CENTRAL BANK OF MONTENEGRO

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1. INFLATION INDICATORS

Consumer prices growth recorded at end-2016 continued in Q1 2017. In relation to December 2016, in March 2017, inflation in Montenegro was positive and amounted to 0.5%. The rise in prices was mainly a result of a global oil prices increase that affected the price growth in the *transport* category (4.1%), as well as of an increase in the prices of numerous food products under the *food and non-alcoholic beverages* category (1.3%). Observation of consumer prices monthly trends shows that the price increase was recorded in all three months, specifically 0.3% in January, and 0.1% in both February and March. Average consumer prices rate (the first three months of 2017 in relation to the same period of 2016) amounted to 2.4%, while at the annual level, prices increased by 2.7%.

Table 1

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

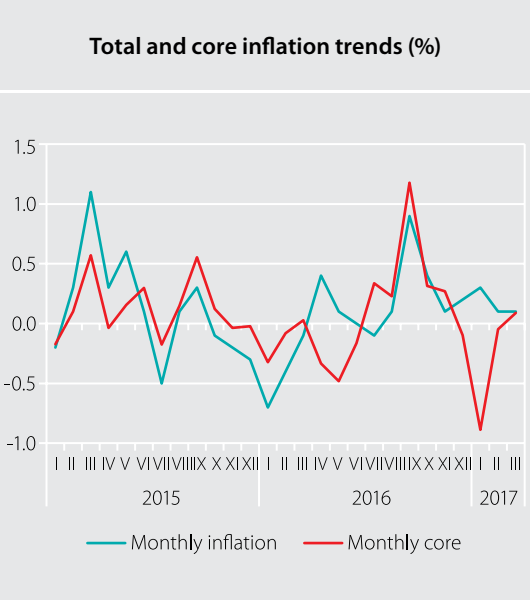
Source: MONSTAT

In Q1, the most significant price growth of 4.1% was recorded in the *transport* category, with the highest increase of 9.5% recorded in the prices of fuels and lubricants for personal transport equipment. In addition to oil price increase at the global level, the growth of prices in the transport category was also induced by higher excise duties on mineral oils following the adoption of the Law Amending the Law on Excise Taxes[1]. Prices under *food and non-alcoholic beverages* increased by 1.3%, and thus this category recorded the highest positive contribution to total inflation (0.5 percentage points). Under this category, increase was recorded in the prices of vegetables (8.8%), fruit (8.1%), milk, cheese and eggs (1.7%), fish and seafood (0.7%), and sugar, jam, honey, chocolate and confectionery (0.3%), while prices declined in food products n.e.c.[2] (-0.8%), meat (-0.6%), non-alcoholic beverages (-0.5%), oils and fats (-0.4%) and bread and cereals (-0.3%). In this period, prices increased in the following categories: *miscellaneous goods and services* (0.8%), *health* (0.4%) and *alcoholic beverages and tobacco* (0.1%). Prices drop was recorded in the following categories: *clothing and footwear* by 3.3%, *furnishing, household equipment and routine household maintenance* by 0.8%, *recreation and culture* by 0.6%, and *housing, water, electricity gas and other fuels* by 0.5%. In March 2016, prices under *communication*, *education* and *restaurants and hotels* remained unchanged relative to December 2016.

[1] OGM, 1/2017, January 2017

[2] Not classified elsewhere

Graph 1



Source: MONSTAT

In the first three months of 2017, monthly **core** inflation stood below the official monthly inflation. Official monthly inflation recorded positive rate during all three months, while core inflation recorded negative rate in January and February and a positive rate in March.

In Q1 2017, the oil prices at global markets increased in relation to Q4 2016. The average price of the OPEC reference basket in Q1 2017 amounted to 52 USD/barrel, which is an increase of 9.3% in relation to Q4 2016. The average price of Brent in Q1 was 53.7 USD/barrel, which is an increase of 8.6% in relation to the price recorded in Q4 2016. Global market oil prices increase recorded in Q1 2017 was a result of the adherence to the agreement signed at end-2016 by the countries members of the OPEC, and some other countries which are not

Table 2

Share of selected categories in total inflation[3]

	Weights	III 17/XII 16	Growth rate	Contribution
TOTAL	1000.0	100.5	0.5	0.5
Food and non-alcoholic beverages	351.7	101.3	1.3	0.5
Alcoholic beverages and tobacco	38.6	100.1	0.1	0.0
Clothing and footwear	85.1	96.7	-3.3	-0.3
Housing, water, electricity gas and other fuels	155.3	99.5	-0.5	-0.1
Furnishing, household equipment and routine household maintenance	41.2	99.2	-0.8	0.0
Health	40.9	100.4	0.4	0.0
Transport	107.0	104.1	4.1	0.4
Communication	49.9	100.0	0.0	0.0
Recreation and culture	33.2	99.4	-0.6	0.0
Education	19.3	100.0	0.0	0.0
Hotels and restaurants	31.3	100.0	0.0	0.0
Miscellaneous goods and services	46.5	100.8	0.8	0.0

Source: MONSTAT and CBCG calculations

[3] 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.

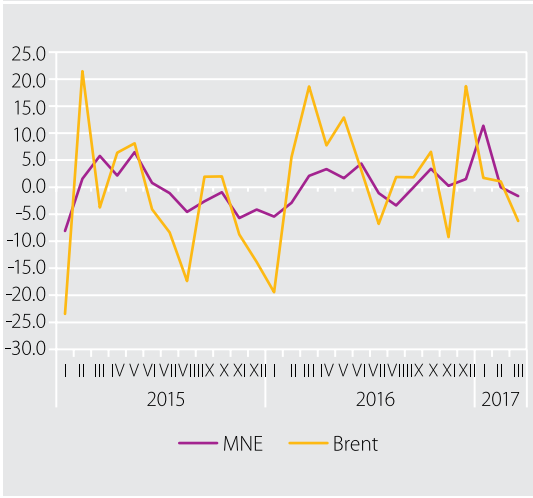
members of this organisation, to curtail the oil production in the first half of 2017.

Annual prices growth of 3.8% in the *food and non-alcoholic beverages* category gave the largest contribution to the increase (1.3 percentage points) in the total annual inflation rate of 2.7%.

Annual price growth was also recorded in the following categories: *transport* (8.3%), *health* (3.4%), *restaurants and hotels* (3.3%), *alcoholic beverages and tobacco* (3%), *clothing and footwear* and *housing, water, electricity gas and other fuels* (0.9% each), *miscellaneous goods and services* (0.7%) and *communications* (0.2%). Annual prices decline was recorded in the following categories: *furnishing, household equipment and routine household maintenance* (-2.2%) and *recreation and culture* (-0.5%). Prices under *education* remained unchanged at the annual level.

