CENTRAL BANK OF MONTENEGRO

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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

CENTRAL BANK COUNCIL: Radoje Žugić, PhD, Governor
Irena Radović, PhD, Vice-Governor
Nikola Fabris, PhD, Vice-Governor
Asim Telaćević
Milivoje Radović, PhD
Milorad Jovović, PhD
Srđa Božović, PhD

DESIGNED BY: Andrijana Vujović
Nikola Nikolić

TRANSLATED BY: Translation Services Division

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1. INFLATION INDICATORS

Consumer prices in Montenegro remained unchanged in the second quarter of 2017 compared to the previous quarter. In this period, prices were recorded in the following categories: *hotels and restaurants* 6.5%, *alcoholic beverages and tobacco* 3.2%, *clothing and footwear* and *other goods and services* 0.4% and *furniture, household equipment and routine maintenance of the apartment* and *health* 0.1%. The fall in prices was recorded in the category *food and non-alcoholic beverages* (-0.8%), *transport* category (-0.6%) and *recreation and culture* (-0.1%), while prices in *communication* and *education* remained unchanged. Observing price developments on a monthly basis, consumer prices growth was recorded in April and May (0.1%), while in June it dropped (-0.1%). On an annual level, consumer prices increased by 2.1% in June, while the average rate (period per period) was 2.3%.

Table 1

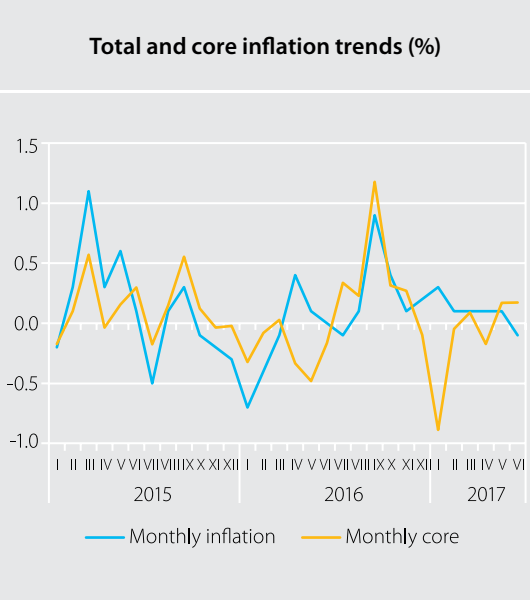
Inflation, %						
	2016.				2017.	
	III	VI	IX	XII	III	VI
Change in relation to the previous year-end	-1.1	-0.5	0.4	1.0	0.5	0.5
Annual change	-0.9	-1.3	-0.3	1.0	2.7	2.1

Source: MONSTAT

During the second quarter, the highest increase in prices was recorded in *hotels and restaurants* by 6.5%, mostly due to the increase in the prices of accommodation services by 22.7%. This caused the largest positive contribution of category *hotels and restaurants* to total inflation of 0.2 percentage points. Prices of *alcoholic beverages and tobacco* increased by 3.2% due to the increase in tobacco prices by 4.6%. In this period, prices in the category of *clothing and footwear* and *other goods and services* increased by 0.4%, while prices in the category of *furniture, household equipment and routine maintenance of the home* and *health* recorded a growth of 0.1%. The biggest drop in prices of 0.8% was recorded in the category *food and non-alcoholic beverages*, which contributed to the biggest negative contribution to total inflation (-0.3 percentage points). In the category *food and non-alcoholic beverages* , prices of vegetables decreased (-12.2%), as well as prices of fish and seafood (-5.2%), oils and fats (-2.2%), bread and cereals (-0.7%) and non-alcoholic beverages, milk, cheese and eggs and sugar, jams, honey, chocolate and sweets (by -0.1%), while prices of fruit increased (10.6% (food products (not classified elsewhere)[1] (1.5%) and meat (0.6%). During the second quarter prices decreased in the category *transport* by 0.6% and the category *recreation and culture* by 0.1%. Prices in the *communications* and *education* remained unchanged in the second quarter.

[1] Not classified elsewhere

Graph 1



Source: MONSTAT

Monthly **core** inflation was lower in April, while during May and June it had a higher level than official monthly inflation. The official monthly inflation rate registered a negative rate in June, while core inflation registered a negative rate in April.

In the second quarter of 2017, oil prices fell in relation to the first quarter. The price of the OPEC reference basket in the second quarter was on average 48.6 USD/barrel, which is 6.6% less than the average price from the first quarter of this year. The average price of Brent in the second quarter was 49.8 USD/barrel, which is by 7.3% less than the average price from the first quarter of this year. Despite respecting the oil producing reduction agreement between OPEC members and non-members countries of this cartel, world oil stocks remain at a relatively high level with low levels of spending, which also affected the decline in prices in the second quarter of this year.

Table 2

Share of selected categories in total inflation[2]

	Weights	VI 17/III 17 Index	Growth rate	Contribution
TOTAL	1000	100.0	0.0	0.0
Food and non-alcoholic beverages	351.7	99.2	-0.8	-0.3
Alcoholic beverages and tobacco	38.6	103.2	3.2	0.1
Clothing and footwear	85.1	100.4	0.4	0.0
Housing, water, electricity gas and other fuels	155.3	99.8	-0.2	0.0
Furniture, household equipment and routine maintenance of the apartment	41.2	100.1	0.1	0.0
Health	40.9	100.1	0.1	0.0
Transport	107.0	99.4	-0.6	-0.1
Communication	49.9	100.0	0.0	0.0
Recreation and culture	33.2	99.9	-0.1	0.0
Education	19.3	100.0	0.0	0.0
Hotels and restaurants	31.3	106.5	6.5	0.2
Miscellaneous goods and services	46.5	100.4	0.4	0.0

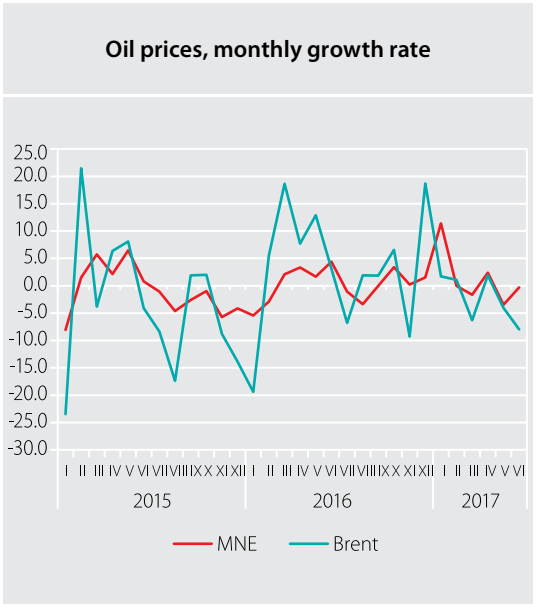
Source: MONSTAT and CBCG calculations

[2] 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.

The smallest price of Brent in the second quarter was recorded in June when it was 46.42 USD/barrel, which is also the lowest price in the first half of this year.

