcoholic beverages* (-0.6%) and *recreation and culture* (-0.1%), while prices in the category *education* remained unchanged.

In March 2018, **producers` prices of manufactured products** recorded 1.8% growth in relation to December 2017. This was due to the growth recorded in all three sectors, those being: *electricity, gas and steam supply* (4.4%), *mining and quarrying* (1.1%), and *manufacturing industry* (0.5%). On the annual level, producers` prices of manufactured products increased by 1.2%.

Comparison of annual inflation recorded in Montenegro with the inflation recorded in selected countries shows that all those countries recorded positive inflation as well. The highest positive annual inflation rate was recorded in Romania (4%) while Poland recorded the lowest positive annual inflation rate (0.7%).

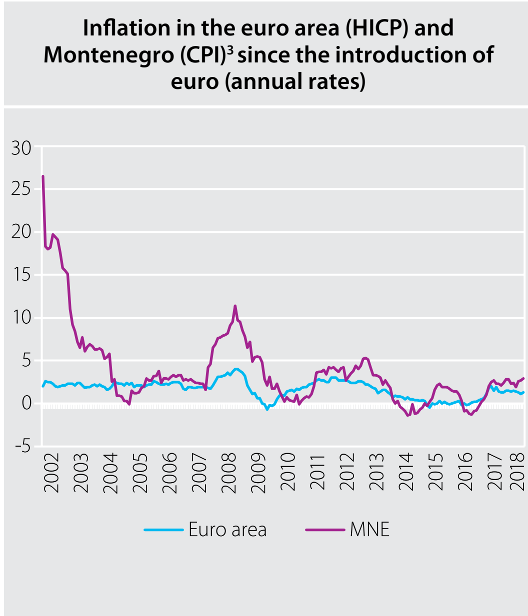
The annual HICP inflation rate reported in the euro area amounted to 1.3%, CPI inflation in Montenegro amounted to 2.9%, while in March the annual HICP inflation in Montenegro was 3.9%.

Graph 7



Source: National statistical offices and Eurostat

Graph 8



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

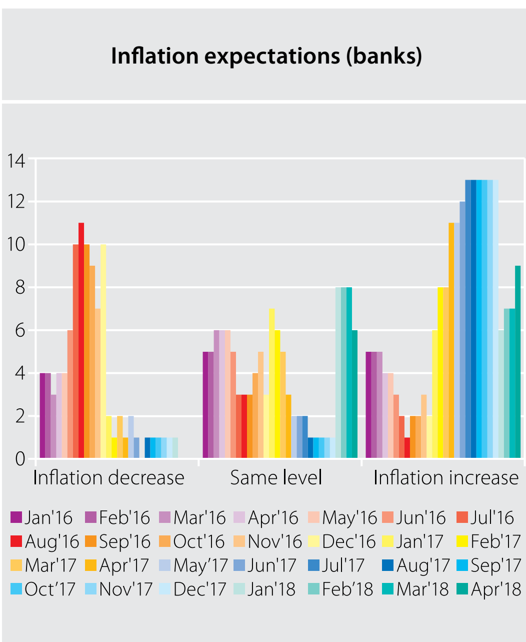
2.1. Banks' expectations

In reference to inflation expectations of banks, based on the survey conducted in April this year, nine banks expect inflation to grow, six 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).

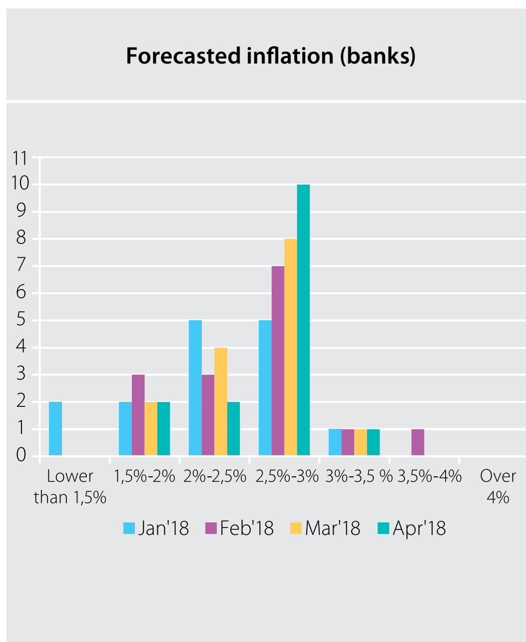
Banks have different expectations regarding inflation levels. Ten banks expect the level of inflation in the range of 2.5% and 3%, two banks expected inflation to range between 1.5% and 2%, i.e. 2% and 2.5%, while one bank expect inflation between 3% and 3.5% (Graph 10).

Concerning the expectations on the nominal lending interest rates trends, nine banks expect this rate to remain at the same level, six banks expect it to decline, and none of the banks expects the nominal lending interest rate to increase. On the other hand, eight banks expect effective interest rates to remain at the same level, seven banks expect them to decline, while none of the banks expect the effective lending interest rates to increase.