Graph 2

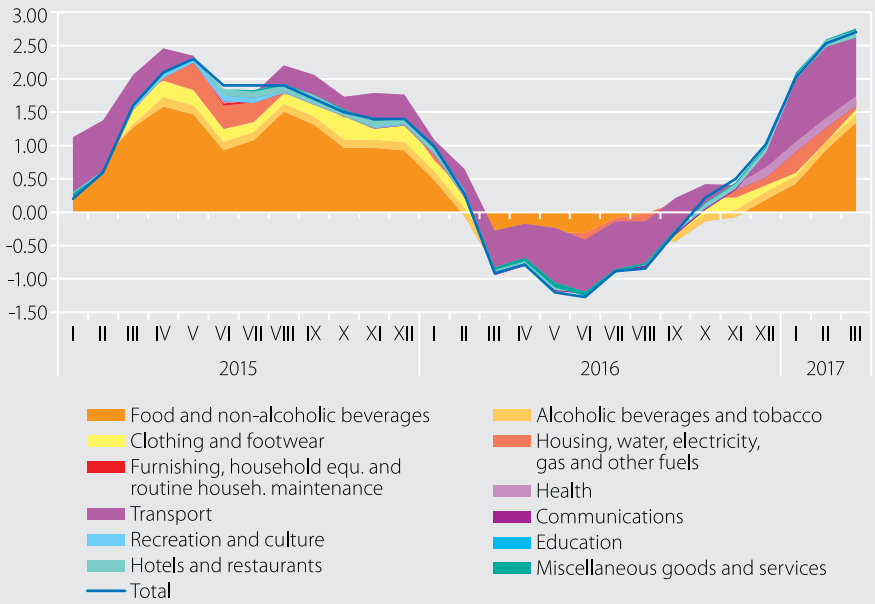
Oil prices, monthly growth rate



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

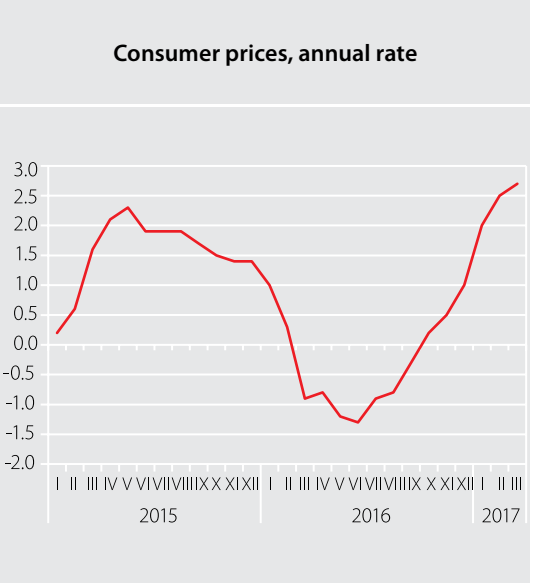
Graph 3

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



Source: Monstat and CBCG calculations

Graph 4

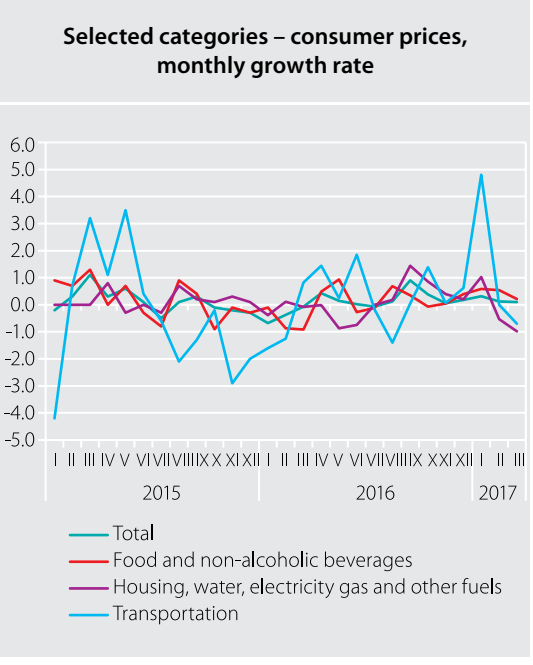


Source: MONSTAT

In March 2017, producers` prices of manufactured products recorded 0.7% growth in relation to December 2016. This was due to the growth recorded in the sector of electricity, gas and steam supply of 5.3%. Prices decline was recorded in the mining and quarrying sector (-2.6%) and manufacturing industry (-2%). On the annual level, producers' prices of manufactured products increased by 0.7%.

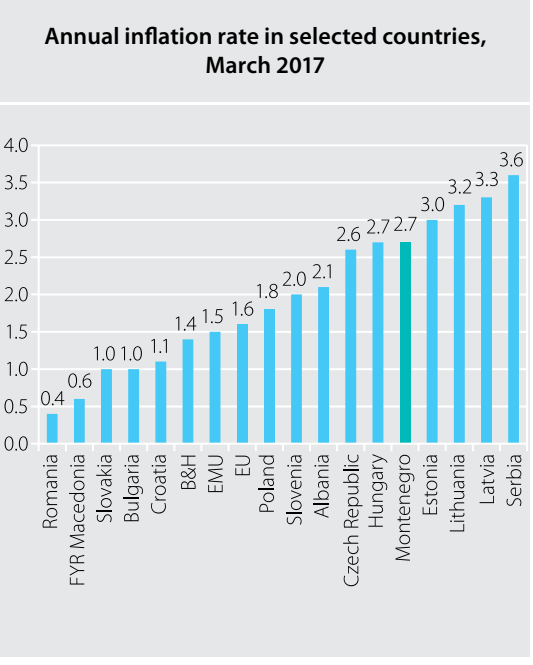
Comparison of annual inflation recorded in Montenegro with the inflation recorded in selected countries shows that, not all the selected countries recorded positive inflation as well. The highest positive annual inflation rate was recorded in Serbia (3.6%) while Romania recorded the lowest positive annual inflation rate (0.4%). In reference to neighbouring countries, in addition to Montenegro, the rates were positive in Albania (2.1%), Slovenia (2%), Bosnia and Herzegovina (1.4%), Croatia (1.1%) and Macedonia (0.6%).

Graph 5



Source: MONSTAT

Graph 6

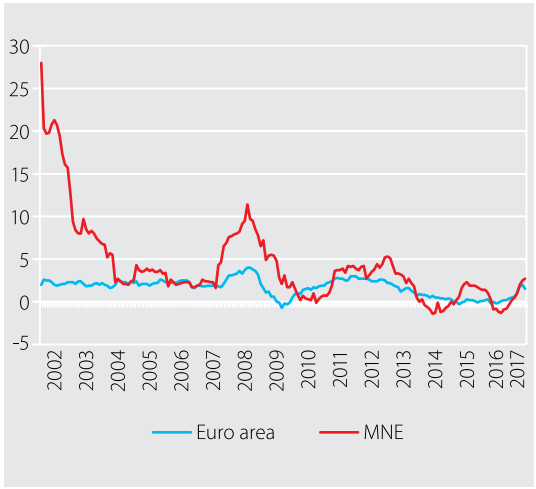


Source: National Statistical offices and Eurostat

The annual HICP inflation rate reported in the euro area amounted to 1.5%, CPI inflation in Montenegro amounted to 2.7%, while annual HICP inflation in Montenegro was 2.8%.