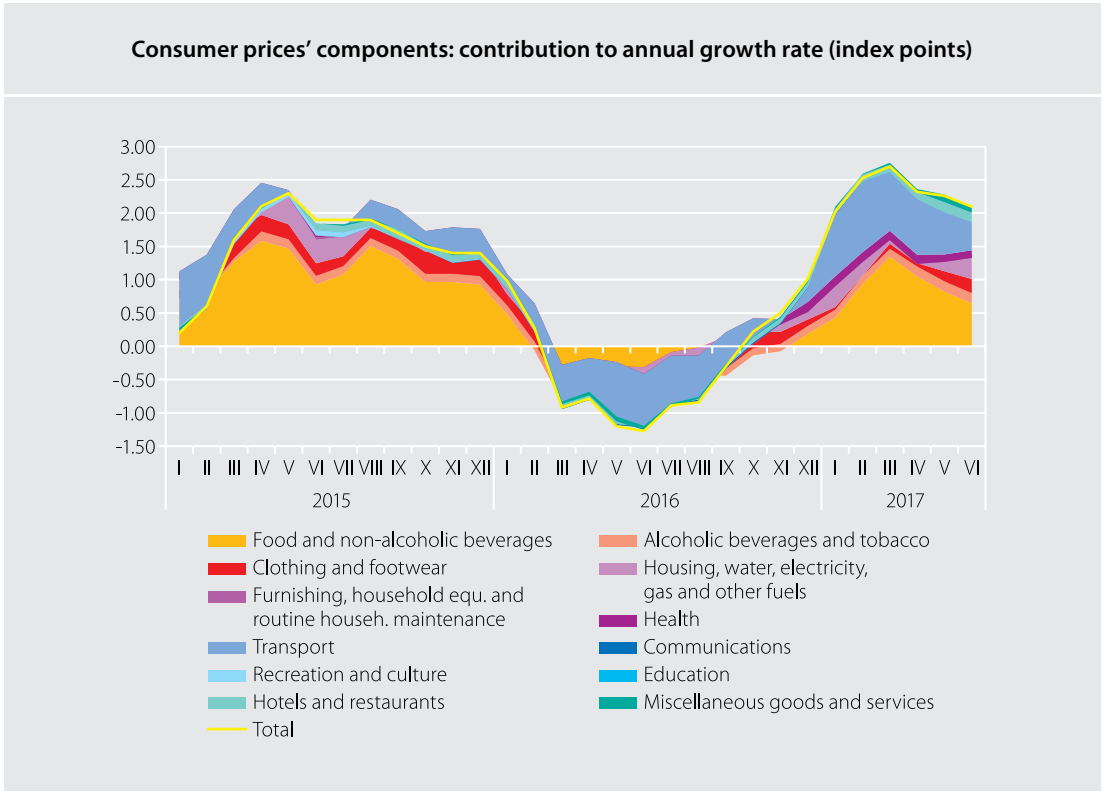
Annual prices growth of 1.8% in the *food and non-alcoholic beverages* category gave the largest contribution to the increase (0.6 percentage points) in the total annual inflation rate of 2.1%. Annual price growth in June was also recorded in the following categories: *hotels and restaurants* (4.5%), *transport* (4.0%), *alcoholic beverages and tobacco* (3.9%), *health* (2.8%), *clothing and footwear* (2.5%), *housing, water, electricity gas and other fuels* (2.3%), and *other goods and services* (1.9%). Decline of prices at the annual level was recorded in the category *furniture, household equipment and routine maintenance of apartments* (-1.1%) and prices from category *recreation and culture* (- 0.1%). Prices of *communications* and *education* remained unchanged at the annual level.

Graph 2



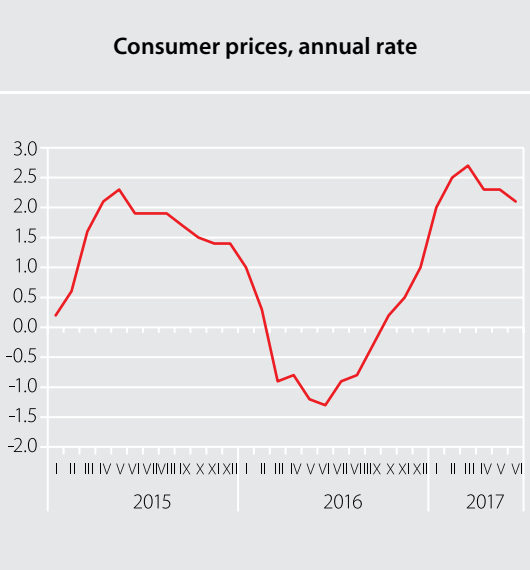
Source: MONSTAT and "Monthly Oil Market Reports", OPEC

Graph 3



Source: Monstat and CBCG calculations

Graph 4

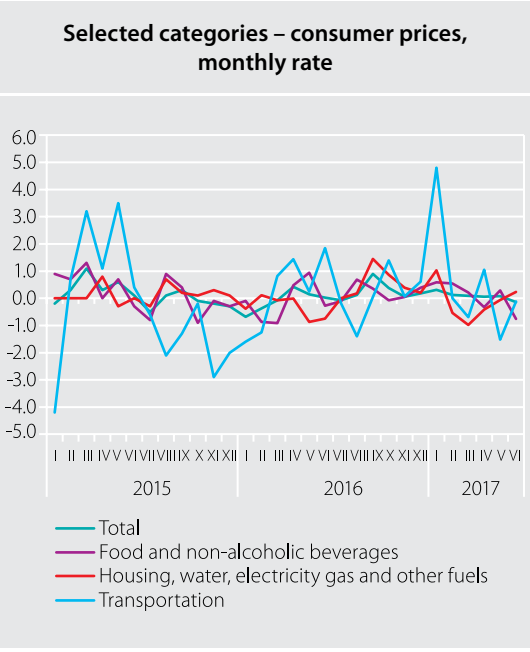


Source: MONSTAT

The producers` prices of manufactured products in June recorded increase of 0.2% in relation to end-2016. Price growth was recorded in electricity, gas and steam supply sector (5.3%), while prices in mining and quarrying manufacturing industry recorded growth of 1%. Manufacturing industry prices declined by 3.3%. On the annual level, producers' prices of manufactured products increased by 0.2%.

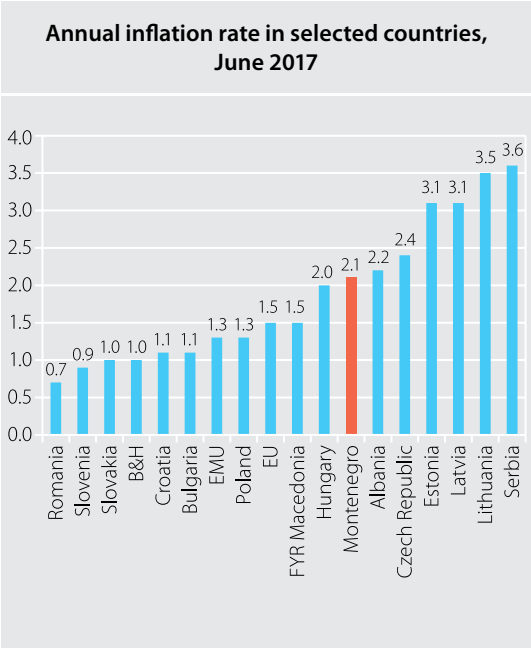
Comparison of annual inflation recorded in Montenegro with the inflation recorded in selected countries shows that, not all the selected countries recorded positive inflation as well. The highest positive annual inflation rate was recorded in Serbia (3.6%) while Romania recorded the lowest positive annual inflation rate (0.7%). In reference to neighbouring countries, other than Montenegro, the rates were positive in Albania (2.2%), Macedonia (1.5%), Croatia (1.1%) Bosnia and Herzegovina (1.0%) and Slovenia (0.9%).