Graph 9



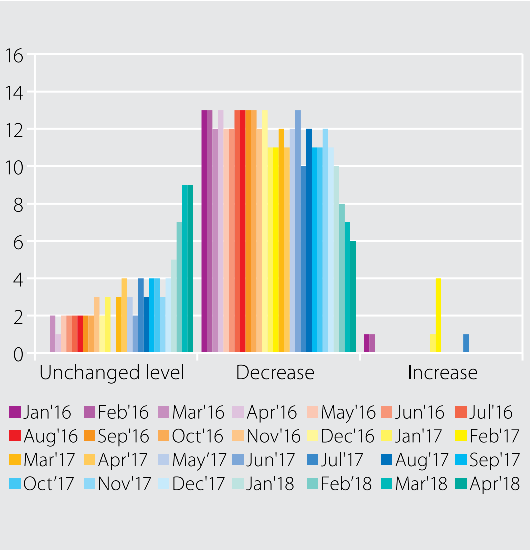
Graph 10



Regarding expectations about the deposit interest rates trend, ten banks expect unchanged deposit interest rates, five banks believe they will decline, while none of the banks expect their increase.

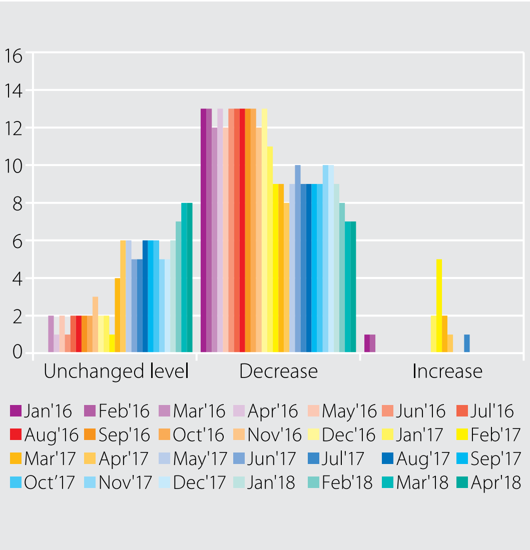
Graph 11

Expectations of nominal lending interest rates trends



Graph 12

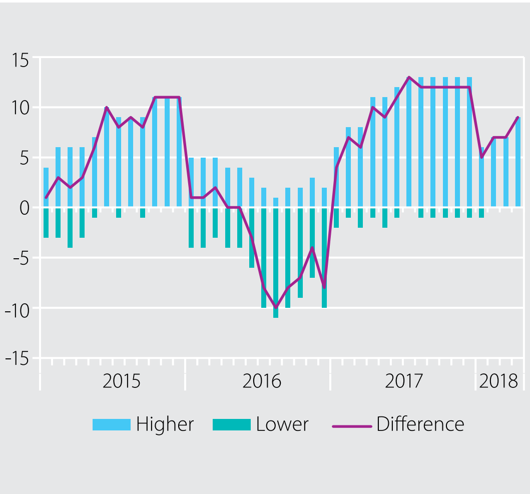
Expectations of effective lending interest rates trends



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 over the first four months of 2018 their positive trend continued.

Graph 13

Market trend indicator



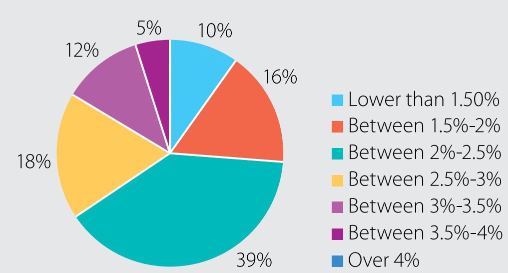
2.2. Expectations of economy (except banks)

Inflation

In the total number of surveyed companies, majority (39%) expected the inflation in 2018 to range between 2% and 2.5%. Inflation is expected to fluctuate between 2.5% and 3% by 18% of companies, while 16% of business entities expect inflation between 1.5% and 2%. According to opinion of 12% of surveyed companies, inflation will range between 3% and 3.5%. Inflation rate lower than 1.5% in 2018 is expected by 10% of respondents, while only 5% predict inflation between 3.5% and 4%. None of the surveyed companies think that inflation will exceed 4% (Graph 14).

Graph 14

Expected inflation in 2018 in relation to 2017

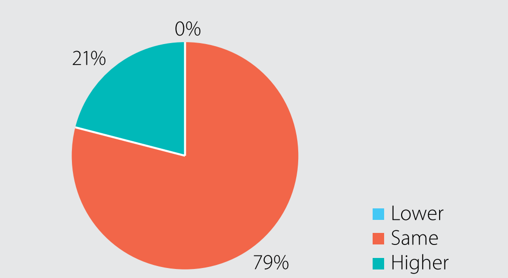


As much as 79% surveyed companies expect wages and salaries to remain unchanged in 2018, 21% of the surveyed companies expect them to increase, while none of those surveyed expect them to decrease. With regard to the number of employed persons, 63% of surveyed companies expect it to remain unchanged, 31% expect this number to increase, and 6% expected it to decrease in relation to 2017.

The majority of business entities (61%) expected the prices of production inputs they use to increase while 26% expect the prices of their products (services) to increase in 2018.