Graph 7

Inflation in the euro area (HICP) and Montenegro (CPI)[4] since the introduction of euro (annual rates)



Source: Monstat and Eurostat

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

2. INFLATIONARY EXPECTATIONS

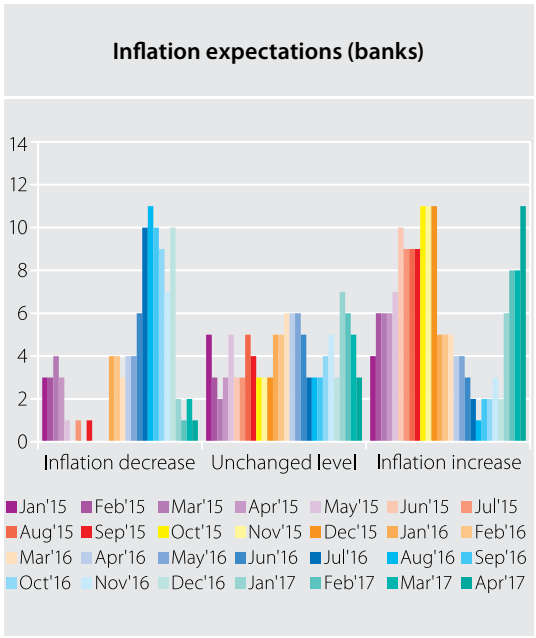
2.1. Banks' expectations

In reference to inflation expectations of banks, based on the survey conducted in April this year, eleven banks expect inflation to grow, three banks banks expect inflation at the same level as in 2016, while one bank expects inflation to decline in relation to 2016 (Graph 8).

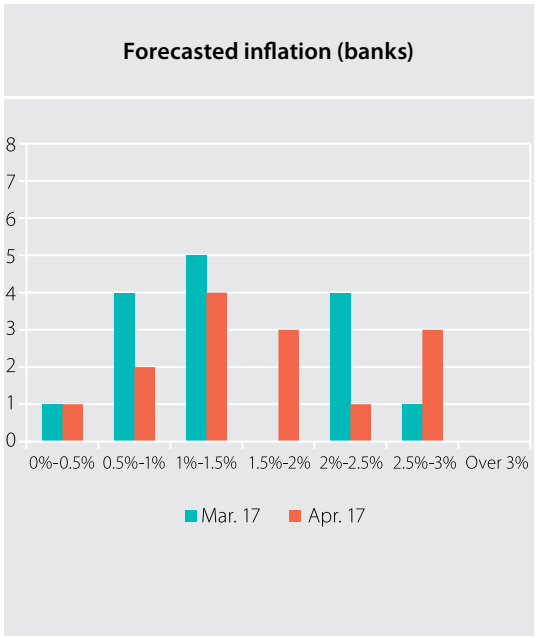
Banks have different expectations regarding inflation levels. Four banks expect the level of inflation in the range of 1% and 1.5%, three banks expect inflation to range between 1.5% and 2%, three banks expect it to range between 2.5% and 3%, while two banks expected inflation between 0.5% and 1%. Inflation levels between 0% and 0.5% are expected by one bank, inflation levels between 2% and 2.5% are also expected by one bank, while none of the surveyed banks expects inflation above 3% (Graph 9).

In consideration of expectations on the nominal lending interest rates trends, eleven banks expect this rate to decline, four banks expect it to remain at the same level, and none of the banks expects the nominal lending interest rate to grow. On the other hand, eight banks expect effective interest rates to decline, six banks expect them not to change, while one bank expects the effective lending interest rates to increase.

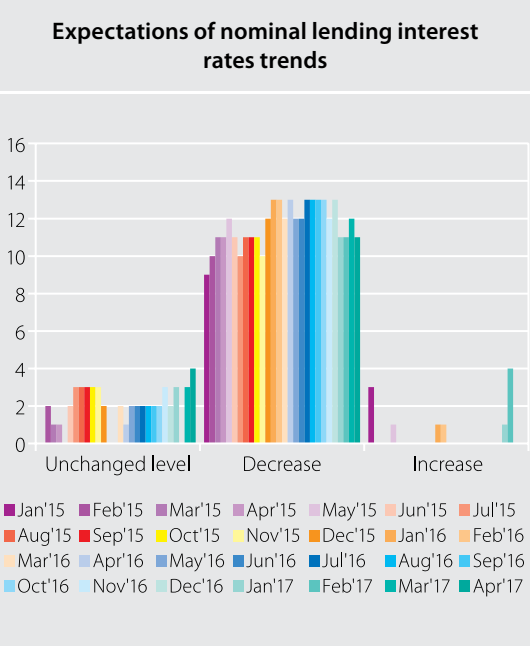
Graph 8



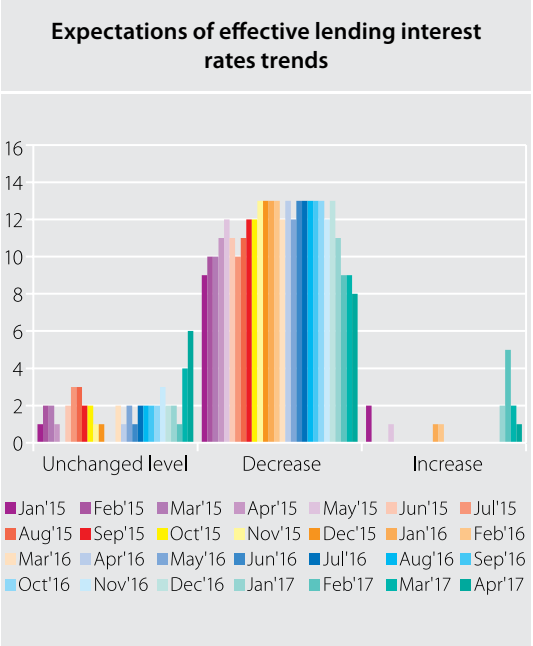
Graph 9



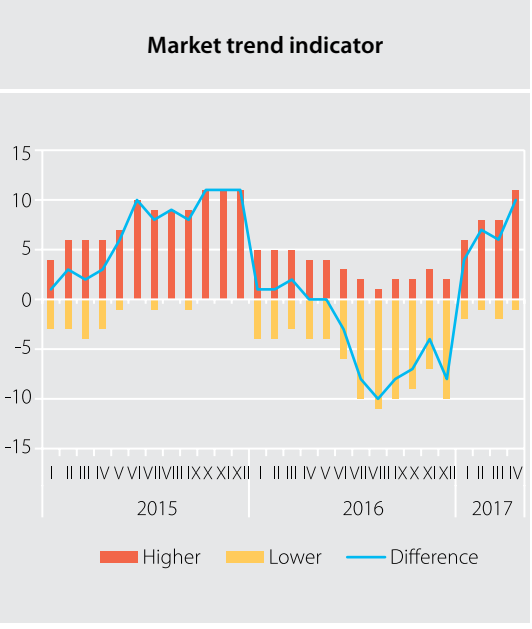
Graph 10



Graph 11



Graph 12



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

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 inflationary forecast is, and vice versa, higher positive value means higher inflationary forecasts. In 2016, inflation forecasts were significantly low, with some oscillations, while over the first four months of 2017 they have been increasing.