Graph 5



Source: MONSTAT

Graph 6

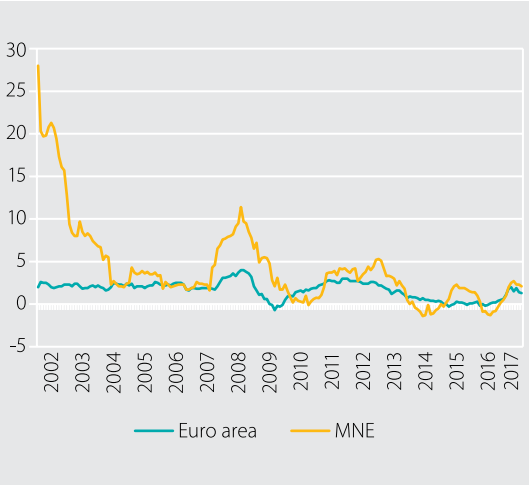


Source: National Statistical Offices and Eurostat

The annual HICP inflation rate reported in the euro area amounted to 1.3%, CPI inflation in Montenegro amounted to 2.1%, while annual HICP inflation in Montenegro was 2.4%.

Graph 7

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.

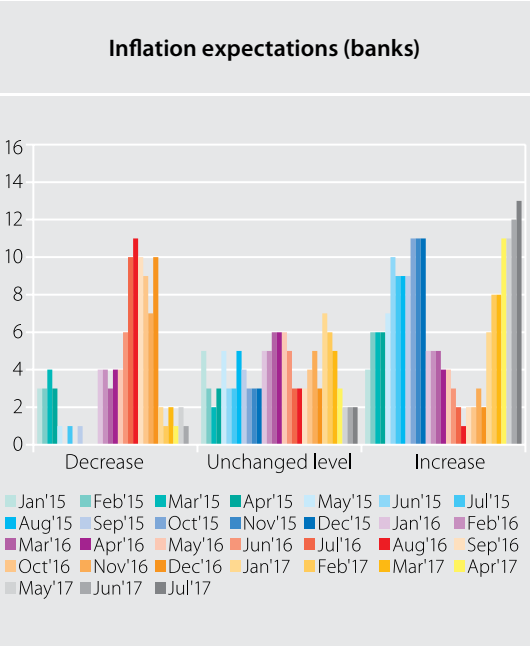
2. INFLATIONARY EXPECTATIONS

2.1. Banks' expectations

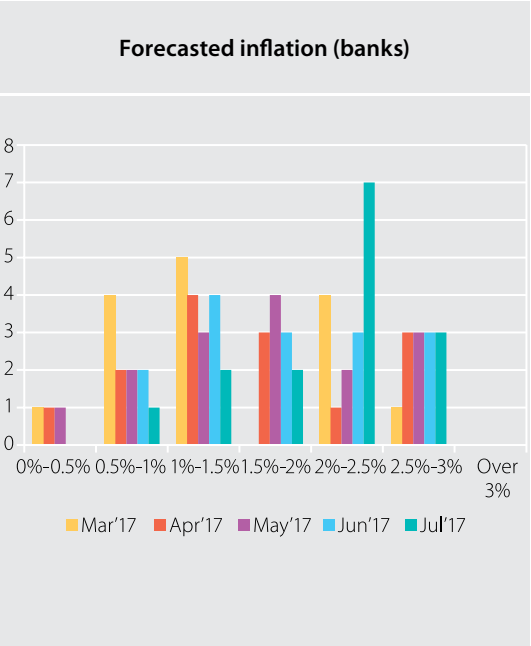
When it comes to the inflationary expectations of banks, according to a survey conducted in July this year, thirteen banks expects a higher inflation rate, the same level of inflation is expected by two banks, while none of the surveyed banks expect the inflation rate to fall in 2017 compared to 2016. (Graph 8)

As Graph 9 shows, there are different expectations of banks on the trend and the amount of inflation by the end of this year. Seven banks expect the level of inflation in the range of 2% and 2.5%, three banks expected inflation to range between 2.5% and 3%, while two banks expected inflation between 1% and 1.5% and two banks between 1.5 and 2%. One bank expects the inflation level between 0.5% and 1%, while none of banks expected inflation between 0% and 0.5% or over 2%.

Graph 8



Graph 9

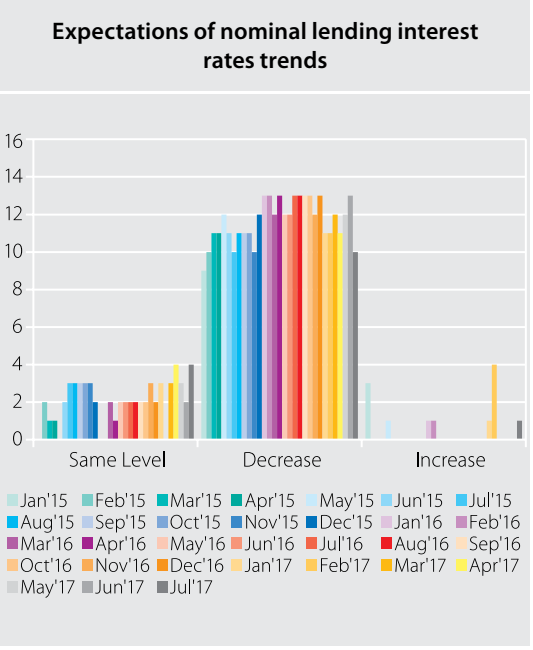


Regarding expectations on the nominal lending interest rates trends, ten banks expect this rate to decline, four banks expect it to remain at the same level, and one bank expects the nominal lending

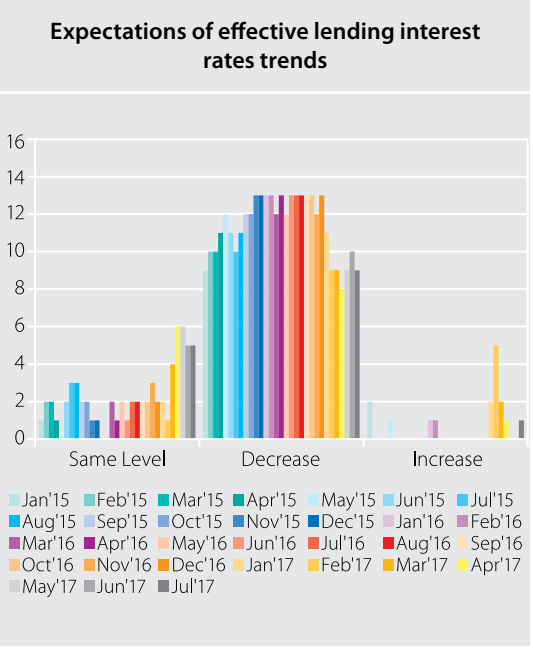
interest rate to grow. On the other hand, nine banks expect effective interest rates to decline, five banks expect them not to change, while one bank expects the effective lending interest rate to increase.

When it comes to expectations of banks on the movement of deposit interest rates, seven banks expect a fall in deposit interest rates, eight banks are of the opinion that they will remain at the same level, while none of the banks expect the growth of deposit interest rates in 2017 compared to 2016.