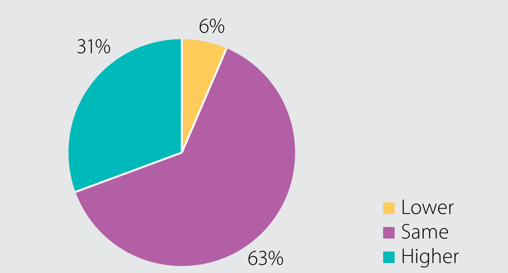
Graph 15

Expected wages and salaries in 2018 in relation to 2017



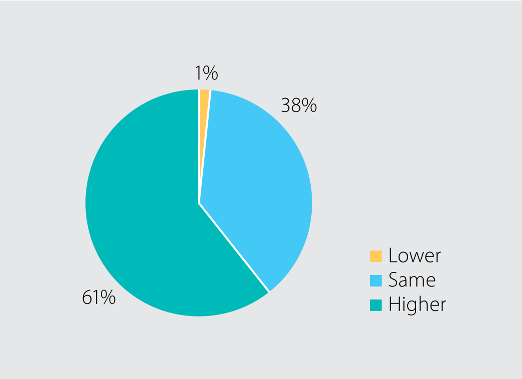
Graph 16

Expected number of employed persons in 2018 in relation to 2017



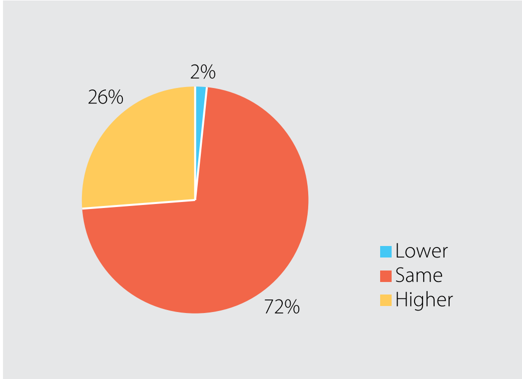
Graph 17

Expected level of production input prices in 2018 in relation to 2017



Graph 18

Expected prices of products (services) in 2018 in relation to 2017



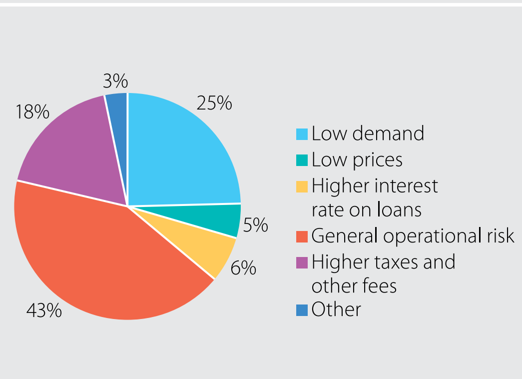
Business Environment

In the area of business barriers, survey results showed that most of the surveyed companies saw general operational risks (43%), low demand (25%), and high taxes and other forms of duties (18%) as main obstacles.

In reference to lending interest rates, 55% of surveyed companies expected them to remain at the same level, 43% expected them to decrease, while barely 2% expected higher lending interest rates in 2018 relative to 2017.

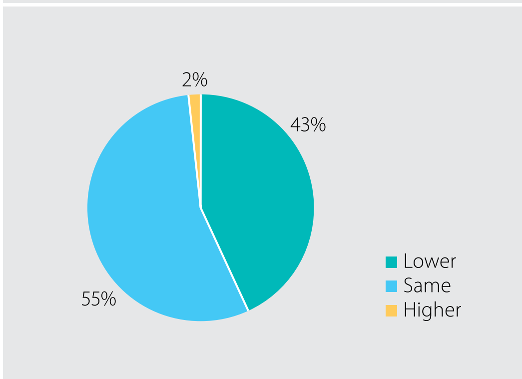
Graph 19

Business barriers



Graph 20

Expected lending interest rates in 2018, in relation to 2017

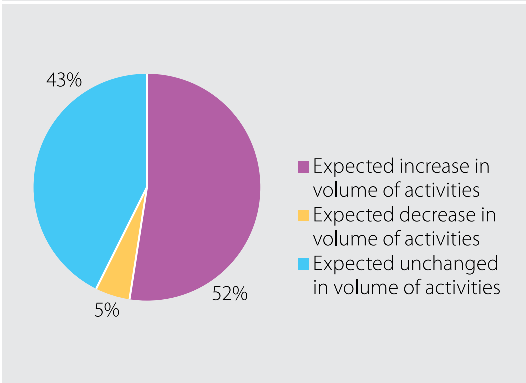


Investments

Out of the total number of surveyed companies, 52% planned to increase the volume of their activities in 2018, while 59% planned new investments. Most investments (57%) referred to increasing the fixed assets, while the following were seen as the main barriers to new investments: high interest rates, unfavourable conditions for capital borrowings and insufficient exploitation of existing capacities.