2.2. Expectations of economy (except banks)

Inflation

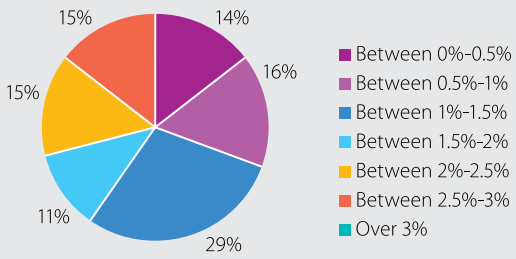
In the total number of surveyed companies, majority (29%) expected the inflation in 2017 to range between 1% and 1.5%. Some 16% of surveyed companies expected inflation to range between 0.5% and 1%, inflation between 2% and 2.5% was expected by 15%, inflation between 2.5% and 3% was also expected by 15% while 14% expected inflation between 0% and 0.5%. A total of 11% of respondents expected that inflation in 2017 will range between 1.5% and 2%, while none of respondents expects inflation to exceed 3% (Graph 13).

As much as 79% surveyed companies expect wages and salaries to remain unchanged in 2017, 8% of the surveyed companies expect them to decline, while 13% expect wages and salaries to increase. With regard to the number of employed persons, 60% of surveyed companies expect it to remain unchanged, 24% expect this number to increase, and 16% expected it to decrease.

The majority of surveyed companies (61%) expected the prices of production inputs to remain unchanged, and 76% expect the prices of their products (services) not to change in 2017.

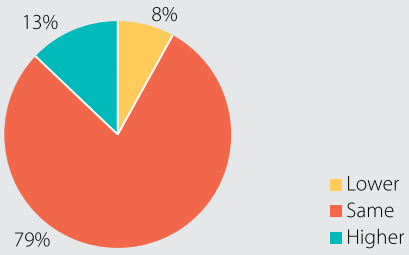
Graph 13

Expected inflation in 2017 in relation to 2016



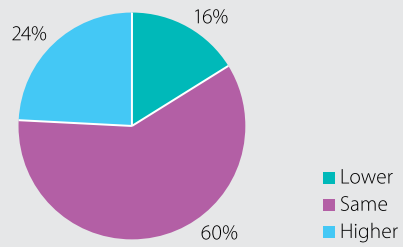
Graph 14

Expected wages and salaries in 2017 in relation to 2016

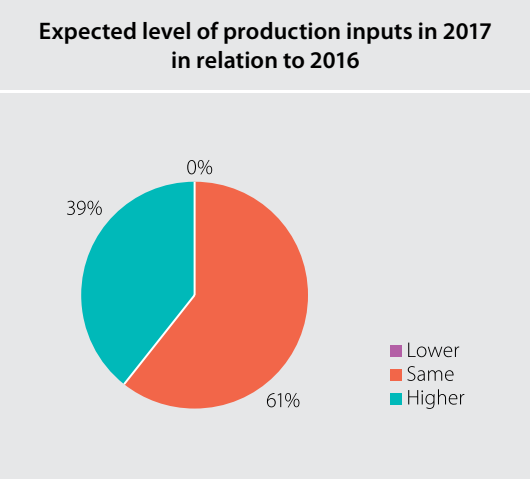


Graph 15

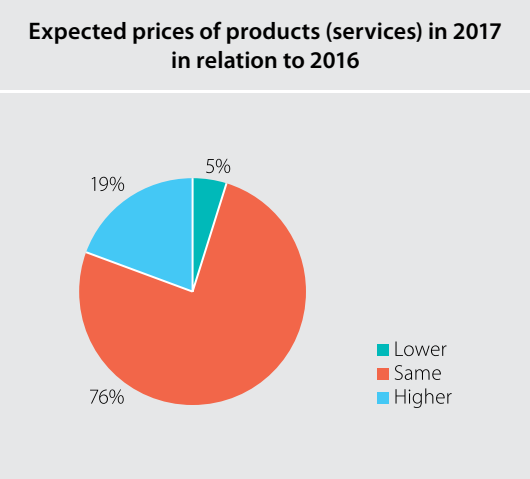
Expected number of employed persons in 2017 in relation to 2016



Graph 16



Graph 17

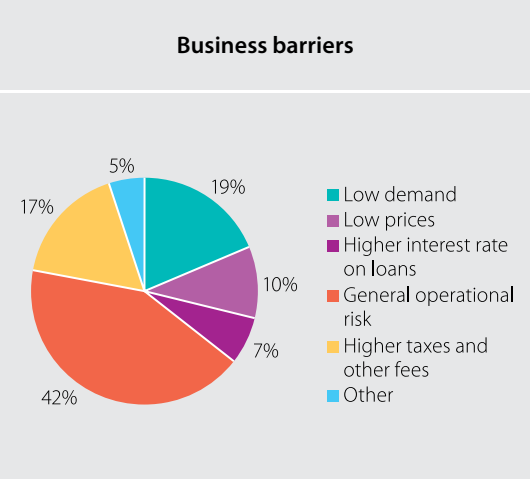


Business Environment

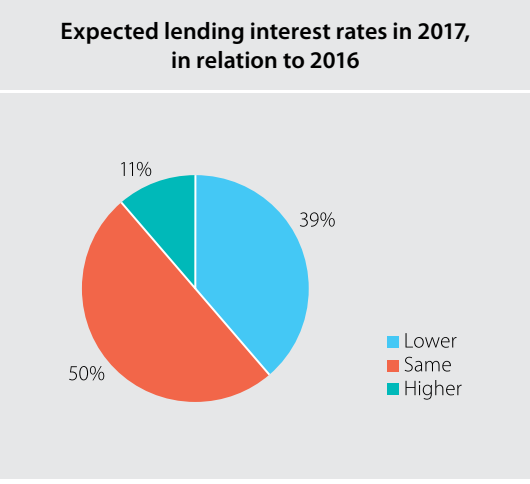
In the area of business barriers, survey results showed that most of the surveyed companies saw general operational risks (42%), low demand (19%), and high taxes and other forms of duties (17%) as main obstacles.

In reference to lending interest rates, 39% of surveyed companies expected them to decline, 50% expected them to remain unchanged, while 11% expected higher lending interest rates in 2017 relative to 2016.