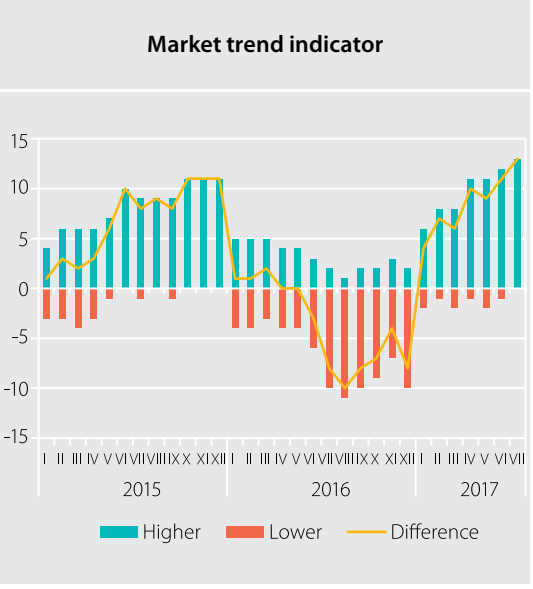
Graph 10



Graph 11



Graph 12



For the purpose of calculating inflation forecasts we use market trend indicator (line in Graph 12). 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. During 2016, inflation forecasts were significantly low, with some oscillations, while over the first seven months of 2017 they have been increasing.

2.2. Expectations of economy (except banks)

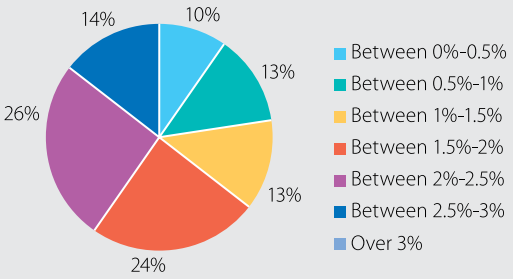
Inflation

In the total number of surveyed companies, majority (26%) expect the inflation in 2017 to range between 2% and 2.5%. Inflation in the range of 1.5% to 2% is expected by 24% of companies, while 14% of surveyed companies expect the inflation to range between 2.5% and 3%. Inflation between 0.5% and 1% and between 1% and 1.5% is expected by 13% of surveyed companies, respectively, while 10% of surveyed companies believe that inflation will range between 0% and 0.5%. None of the surveyed companies expects inflation to exceed 3% (Graph 13). Some 79% of companies surveyed expect lower wages and salaries in 2017 compared to the previous year, lower wages and salaries are expected by 10%, while 11% of surveyed companies expect wages and salaries to increase in 2017. With regard to the number of employed persons, 74% of surveyed companies expect it to remain unchanged, 16% expect this number to increase, and 10% expected it to decrease in relation to the previous year.

The majority of surveyed companies (61%) expected the prices of production inputs to remain unchanged, and 77% expect the prices of their products (services) not to change in 2017.

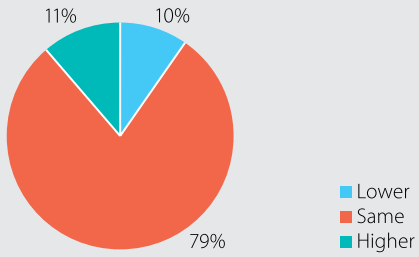
Graph 13

Expected inflation in 2017 in relation to 2016



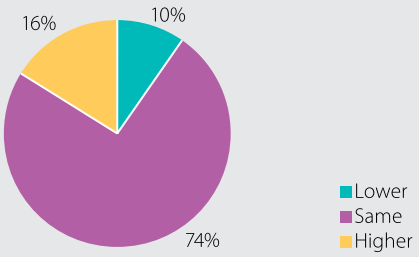
Graph 14

Expected wages and salaries in 2017 in relation to 2016

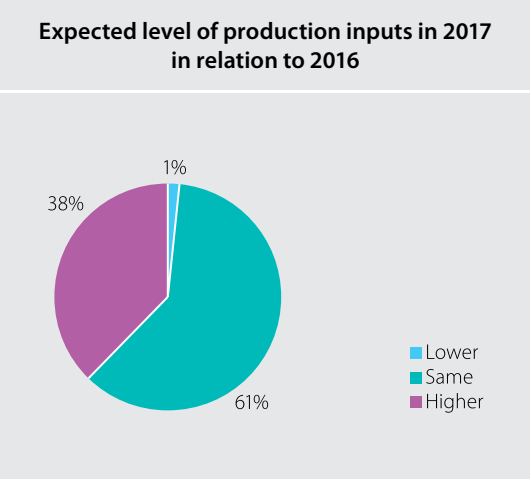


Graph 15

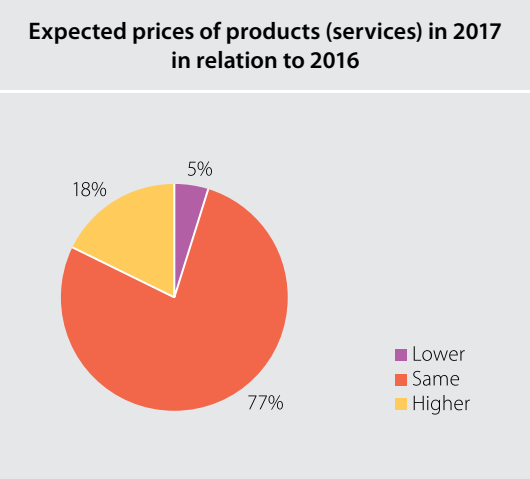
Expected number of employed persons in 2017 in relation to 2016



Graph 16



Graph 17

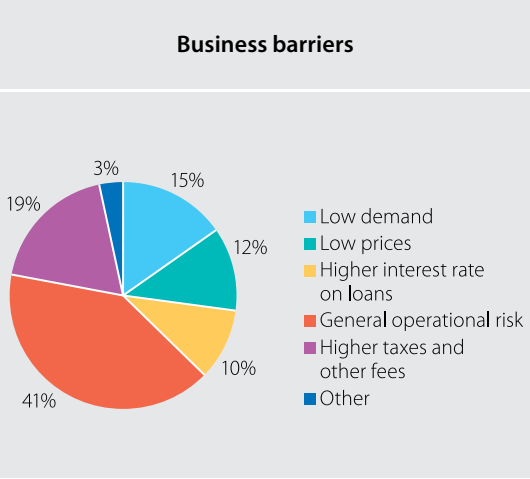


Business Environment

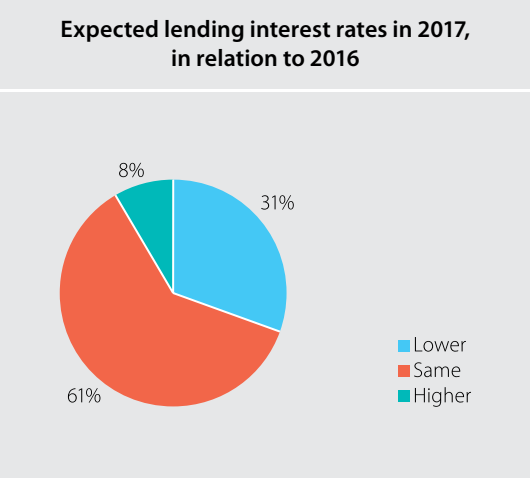
In the area of business barriers, survey results showed that most of the surveyed companies saw general operational risks (41%), high taxes and other forms of duties (19%) and low demand (15%) as main obstacles.

In reference to lending interest rates, 31% of surveyed companies expected them to decline, 61% expected them to remain unchanged, while 8% expected higher lending interest rates in 2017 relative to 2016.