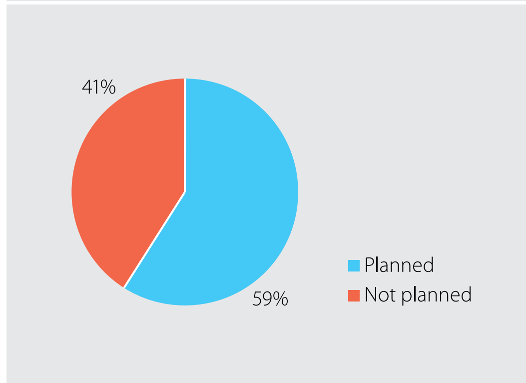
Graph 21

Expected volume of activities in 2018



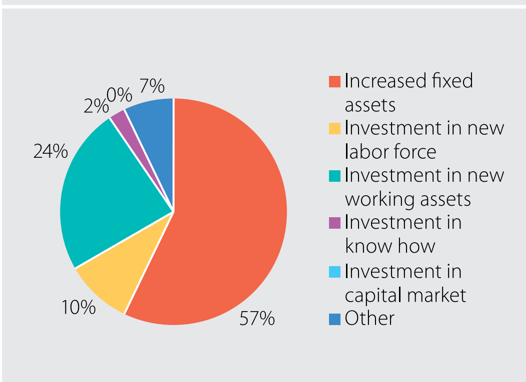
Graph 22

New investments in 2018



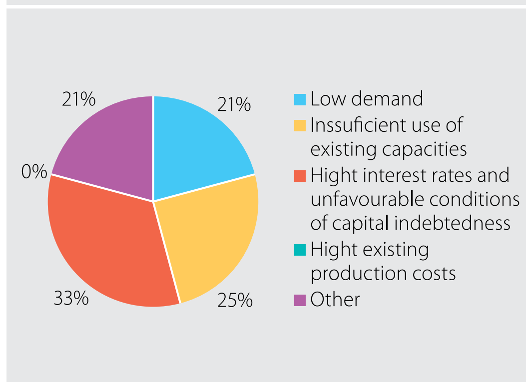
Graph 23

Types of new investments planned in 2018



Graph 24

Obstacles to new investments in 2018



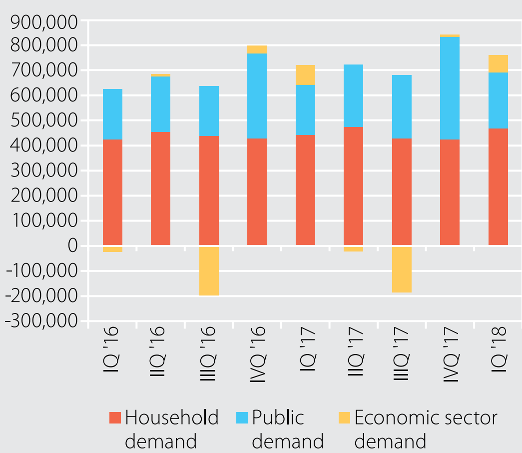
3. INFLATION DETERMINANTS

3.1. Demand

As per preliminary data, in Q1 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 Q1 2018 in relation to Q4 2017, household and corporate sector demand increased, while government spending declined.

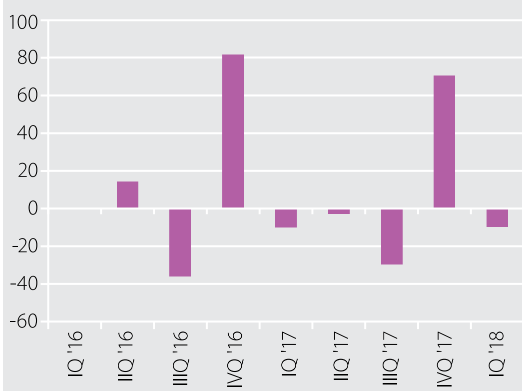
Graph 25

Aggregate demand, in thousand euro



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 indicator 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

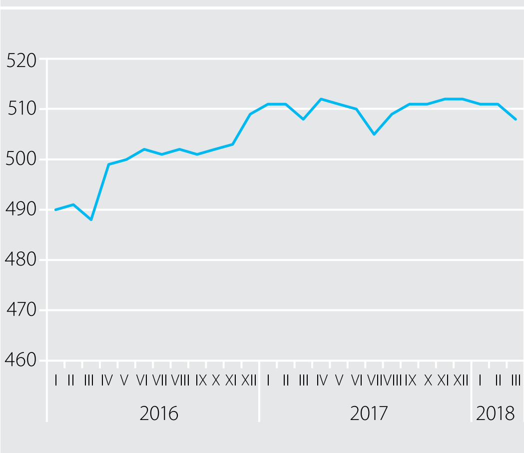
3.1.1. Salaries and other available demand determinants

In Q1 2018, an average gross salary in Montenegro amounted to 764 euro, while an average salary without taxes and contributions amounted to 510 euro. In relation to Q4 2017, average gross and net wages and salaries recorded decrease of 0.4% and 0.3%, respectively. Average wages and salaries recorded y-o-y decrease of 0.1% while the average salary without taxes and contributions remained at the same level.

If we take into account consumer prices, i.e. the wages and salaries trend observed in real terms, it is concluded that real wages and salaries fell in all three months of Q1 2018.

Graph 27

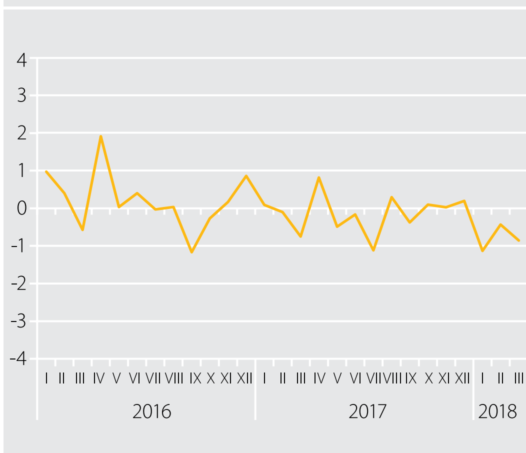
Average wages and salaries without taxes and contributions in Montenegro



Source: MONSTAT

Graph 28

Real wages and salaries (monthly rate)



Source: MONSTAT

In Q1 2018, retail loans[4] grew by the monthly average rate of 0.8%, while in the same period of 2017 they grew at an average rate of 0.9%. At the end of the observed period, total retail loans amounted to 1,144.8 million euro, or by 28 million euro or 2.5% more than at the end-2017, i.e. by 105.1 million euro or 10.1% more than in same period of 2017 (Graph 29).