Graph 18



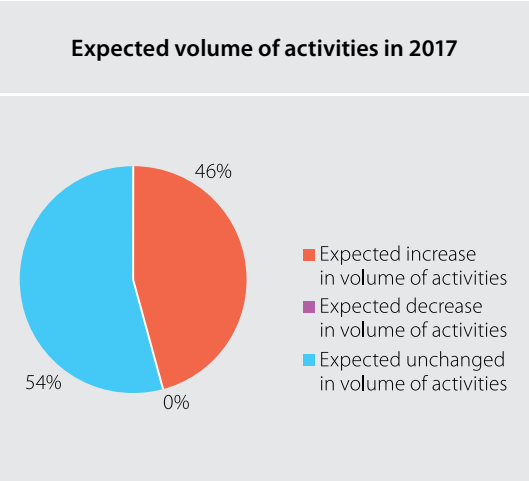
Graph 19



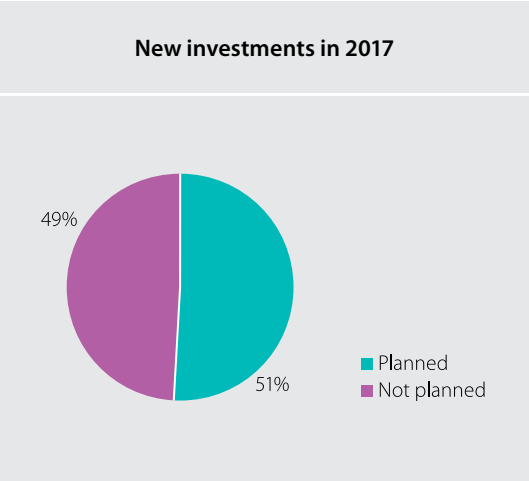
Investments

Out of the total number of surveyed companies, 46% planned to increase the volume of activities in 2017, while 51% planned new investments. Most investments (65%) referred to increasing the fixed assets, while the following were seen as the main barriers to new investments: insufficient exploitation of existing capacities and other obstacles (27% each), high interest rates and unfavourable conditions for capital borrowings (23%), low demand (15%), and high production costs (8%).

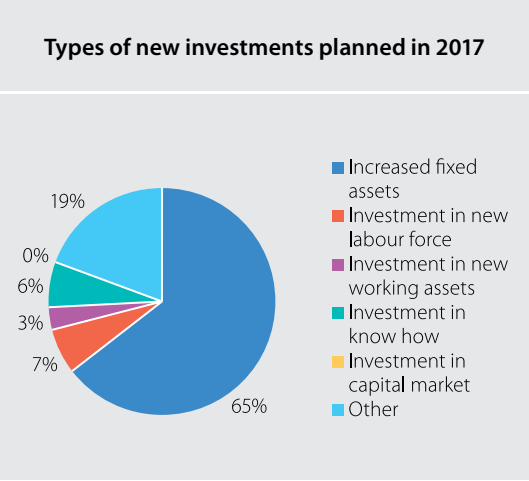
Graph 20



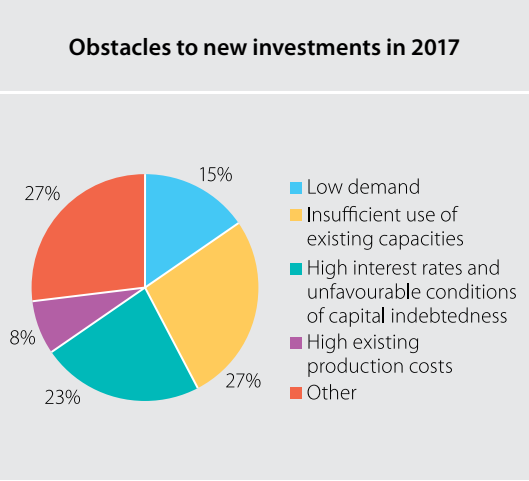
Graph 21



Graph 22



Graph 23



3. INFLATION DETERMINANTS

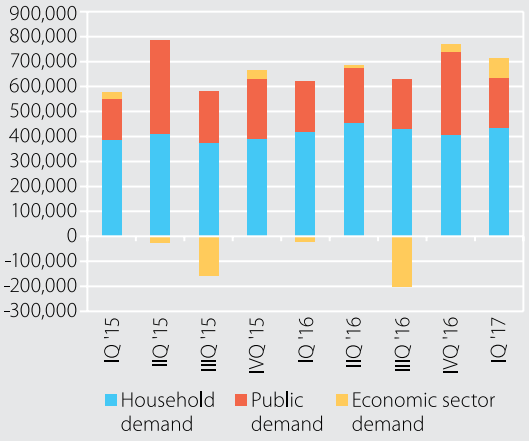
3.1. Demand

As per preliminary data, in Q1 2017, the aggregate demand recorded a y-o-y increase, yet a decline in relation to Q4 2016. Taking into account the level of total demand in Q1 2017 in relation to Q4 2016, household and corporate sector demand increased, while government spending declined.

In Q1 2017, the level of aggregate demand recorded a slight y-o-y growth, while it declined in relation to Q4 2016.

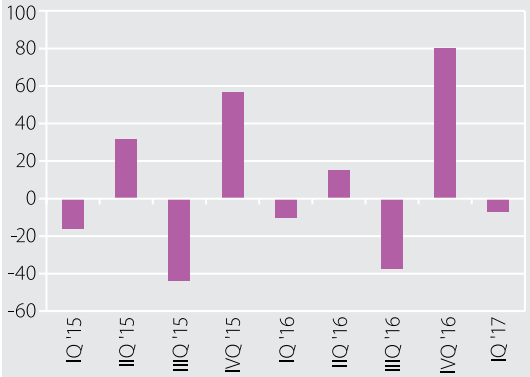
Graph 24

Aggregate demand, in thousand euros



Graph 25

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

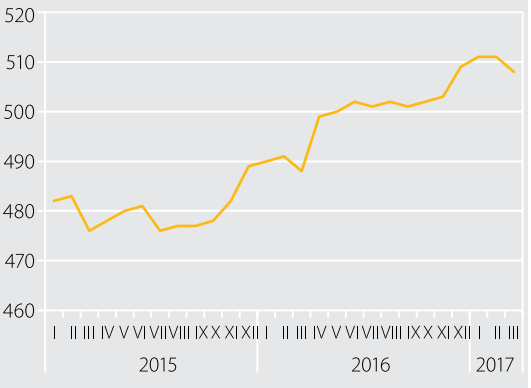
3.1.1. Salaries and other available demand determinants

In Q1 2017, an average gross salary in Montenegro amounted to 765 euros, while an average salary without taxes and contributions amounted to 510 euros. In relation to Q4 2016, average gross and net wages and salaries recorded respective increases of 1% and 1.1%. Average wages and salaries and average wages and salaries without taxes and contributions recorded respective y-o-y increases of 3.8% and 4.1%.

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 grew in January, while they declined in February and March.