Graph 18



Graph 19

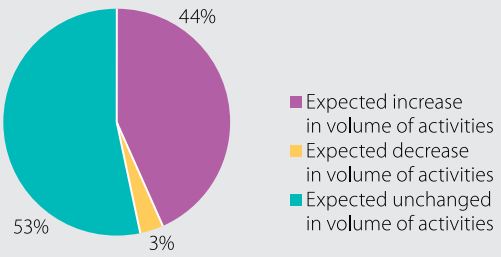


Investments

Out of the total number of surveyed companies, 44% planned to increase the volume of activities in 2017, while 52% planned new investments. The largest number of investments (59%) refers to the increase in fixed assets, and as the biggest obstacles to new investments are other obstacles (27%), insufficient utilization of existing capacities (24%), high interest rates and unfavourable conditions of capital borrowing (21%), as well as low demand and high existing production costs (14%), respectively.

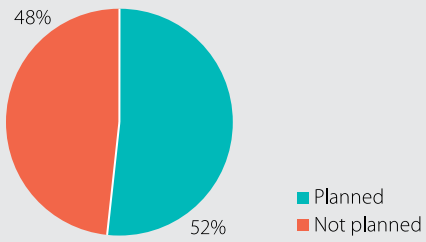
Graph 20

Expected volume of activities in 2017



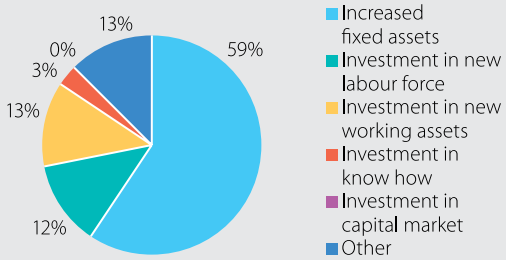
Graph 21

New investments in 2017



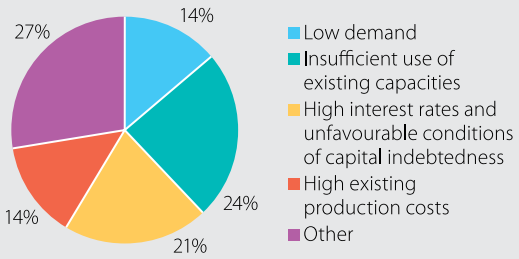
Graph 22

Types of new investments planned in 2017



Graph 23

Obstacles to new investments in 2017



3. INFLATION DETERMINANTS

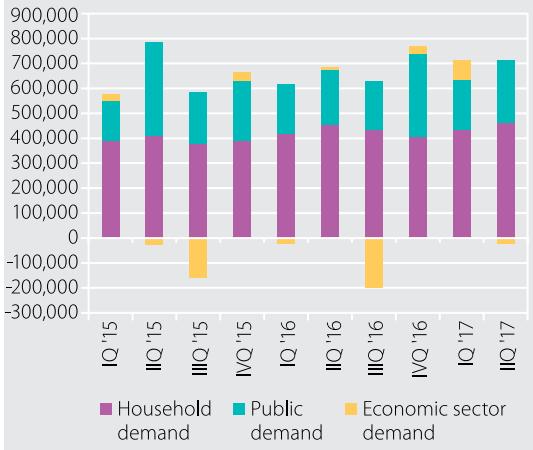
3.1. Demand

According to preliminary data, aggregate demand recorded quarterly decline in Q2 2017, yet recording insignificant y-o-y increase. Observing the level of total demand in the second quarter of 2017, the household demand and government spending increased compared to the previous quarter, while the component of the corporate sector decreased.

In Q2 2017, the level of aggregate demand recorded y-o-y decline, while it increased in relation to Q1 2017.

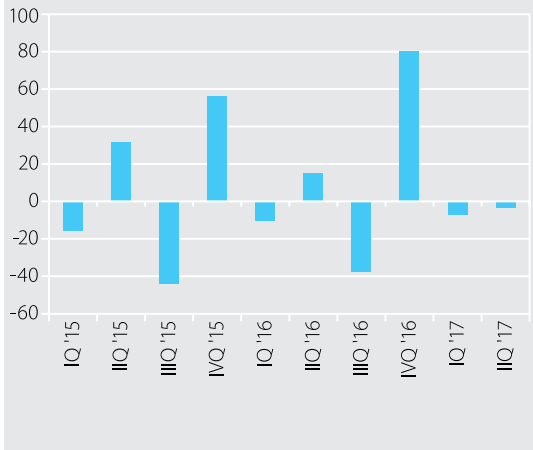
Graph 24

Aggregate demand, in thousand euros



Graph 25

Aggregate demand quarterly 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

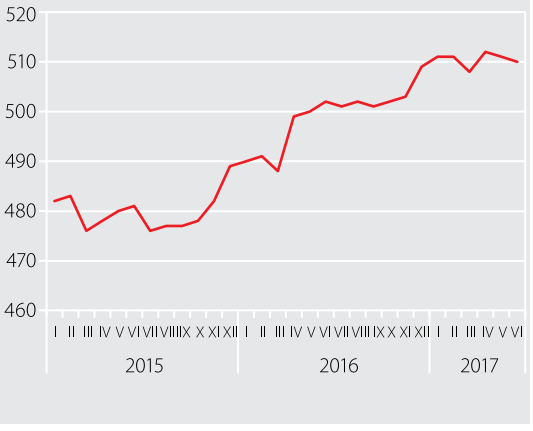
3.1.1. Salaries and other available demand determinants

In Q2 2017, an average gross salary in Montenegro amounted to 766 euros, while an average salary without taxes and contributions amounted to 511 euros. Compared on a quarterly basis, average salary and average salary without taxes and contributions increased by 0.1% and 0.2%, respectively.

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 reported growth in April, while real decline was reported in May and June.

Graph 26

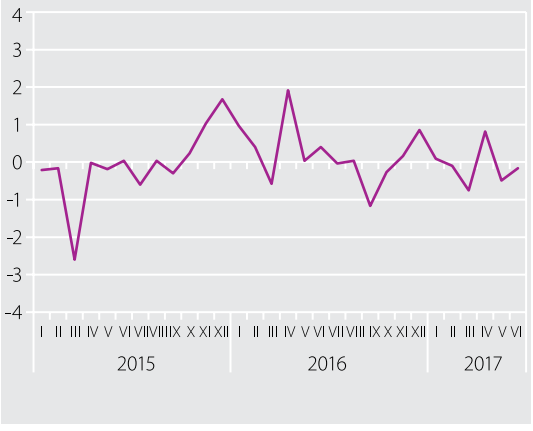
Average wages and salaries without taxes and contributions in Montenegro



Source: MONSTAT

Graph 27

Real wages and salaries (monthly rate)



Source: MONSTAT

Borrowing to the household sector was marked by a positive trend in Q2 2017. The average monthly growth of loans granted to this sector was 1%, while the growth at the average rate of 0.8% was recorded in the same period of 2016. At the end of Q2 2017, household loans amounted to 1,082.1 million euros, which was 64.1 million euros or 6.3% more than at the end of the previous year, i.e. 116.4 million euros or 12.1% more than in same period of the previous year (Graph 28).

At end-June 2017[4], debt per capita amounted to 1,739 euros, recording increase by 102.5 euros in relation to end-2016, and by 186.6 euros compared y-o-y.

Total MFIs loans disbursed to households amounted to 56.1 million euros at end-June 2017 which was 4.7 million euros or 9.2% more than at the end of 2016, and 7.3 million euros or 15% higher compared y-o-y.