At end-March 2018, debt per capita[5] amounted to 1,840 euro, recording an increase of 45 euro in relation to end-2017, and a y-o-y increase of 169 euro.

Total MFIs loans disbursed to retail sector amounted to 59.9 million euro at end-March 2018 which was 2.3 million euro or 3.9% more than at the end of 2017, and 6.4 million euro or 11.8% higher compared y-o-y.

At end-March 2018, this sector's deposits amounted to 1,232.5 million euro, which is by 700,000 euro or 0.1% more than at the end-2017, or by 101.3 million euro (9%) more than in the same period of the previous year.

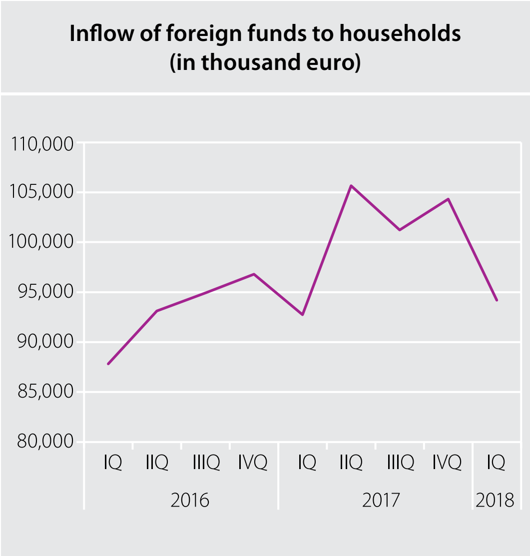
Loans to deposits ratio for this sector amounted to 0.93 at end-March 2018, being higher compared to end-2017 when it amounted to 0.91, as well as in relation to the same period of 2017 when it amounted to 0.92.

Retail sector reported total net savings in the amount of 87.7 million euro at end-Q1 2018, which represented a decrease of 27.3 million euro or 23.7% at end-2017, yet a y-o-y decrease of 3.8 million euro or 4.2%.

In Q1 2018, compared to Q1 2017, the balance of payments statistics show an increase in the inflow of cash arising from employees' compensations and from foreign remittances in favour of domestic natural persons.

Graph 29

Graph 30

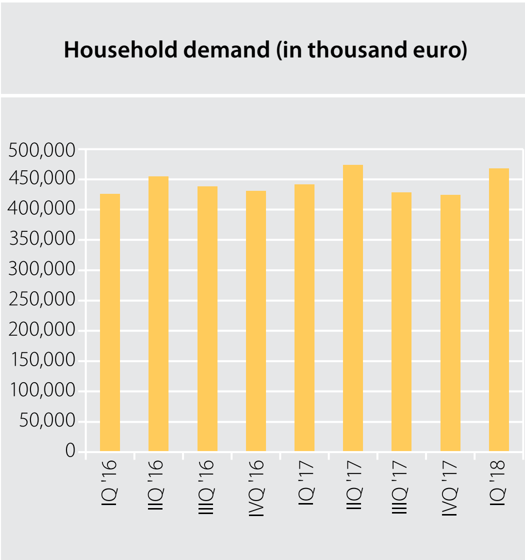


Source: CBCG

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



Observation of the total retail sector demand by quarters shows that household demand in Q1 2018 was higher compared to the previous quarter and compared y-o-y.

3.1.2. Budgetary analysis

According to Ministry of Finance preliminary data, total revenues[6] of the Budget of Montenegro amounted to 456.4 million euro in Q1 2018.

Source revenues amounted to 327.4 million euro or 7.4% of projected GDP[7], and they decreased by 2.3% in relation to the plan, and recorded a y-o-y increase of 10%. In the structure of source revenues, tax revenues accounted for the main share of 65.5%, followed by contributions with 28.9%, other revenues with 1.9%, fees with 1.7%, donations with 1.1%, duties with 0.8%, and receipts from loan repayment and funds transferred from the previous year with 0.1%.

Tax based revenues amounted to 214.4 million euro, recording a 10.1% increase compared y-o-y and a 4.7% decrease relative to the plan. Other than excise duties, all other taxes increased compared to the first quarter of the previous year. In nominal terms, the highest growth of revenues in relation to the previous year was recorded in value added tax in the amount of 13.5 million euro or 12.7% as a result of the increase of the standard VAT rate by 2 percentage points.

Revenues arising from contributions amounted to 94.6 million euro being 3.9% over the plan, and recording a 10.3% y-o-y increase.

In the three months of 2018, *budget expenditures* amounted to 397.5 million euro or 9% of GDP. Compared to the plan for the three months of the current year, the expenditures were lower by 9.1%, but being higher by 8% or 29.4 million euro y-o-y, mainly due to the increase in transfers to the institu-

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 4,397.7 million euro.