Graph 26

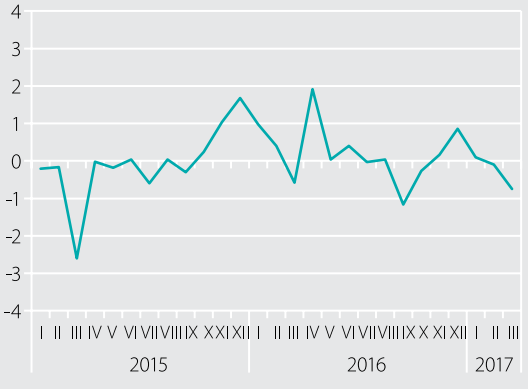
Average wages and salaries without taxes and contributions in Montenegro



Source: MONSTAT

Graph 27

Real wages and salaries (monthly rate)



Source: MONSTAT

Borrowing to the household sector was marked by a positive trend in Q1 2017. The average monthly growth of loans granted to this sector was 0.9%, while the growth at the average rate of 0.5% was recorded in the same period of 2016. At the end -Q1 2017, total household sector loans amounted to 1,046.3 million euros, or by 28.3 million euros or 2.8% more than at the end -2016, i.e. by 111 million euros or 11.9% more than in same period of 2016 (Graph 28).

At end-March 2017, debt per capita[5] amounted to 1,682 euros, recording an increase of 45.5 euros in relation to end-2016, and a y-o-y increase of 178.3 euros.

Total MFIs loans disbursed to households amounted to 53.5 million euros at end-March 2017 which was by 2.1 million euros or 4% more than at end-2016, and by 5.5 million euros or 11.4% higher compared y-o-y.

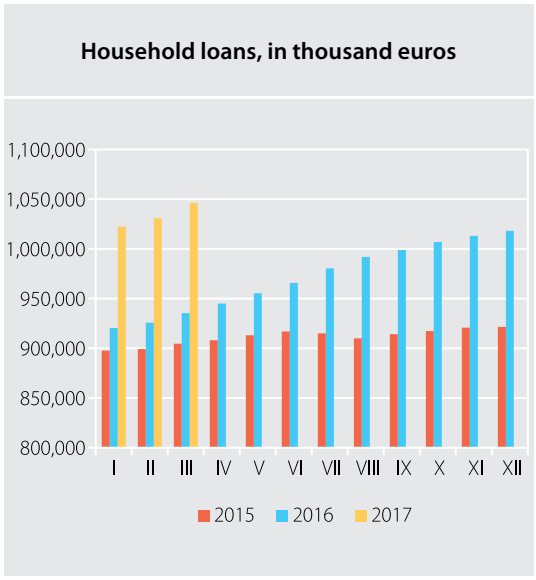
During Q1 2017, deposits of the household sector recorded an average monthly growth of 0.06% (the average monthly growth of 0.2% was recorded in the same period of 2016). At end-March 2017, this sector's deposits amounted to 1,561.6 million euros, which is by 27.4 million euros or 1.8% more than at the end-2016, or by 120.8 million euros (8.4%) more than in the same period of the previous year.

At end-March 2017, loans to deposits ratio for this sector amounted to 0.88 being higher compared to end-2016 when it amounted to 0.84, yet recording a decline in relation to the same period of 2016 when it amounted to 0.91.

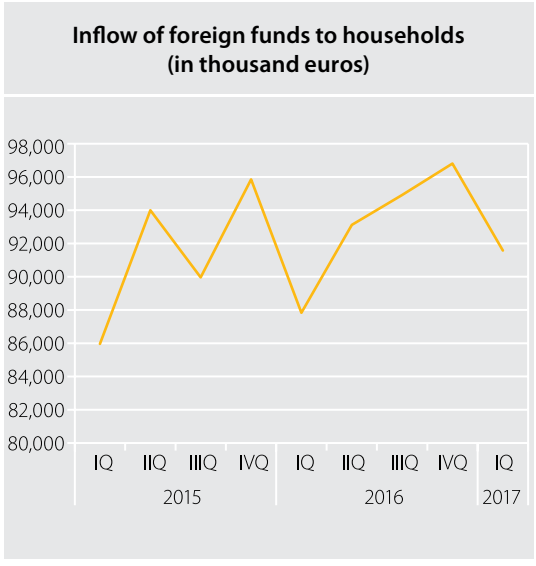
Household sector recorded total net savings in the amount of 515.3 million euros at end-Q1 2017, which represents a decline od 847,000 euros or 0.2% in relation to end-2016 and a y-o-y increase of 9.8 million euros or 1.9%.

In Q1 2017, compared to Q1 2016, 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 28



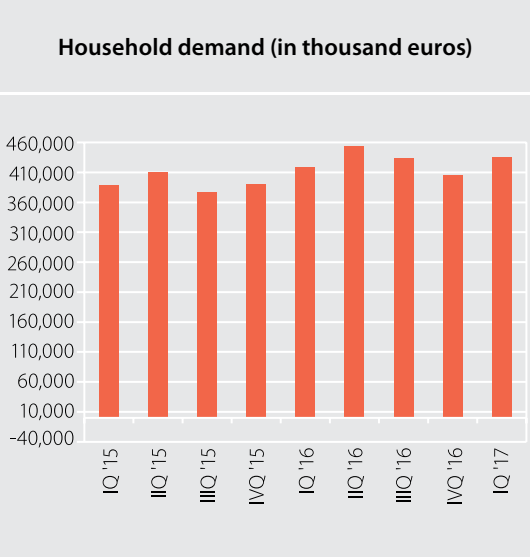
Graph 29



Source: CBCG

[5] Population estimate for 2016 : Estimate as at 1 January (2016), Source: Monstat

Graph 30



Observation of the total household demand by quarters shows that household demand in Q1 2017 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 380.6 million euros in the first three months of 2017.

Source revenues amounted to 297.7 million euros or 7.5% of projected GDP[7], and they decreased by 2.4% in relation to the plan, and recorded a y-o-y increase of 4.5%. In the structure of source revenues, tax revenues accounted for the main share of 65.4%, followed by contributions with 28.8%, other revenues with 2%, fees with 1.5%, donations with 1.2%, duties with 0.8%, and receipts from loan repayment with 0.3%.

Tax revenues amounted to 194.7 million euros, recording a y-o-y increase of 7.9%, and being by 1.5% above the plan. All taxes, except personal income tax and property turnover tax, recorded y-o-y increase. In nominal terms, the highest annual increase in revenues was recorded in excise duties in the amount of 7.4 million euros or 21.9% as a result of the application of the amended Law on Excise Taxes.

Revenues arising from contributions amounted to 85.7 million euros being by 10.1% below planned, and recording a y-o-y decline of 4.9%.

In the three months of 2017, **Budget expenditure** amounted to 368.2 billion euros or 9.3% of GDP. Expenditure was by 13.3% lower in relation to the plan for the three months of 2017 and by 3.3% or 11.7 higher in relation to the same period of 2016 mainly due to a 12.3 million euros increase in interests for Eurobonds issued in 2015 and 2016.

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[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 2017 amounts to 3,957.2 million euros.