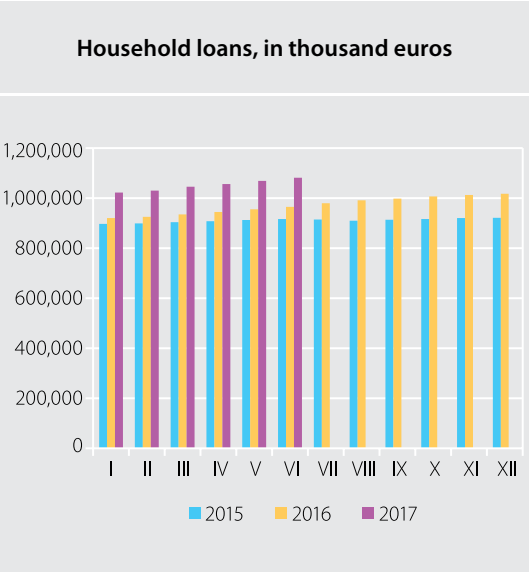
During Q2 2017, deposits of the household sector recorded average monthly uptrend of 0.5% (the average monthly growth of 0.1% was recorded in the same period of 2016). At end-June 2017, this sector's deposits amounted to 1,581 million euros, which is by 46.9 million euros or 3.1% more than at the end-2016, or by 132.3 million euros (9.1%) more than in the same period of the previous year.

At end-June 2017, loans to deposits ratio for this sector amounted to 0.68 being higher compared to end-2016 when it amounted to 0.66, and in relation to the same period of 2016 when it amounted to 0.67.

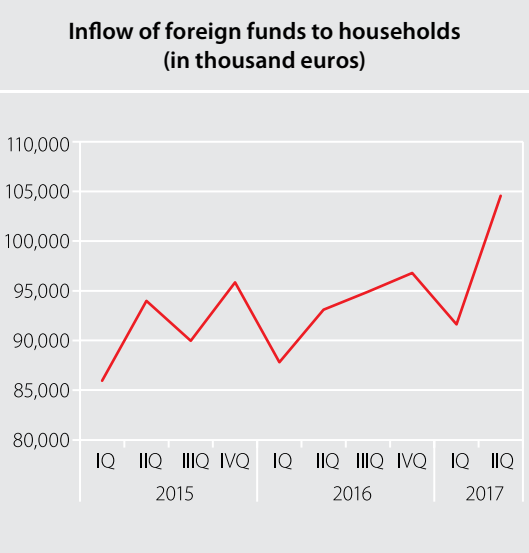
Household sector reported total net savings in the amount of 498.9 million euros in end Q2 2017, which represented decrease of 17.2 million euros or 3.3% in relation to end-2016, yet a y-o-y increase of 15.9 million euros or 3.3%.

The balance of payments statistics in Q2 2017 recorded an evident increase in cash inflows based on remittances from abroad, as well as on the basis of compensation to employees in relation to Q1 2017.

Graph 28



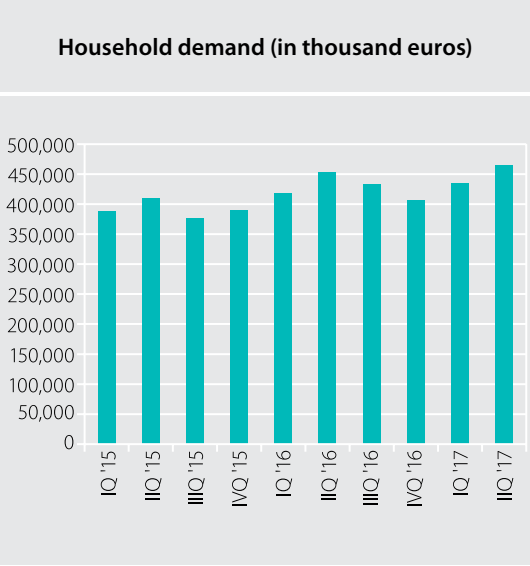
Graph 29



Source: CBCG

[4] Population estimate for 2017: Estimate as at 1 January (2017), Source: Monstat

Graph 30



Observation of the total household demand by quarters shows that household demand in Q2 2017 was higher compared to the previous quarter and compared y-o-y.

3.1.2. Budgetary analysis

Budget of Montenegro

According to Ministry of Finance preliminary data, total revenues[5] of the Budget of Montenegro amounted to 974.4 million euros in the first six months of 2017.

Source revenues amounted to 682 million euros or 17.2% of projected GDP[6], and they decreased by 0.1% in relation to the plan, and recorded a y-o-y increase of 7.7%. In the structure of source revenues, tax revenues accounted for the main share of 64.4%, followed by contributions with 29.7%, other revenues with 2.3%, fees with 1.3%, donations with 1.1%, duties with 0.8%, and receipts from loan repayment and assets transferred from the previous year with 0.4%.

Tax revenues amounted to 3 million euros, recording a y-o-y increase of 20%, and being by 3.7% above the plan. All taxes were higher compared to the observed period of the previous year, excluding personal income tax, which remained at the same level. In nominal terms, the highest annual increase in revenues was recorded in Value Added Tax in the amount of 19.8 million euros or 9% and excise duties in the amount of 16.5 million euros or 21.5% as a result of the implementation of the amended Law on Excise Taxes.

Revenues arising from contributions amounted to 202.6 million euros being 3.8% below the plan for Q2 2017, and recording a 2.2% y-o-y increase.

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

[6] Source: Ministry of Finance, Estimated GDP for 2017 amounts to 3,957.2 million euros.

In the first half of 2017, **budget expenditure** amounted to 787.2 billion euros or 19.9% of GDP. Expenditures were by 7.3% lower in relation to the plan for the six months of 2017 and by 5.4% or 40.6 million euros higher in relation to the same period of 2016 mainly due to a 27.9 million euros increase in the capital budget, due to higher expenditures for the construction of the Bar-Boljare highway.

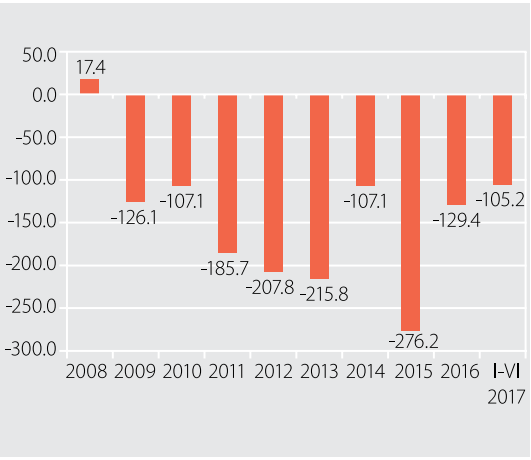
Current budget expenditures amounted to 385.9 million euros or insignificantly lower than planned. Almost all current expenditures, except expenditures for gross wages and salaries, services, interest and other expenditures were below the planned.

Montenegro's capital budget amounted to 41.1 million euros or 1% of GDP.

The deficit of the Budget of Montenegro was estimated to 105.2 million euros, or 2.7% of GDP for the first six months of 2017.

Graph 31

Budget surplus/deficit in the period 2008 – June 2017, in million euros



Source: Ministry of Finance

3.1.3. Corporate sector

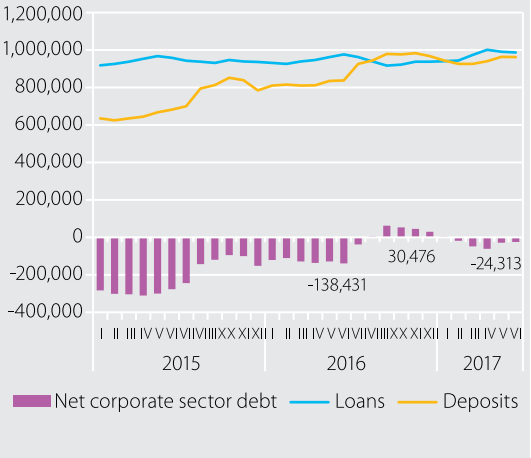
Since the data on the corporate sector investments are not available, net corporate sector indebtedness can be used for approximation.