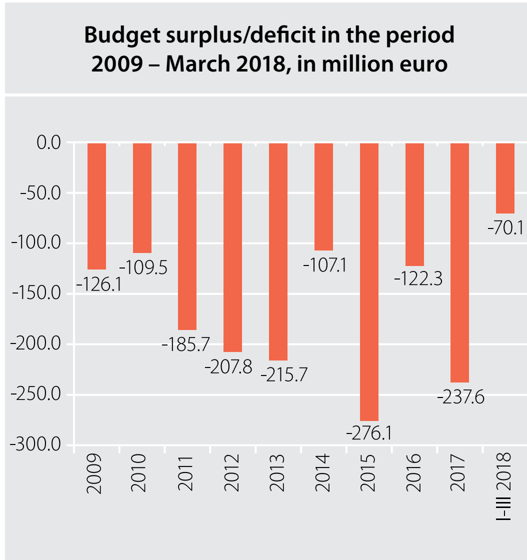
tions, individuals, NGOs and the public sector by 14.6 million euro and a capital budget by 5.8 million euro.

Current budget expenditures in the observed period amounted to 199.3 million euro and were higher than planned by 7.2% as a result of an increase in interest rates by 23.5 million, while the most significant increase in expenditures in relation to the comparative period of the previous year was recorded in capital expenditures in the current budget (growth of 278.1%).

Montenegro's capital budget amounted to 15.8 million euro or 0.4% of GDP.

The deficit of the Budget of Montenegro was estimated to 70.1 million euro, or 1.6% of GDP for Q1 2018.

Graph 32



Source: Ministry of Finance

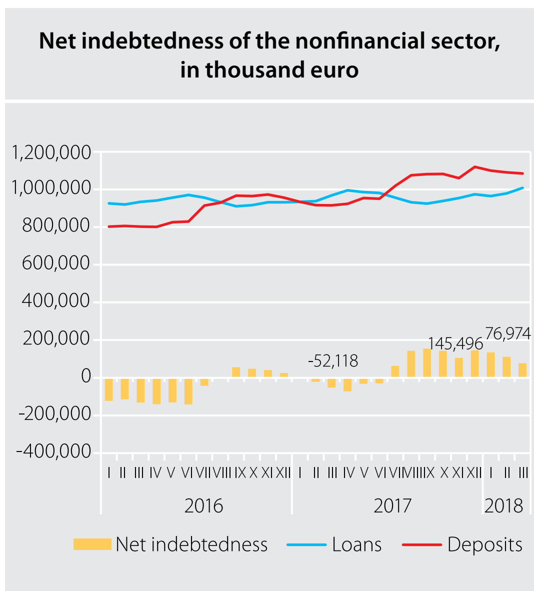
3.1.3. Non-financial sector[8]

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

In Q1 2018, loans to non-financial sector were lower than this sector's deposits. In March 2018, the net savings of the nonfinancial sector amounted to 77 million euro. (Graph 33)

Long-term loans accounted for the main share of 75.3% in the structure of non-financial sector loans at end-Q1 2018, which indicates that loans to corporate sector were mainly used for increasing economic activity volume.

Graph 33



[8] The non-financial sector includes state companies and private companies.

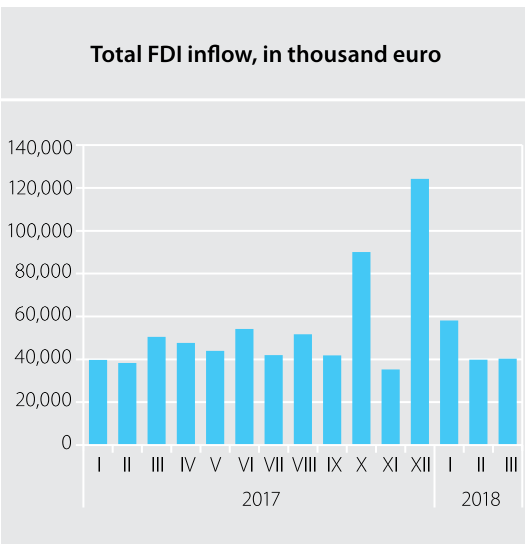
3.1.4. External demand and the current account

In Q1 2018, the deficit was recorded in the current account as a result of higher domestic demand and deterioration of the balance in foreign visible trade, which was expected considering the implementation of significant infrastructure projects. According to preliminary data, the current account deficit amounted to 304.5[9] million euro and represents a y-o-y increase of 4.9%, which is a consequence of the deepening of the imbalance on the goods account, i.e. significantly higher absolute growth of visible imports than exports.

The increase in the deficit on the goods account continued in Q1 2018 (by 7.6%), despite the faster growth of visible exports than imports (20.3% compared to 9.9%). Total visible exports amounted to 97.8 million euro, being a growth of 20.3%, while goods imported at the same time amounted to 487.3 million euro or 9.9 more in relation to the Q1 2017. Higher visible imports in the past few years was the result of higher domestic demand for the implementation of infrastructure projects, as well as other significant projects in the field of energy and tourism.

On the other hand, an increase in the surplus on the services account by 112.3% (to 18 million euro) was recorded as a result of the significantly stronger growth of exports than imports of services (19.9% compared to 12.9%). The increase of tourism revenues by 14.6% contributed significantly to this. In the primary income account, the surplus was 10.8 million euro, being 8.3% less than in 2017 and is the result of an increase in expenditures based on employee compensation and interest payments. Secondary income account ran a surplus of 56.2 million euro, or 9.3% more than in 2017.