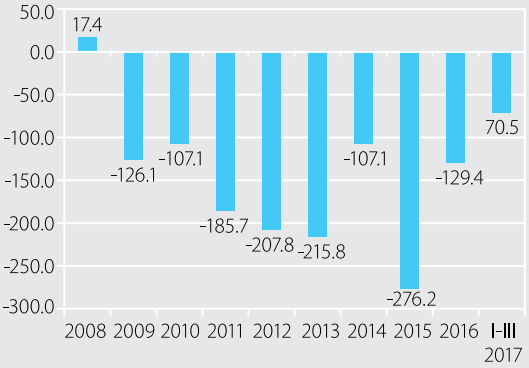
Current budget expenditure amounted to 189 million euros or 2.8% below the plan. Almost all current expenditure, except expenditure for material, services and interests, were below planned.

The Montenegrin capital budget amounted to 9 million euros or 0.2% of GDP.

The Deficit of the Budget of Montenegro was estimated to 70.5 million euros, or 1.8% of GDP for the first three months of 2017.

Graph 31

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



Source: Ministry of Finance

3.1.3. Corporate sector

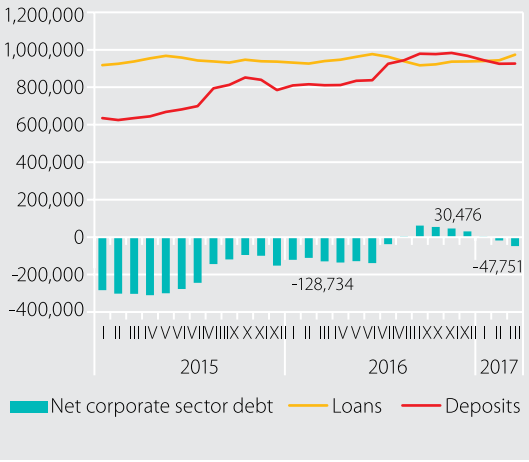
Since the data on the corporate sector investments are not available, net corporate sector indebtedness can be used for approximation.

In the first three months of 2017, corporate loans significantly exceeded this sector's deposits (with the exception of January). In March 2017 the net debt of the corporate sector amounted to 47.8 million euros at the end of the observed period, and in relation to end-Q1 2016, it declined by 81 million euros or 62.9% (Graph 32).

Long-term loans accounted for the main share of 75.1% 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 and the current account

Q1 2017 was marked by the widening of the current account deficit as a result of higher domestic demand. According to preliminary data, current account deficit amounted to 318.5 million euros[8],

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

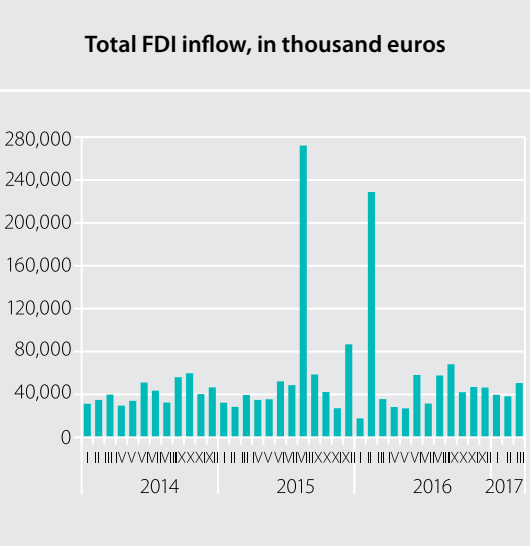
showing a y-o-y increase of 10.5%. The deficit widening was a result of an increased goods account imbalance, i.e. substantially higher growth of visible exports than visible exports in the absolute amount.

Goods account deficit amounted to 357.7[9] million euros recording a y-o-y increase of 16.4% due to the increase of visible imports by 19.6% caused by higher imports of general-purpose machinery and electricity. Total visible exports amounted to 80.9 million euros recording an increase of 35.8%. Exports growth was induced mainly by the increase in the exports of mineral ores and electricity.

In the observed period, services account ran a deficit of 6.3 million euros, while the primary income account ran a surplus of 10.8 million euros, which is by 80.7% more than in 2016 as a result of increased income from employees' compensations. Secondary income account ran a surplus of 34.7 million euros, or 38.9% more than in 2016.

In Q1 2017, net **foreign direct investments** amounted to 101.7 million euros, which represents an increase of 45.4% caused by a lower outflow compared to Q1 2016. Total FDI inflow added up to 128.3 million euros, or 54.5% lower than in 2016. FDI inflow in the form of equity investments amounted to 85.6 million euros or 66.7% of total inflow recorded between January and March 2017. In the structure of equity investments, investments in companies and banks accounted for 48.4 million euros or 37.7% of total inflow, while inflow arising from the investments in real estates amounted to 37.2 million euros. Inflow of FDI in the form of intercompany debt amounted to 41.1 million euros or 32% of the total inflow, while inflow from the withdrawal of residents' funds invested abroad amounted to 1.6 million euros (1.3% of total inflow).

Graph 33



Source: CBCG

In Q1 2017, total outflow of foreign direct investments amounted to 26.6 million euros. In the outflow structure the main share referred to outflow from withdrawal of non-residents' funds invested in Montenegro, which amounted to 22.5 million euros, while the outflow from residents' investments abroad amounted to 4.1 million euros.

In Q1 2017, **portfolio investments** account recorded net inflow of 1.4 million euros, while the net inflow in the **other investments** account amounted to 94 million euros. This account's trends were marked by increased liabilities for loans taken. In the observed period, domestic banks reduced their deposits held abroad, while simultaneously increasing liabilities for loans taken.

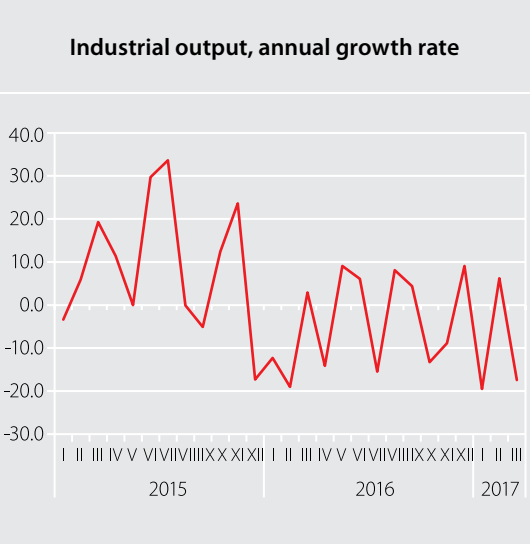
[9] Monstat data adjusted by the CBCG in line with the IMF methodology (Balance of Payments Manual, Sixth edition, IMF, 2009). Data on visible import and export are presented by f.o.b.

3.2. Supply and demand

In Q1 2017, industrial output recorded a y-o-y decline of 10.9% due to the decline recorded in the manufacturing industry and electricity, gas and steam supply sectors of 25.1% and 10.8%, respectively. Output increase of 187.4% was recorded in the mining and quarrying sector. Observation of monthly data on the industrial output trends in Q1 2017 shows that growth was recorded in February (34.1%) and March (4.1%), while industrial output declined in January (-36.6%).