In the first six months of 2017, corporate loans exceeded this sector's deposits (with the exception of January). In June 2017 the net debt of the corporate sector amounted to 24.3 million euros at the end of the observed period, and in relation to end-Q2 2016, it declined by 114.1 million euros or 82.4% (Graph 32).

Long-term loans accounted for the main share of 77.6% in the structure of corporate sector loans, which indicates that loans to this sector were mainly used for increasing economic activity volume.

Graph 32

Net corporate sector debt, in thousand euros



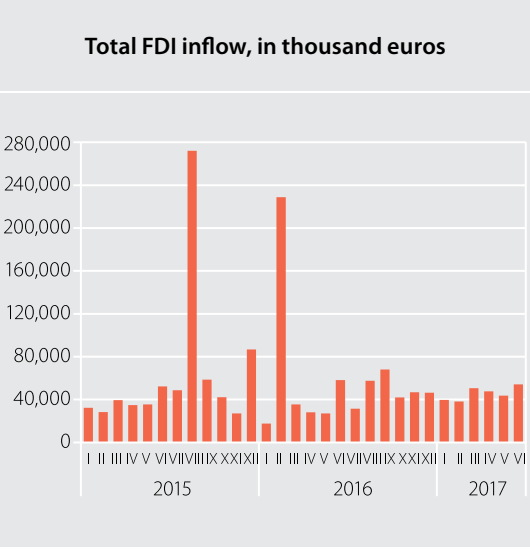
3.1.4. External demand - balance of payment

In the first half of 2017, a decrease in the current account deficit was recorded. This was mainly due to an increase in surplus in service accounts and primary and secondary income, while at the same time an imbalance in foreign exchange trade was increased. According to preliminary data, the current account deficit amounted to 631.3 million euros or 5.1% less than in the same period of 2016. In the observed period, the increase in the deficit on the account of goods increased by 8.6% (866.3 million euros), as a result of an increase in imports by 8.4%, which was largely due to the increase in imports of oil and oil derivatives and electricity.

In the international exchange of services, Montenegro achieved a surplus of 134.7 million euros in the first half of 2017, an increase of 54.5% over the same period of the previous year and is a consequence of a significant income increase in travel /tourism and transport services. A surplus of 31.7 million euros was recorded on the primary income account, unlike in the previous year, when the deficit of 5.3 million euros was realized. Such developments are the result of a smaller outflow on the basis of dividends paid and an increase in inflows based on employee compensation and interest rates. Secondary income account ran a surplus of 68.6 million euros, or 36.5% more than in 2016.

Trends at the financial account are characterized by an increase in net inflows compared to 2016. According to preliminary data, net FDI inflow in the period January-June 2017 amounted to 220 million euros, which is 41.7% more compared to the same period in 2016. Total FDI inflow in the reporting period amounted to 273.8 million euros, while the outflow of 53.8 million euros was recorded in the same period. In the FDI inflow structure, equity investments amounted to 163 million euros, accounting for 59.5% of total inflows in the first six months of 2017, while inflows in the form of intercompany debt amounted to 108.6 million euros or 65.8% more than in the same period of 2016. The inflow of monetary assets arising from the withdrawal of residents' capital abroad amounted to 2.2 million euros.

Graph 33



Source: CBCG

In the first half of 2017, the investment portfolio accounted for a net inflow of 10.4 million euros, which is less than in the same period of 2016 (EUR 26.5 million), while the net inflow on the account of other investments was 112.8 million euros.

3.2. Supply and demand

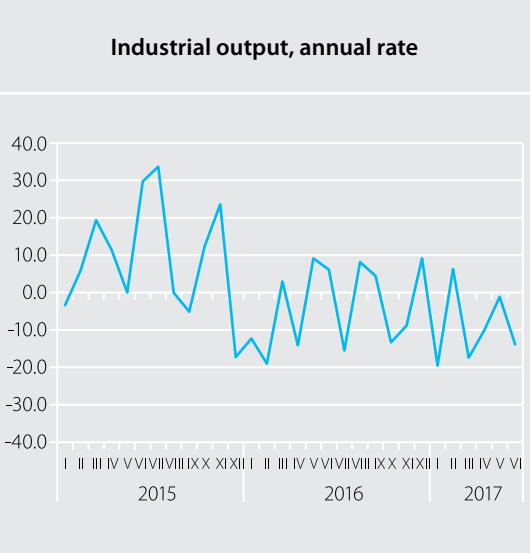
In Q2 2017, total industrial production decreased by 9.6% compared to the same period last year. Manufacturing industry recorded output decline of 3.4%, as well as electricity, gas and steam supply (36.1%) while mining and quarrying recorded growth of 131.3%. Observation of monthly data on the

industrial output trends shows that the growth was recorded in February (34.1%), May (5.8%) and March (4.1%), while the decline was recorded in January, April and June (-36.6%, -14.6% and -7.8%, respectively).

In Q2 2017, a total of 349,276 tourists stayed in collective accommodation establishments, which is a y-o-y increase of 18.6%. The number of domestic tourists' arrivals in collective accommodation establishments increased by 8.1%, while the number of foreign tourists grew by 20.5%. Tourist overnights amounted to 1.2 million, which is a y-o-y increase of 15.8%. Foreign tourists accounted for 85.2% of total overnights.

Total **production of forest assortments** in the first six months of this year amounted to 109.790 m³, which is 7.9%[7] more than more than the same period of the previous year.

Graph 34



Source: MONSTAT

According to preliminary data, the value of **executed construction works** for the first six months of this year was higher by 45.3% compared to the same period of 2016, while construction activity measured by effective working hours increased by 22.6%.

According to Monstat data, in the first six months of 2017, road transport recorded 0.7%[8] more passengers than in the same period of 2016, while road freight transport increased by 8.9%[9]. Railway passenger transport decreased by 20.3%[10] and railway freight transportation increased by 59.4%[11] compared y-o-y. During the first half of the year, in air transport the number of passengers at airports was 23% higher, while transport of goods decreased by 2.6% compared to the same period of the previous year.

Total turnover in ports in the first six months of this year amounted to 1.1 million tonnes and was higher by 52.9% compared to the same period of the previous year, while exports accounted for 63.9% and imports 35.9%.[12] In the observed period, exports increased by 94.2%, and imports increased by 10.4%.

[7] Expressed by weighted index, while expressed by non-weighted index, production increased by 8.5% over the same period.

[8] Presented through number of passengers, while it increased by 5.8% expressed through passenger kilometres.

[9] Presented through transported goods in thousand tonnes, while it increased by 0,6% presented in tonne kilometres.

[10] Presented through number of passengers in thousands, while it decreased by 25.4% presented through passenger kilometres.