Graph 34



Source: CBCG

In Q1 2018, net foreign direct investments amounted to 50.8 million euro and were lower by 50.1% y-o-y, which is the result of a decrease in equity investments, and at the same time with significantly higher outflow compared to the previous year. The total FDI inflow amounted to 138.4 million euro or 7.7% more than in 2017 due to the increase in debt investments. Equity investments were reduced by 33.6% (to 56.9 million euro), while at the same time, resident debtors' liabilities to related companies (intercompany debt) increased by 89.6% (to 78.1 million euro). The inflow of monetary assets arising from the withdrawal of residents' funds invested abroad amounted to 3.4 million euro (2.5% of the total inflow).

In Q1 2018, portfolio investments account recorded net inflow of 5.3 million euro, while the net inflow in the other investments account amounted to 13.2 million euro. The developments in this

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

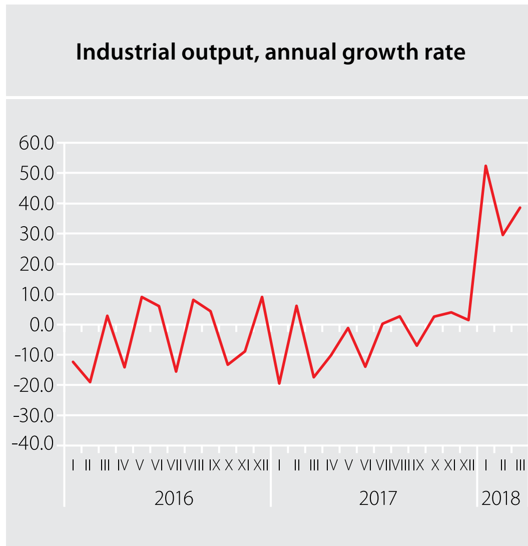
account are characterized by the increase in liabilities of other sectors (corporate sector) based on borrowings, while at the same time a decrease in liabilities of the government sector was recorded. In the observed period, domestic banks reduced both their deposits held abroad and liabilities for loans taken.

3.2. Supply and production

In Q1 2018, industrial output recorded a y-o-y increase of 39% due to the increase recorded in the manufacturing industry and electricity, gas and steam supply sectors of 17% and 82.6%, respectively. Output decrease of 20.2% was recorded in the mining and quarrying sector. Observation of monthly data on the industrial output trends in Q1 2018 shows that growth was recorded in February (13.7%) and March (11.4%), while industrial output declined in January (-4.5%).

In Q1 2018, a total of 84,643 tourists stayed in collective accommodation establishments in Montenegro, which is a y-o-y increase of 28.7%. The number of domestic tourist arrivals in collective accommodation establishments increased by 13.6%, while the number of foreign tourists grew by 33.7%. Tourist nights amounted to 191,348, which is a y-o-y increase of 11.9%.

Graph 35



Source: MONSTAT

In Q1 2018, forestry recorded a total of 13,475 m^3 of forest assortments, which is a significant y-o-y decrease of 36.2%[10].

The value of executed construction works amounted to 145.5 million euro in Q1 2018, recording a 46.8% y-o-y growth, and construction activity measured by effective working hours grew by 29.1%. In the first three months of 2018, air passenger transport recorded a y-o-y increase of 18.8%, while air freight transport decreased by 1.1%. In Q1 2018, road passenger transport recorded y-o-y increase of 0.1%[11], while road freight transport increased by 2%[12]. In the same period, passenger railway transport decreased by 12%[13], while freight railway transport decreased by 21.4%[14].

[10] During the same period, production decreased by 38.5%, expressed by non-weighted index.

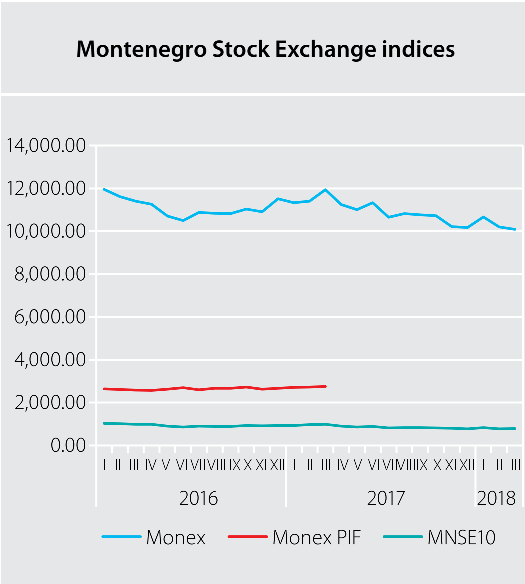
[11] Presented through number of passengers, while it increased by 0.2% expressed in passenger kilometres.

[12] Presented through transported goods in thousand tonnes, while it decreased by 20.6% presented in tonne kilometres.

[13] Presented through number of passengers in thousands, while presented through passenger kilometres the decline was 6.5%.

[14] Presented in thousand tonnes, while it decreased by 5.5% presented in passenger tonnes.

Graph 36



Source: Montenegro Stock Exchange

3.3. Stock exchange indices

At end-Q1 2018, the Monex index dropped in relation to end-2017, while MNSE10 index grew. Both indexes recorded a y-o-y fall (Graph 36).