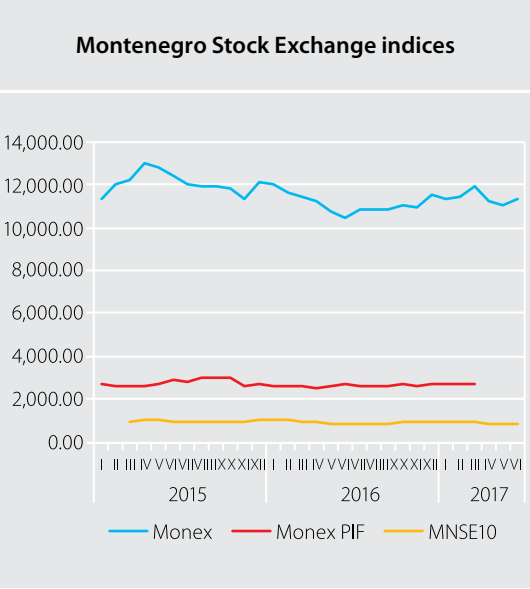
[11] Presented in thousand tonnes, while presented through passenger tonnes the increase was 73.1%.

[12] Exports and imports do not sum to 100 due to residual referring to transit of goods.

3.3. Stock exchange indices

At the end of the second quarter of 2017, both indexes fell against the end of the previous year, while at the annual level both indexes recorded growth (Graph 35). From April 2017, the MONEX PIF index is no longer in use.[13]

Graph 35



Source: Montenegro Stock Exchange

At end-June 2017, index Monex[14] amounted to 11,328.56 recording decrease of 182 index points or 1.6% in relation to end-2016, and a y-o-y increase of 835.2 index points or 8%.

MNSE10 index[15] stood at 884.70 at the end of the third quarter and recorded a decline of 43.6 index points or 4.7% compared to the end of 2016, while compared to the same period of the previous year it was 30.5 index points or 3.6% higher.

[13] The MONEX PIF index is the successor of the NEX PIF index, which monitored trends in the price of shares of six privatization funds. As the process of transformation of funds ended, the need for calculating this index has ceased.

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

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

4. MONETARY POLICY

During the second quarter of 2017, there were no changes to the existing ones, nor were new decisions made regarding monetary policy instruments of the Central Bank of Montenegro.

5. INFLATION FORECAST FOR 2017 AND FIRST TWO QUARTERS OF 2018

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 2017 and Q2 2018 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 2017 and Q2 2018

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[16].

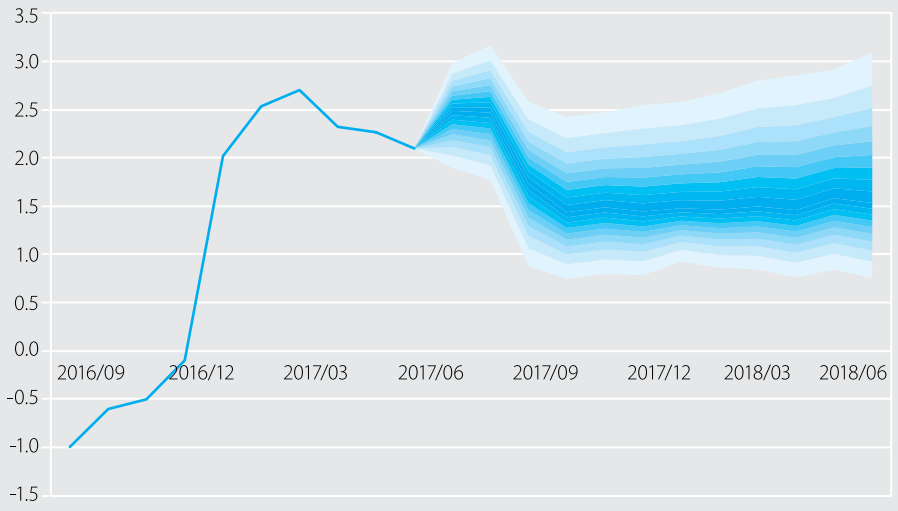
[16] More detailed explanation of ARIMA model of Montenegro was presented in the Central Bank Working Paper 11 "Inflation forecasting: Empirical research of retail price index of Montenegro for 2007 – implementation of ARIMA model".

ARIMA model was used for short term forecasts (12 months), whereby iteration of several ARIMA models was made, which were ranked based on their efficiency and quality of diagnostics. The selected ARIMA model, ARIMA (1, 1, 6)[17] has sufficient confidence level for forecasts.

The monthly forecasts value was used as the value of central projection of the CPI graph for 2017 and Q2 2018. Obtained values represent the distribution mode, i.e. values with the highest frequency in the distribution of this time series.

Graph 36

CPI projections of Montenegro for 2017 and Q2 2018



Source: CBCG, 2017

Mean value of the obtained model is 1.7. The value of the coefficient of asymmetry varies between 0.6 and 1.2, and the relative standard deviation is 0.3. The central range is located in the lower part of the distribution, which indicates that the appropriate range of uncertainty is concentrated towards higher levels of inflation. 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.[18] 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.

[17] 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.

[18] 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 Montenegro, based on the ARIMA model for the last two quarters of 2017 and first two quarters of 2018, shows that, with a probability of *90%, CPI inflation will range from 0.8% to 3.2%, depending on the month. For 2017, an average inflation of 2.1% is projected, while for December 2017, inflation is projected in the range from 0.8% to 2.6%, with a central tendency of 1.5%*. The fan chart central projection (the darkest part) represents a 10% probability span (Graph 36).

Starting assumptions of the inflation forecast for the last two quarters of 2017 and the first two quarters of 2018

The risks surrounding the projected inflation rate shown on the fan chart are concentrated at higher levels. The projected inflation rate includes an increase in excise duties and an increase in VAT, which are presented in the Fiscal Strategy of the Ministry of Finance. Higher rates of inflation than the projected ones could be affected by a stronger rise in oil prices on the international market, as well as adverse 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 fall in oil prices and a weaker growth in inflation in the euro area than projected.

Internal factors:

- Increasing excise taxes on tobacco and tobacco products, ethyl alcohol, carbonated drinks with sugar and excise taxes on coal will be reflected in the rise in prices.
- Increase in the VAT rate for 2 percentage points, or from 19% to 21%, whose implementation date is foreseen for January 2018.
- Potential increase in electricity prices of 5%;
- A standstill in wages and real estate prices.

External factors:

- In the second half of 2017, a slight recovery of oil prices is expected. Forecasts for 2018 indicate that oil prices could be at the same level as in 2017.
- Moderate growth of prices of food products at the international market is expected in 2017.

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

6. EXPECTED INFLATION IN 2017

The level of aggregate demand drops in relation to the previous quarter, but it is higher in relation to the same quarter of the previous year. Household demand and government spending increased, while the aggregate demand of the economy decreased.

The level of economic activity is high, and the estimated growth rate of GDP (4%) is significantly higher than the growth rate of aggregate demand in relation to the second quarter of the previous year. The fact that 44% of surveyed companies plan to increase the volume of activities, and that 52% plan new investments can suggest that in the coming period economic activity can be expected to grow, which will certainly have an anti-inflationary effect.

Some announced fiscal consolidation measures (increase in excise duties and VAT) affect the inflationary expectations and exert pressure on the price increase. This is reflected in our market trend indicator, which shows strong growth of inflationary expectations.

The largest number of surveyed banks and companies expects the inflation rate in the range of 2% to 2.5%.

For 2017, an average inflation of 2.1% is projected, while for December 2017, inflation is projected in the range from 0.8% to 2.6%, with a central tendency of 1.5%. Our expert assessment is slightly higher than the model assessment and remained unchanged in relation to the previous projection. Expert estimates suggest that at the end of this year inflation can range from 1% to 3% with a central projection of 2%.

Table 3

Inflation rate estimation		
Optimistic projection	Central projection	Realistic projection
1%	2%	3%

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.