At end-March 2018, SE index Monex[15] amounted to 10,087.99 recording an decrease of 87.4 index points or 0.9% in relation to end-2017, and a y-o-y decrease of 1,854.3 index points or 15.5%.

MNSE10 index[16] stood at 782.68 at end-Q1, and recorded an increase of 6 index points or 0.8% compared to end-2017, while it was lower by 203.3 index points or 20.6% y-o-y.

[15] 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 "Montenegroberza" AD Podgorica. With the new Methodology, the legal heir of the MONEX20 index - MONEX index - has more companies in its index basket.

[16] 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 "Montenegroberza" AD Podgorica. It is composed of the top ten companies in the Montenegrin market.

4. MONETARY POLICY

During Q1 2018, there were no changes to the existing decisions, nor were new ones made regarding the Central Bank of Montenegro monetary policy instruments.

5. INFLATION FORECAST FOR 2018 AND Q1 2019

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 Q1 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 Q1 2019

With a view to developing a fan chart, an ARIMA (Autoregressive Integrated Moving Average) model of time series of inflation in Montenegro showed through the Consumer Price Index was developed[17].

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 and 21)[18] has sufficient confidence level for forecasts.

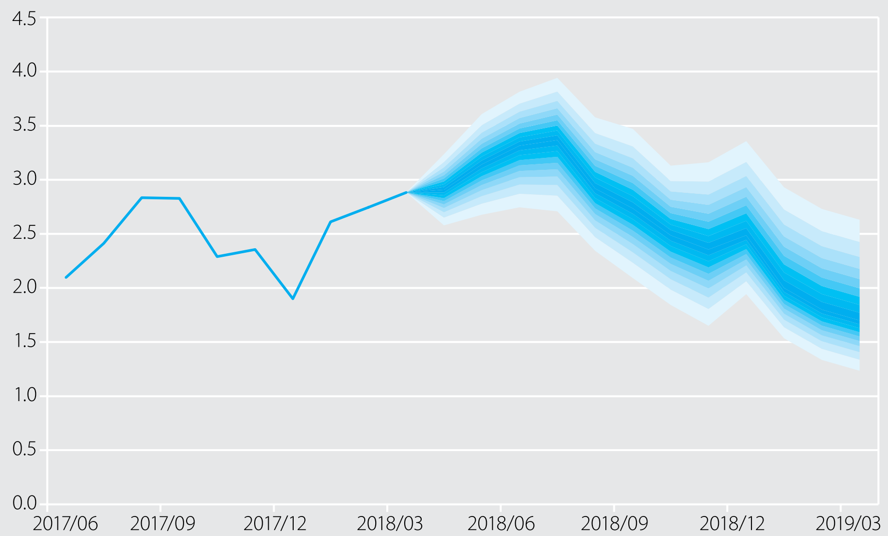
[17] A detailed explanation of the ARIMA model of Montenegro was presented in the working study of the Central Bank No. 11 **"Inflation Forecast". Empirical research on the retail price index trend of Montenegro for 2007 - applying the ARIMA model**.

[18] 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.

The monthly forecasts value was used as the value of central projection of the CPI graph for 2018 and Q1 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 Q1 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.[19] 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.

The fan chart of inflation in Montenegro, based on the ARIMA model assessment for 2018 and Q1 2019, indicates that there is a *90% probability that the CPI inflation will range between 1.3% and 3.9%, depending on the month, with the central projection of 2.6%. At the same time, inflation for 2018 is forecasted to range between 1.7% and 3.9%, with the central trend of 2.8%*. The fan chart central projection (the darkest part) represents a 10% probability span (Graph 37).

[19] 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 risks related to the projected inflation rate shown on the fan chart are symmetrically set. Higher rates of inflation than projected ones could be affected by a stronger rise in oil prices in the international market, 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, such as 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.
- For the needs of the projection, we assumed a potential increase in electricity prices of 3% from August 2018.
- A standstill in wages and real estate prices.

External factors:

- Growth of inflation in the euro area and its approaching to the objective, which is spurred by monetary policy measures and stronger economic growth.
- Rise in oil prices began in Q4 2017, and continued in Q1 2018. Forecasts indicate that oil prices will remain at higher level in H1 2018, while their downward trend in the international market is expected in H2 2018 and early 2019.
- After recovery of metal and food prices in the international market in the past three years, they are expected to increase in 2018.

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

6. EXPECTED INFLATION IN 2018

This year, a higher inflation rate is expected, primarily as a result of fiscal consolidation measures that have affected the growth of the VAT rate and excise duties. Also, the rise in inflation will also be influenced by the rise in oil prices on global stock exchanges.

Bearing in mind the mentioned measures, it is no surprise that both banks and businessmen expect inflation growth this year. Our survey showed that most banks expect inflation in the range of 2.5% to 3%, while the largest number of respondents expect inflation in the range of 2% to 2.5%.

In Q1 2018, there was an increase in economic activity more than expected, and our survey among businessmen indicates that the rest of the year can expect growth in production, investment and employment. All of this will have anti-inflationary effect.

Our model inflation projection predicts inflation for this year in the range of 1.7% to 3.9%, with a central trend of 2.8%. This is similar to our expert projection, which suggests that inflation can range from 1.9 to 3.9% with a central trend of 2.9%.

Table 3

Inflation rate estimation for 2018		
Optimistic projection	Central projection	Realistic projection
1.9	2.9	3.9

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.