In Q1 2017, a total of 65,753 tourists stayed in collective accommodation establishments, which is a y-o-y increase of 10.3%. The number of domestic tourists' arrivals in collective accommodation establishments increased by 5%, while the number of foreign tourists grew by 12.3%. Tourist overnights amounted to 170,947, which is a y-o-y increase of 8.3%.

Graph 34



Source: MONSTAT

In Q1 2017, forestry recorded a total of 21.904 m^3 of forest assortments, which is a y-o-y increase of 44.1%.[10]

In Q1 2017, the value of executed construction works amounted to 99.1 million euros, which represented a y-o-y growth of 37.5%, while construction activity measured by effective working hours grew by 24.8%.

In the first three months of 2017, air passenger transport recorded a y-o-y increase of 13.5%, while air freight transport increased by 0.5%. In Q1 2017, road passenger transport recorded y-o-y increase of 0.7%[11], while road freight transport increased by 1.6%[12]. In Q1 2017, railway passenger transport recorded a y-o-y decline of 20.3%[13], while, over the same period, railway freight transport increased by 85.2%[14].

[10] Expressed by weighted index, while expressed by non-weighted index production increased by 49.8% over the same period

[11] Presented through number of passengers, while it increased by 9.6% expressed through passenger kilometres

[12] Presented through transported goods in thousand tonnes, while it increased by 11% presented in tonne kilometres

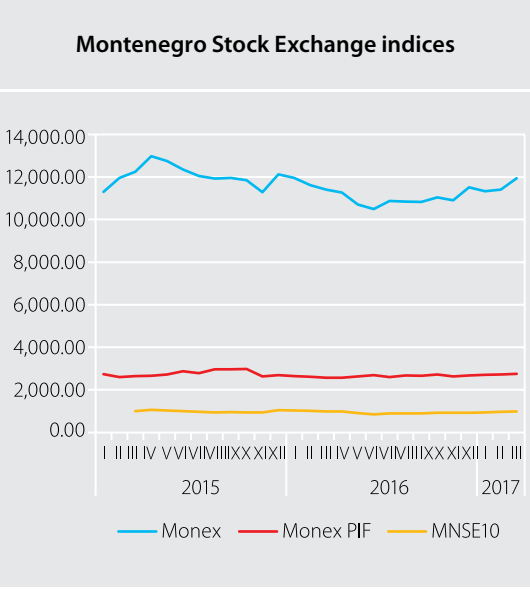
[13] Presented through number of passengers in thousands, while presented through passenger kilometres the decline was 22.9%.

[14] Presented in thousand tonnes, while presented through passenger tonnes the increase was 102.3%.

3.3. Stock exchange indices

At end-Q1 2017, all three indices increased in relation to end-2016, while annual comparison shows a slight decline only in MNSE10 (Graph 35).

Graph 35



Source: Montenegro Stock Exchange

At end-March 2017, SE index Monex[15] amounted to 11,942.29 recording an increase of 431.7 index points or 3.8% in relation to end-2016, and a y-o-y increase of 532 index points or 4.7%.

During the reporting period, Monex PIF[16] - the investment funds index - also increased. At end-March 2017, Monex PIF amounted to 2,750.26 and it was by 76.9 index points or 2.9% higher compared to end-2016, and by 173.5 index points or 6.7% higher compared y-o-y.

MNSE10 index stood at 985.98 at end-Q1, and recorded a increase of 57.7 index points or 6.2% compared to end-2016, while it was slightly lower - specifically by 0.2 index points or 0.02% - compared to Q1 2016.[17]

[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] Index is composed of privatisation funds shares.

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

4. MONETARY POLICY

In March 2017, a Decision amending the Decision on Bank Reserve Requirement to be held with the Central Bank of Montenegro[18] was adopted. Pursuant to this decision, reserve requirement rate was lowered by 2 percentage points, from 9.5% to 7.5%, and from 8.5% to 6.5%, depending on the defined reserve requirement calculation base. Periods for calculation and maintenance of the banks' reserve requirement with the CBCG were changed from weakly to monthly periods. In addition, the possibility of allocating a portion of reserve requirement in the form of Montenegro's Treasury bills was abolished.

[18] (OGM 15/17)

5. INFLATION FORECAST FOR 2017 AND Q1 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 Q1 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 Q1 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[19].

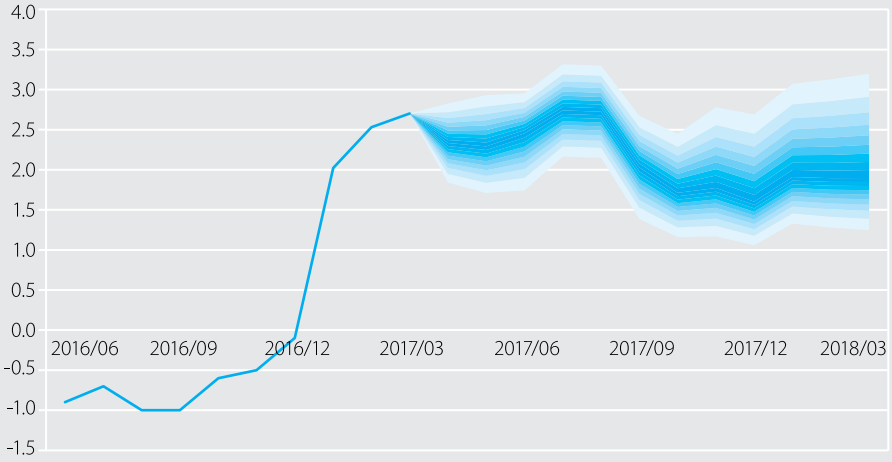
[19] More detailed explanation of ARIMA model of Montenegro was presented in the Central Bank Working Paper 11 "Inflation forecasting: Empirical research of retail price index of Montenegro for 2007 – implementation of ARIMA model".

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 (1,1,16)[20] 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 Q1 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 Q1 2018



Source: CBCG, 2017

Mean value of the obtained model is 2.2. The value of the coefficient of asymmetry varies between 0.6 and 1.1, 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.[21] 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.

[20] 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.

[21] 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% and 3.3%, depending on the month, with the central projection of 2.3%. At the same time, inflation at the end of 2017 is forecasted to range between 1.1% and 2.7%, with the central trend of 1.7%*. The fan chart central projection (the darkest part) represents a 10% probability span (Graph 36).

The starting assumptions for forecasting inflation in 2017 and Q1 of 2018 are:

1. The increase in crude oil prices at the international market of about 10%, which, combined with a 9% increase in excise duties on mineral oils, should result in the overall inflation increase; However, given the increased uncertainty on the side of crude oil supply (production increase in the USA) as well as on the side of demand (sluggish recovery of demand in developing countries) the levels of uncertainty in the final quarter of 2017 and Q1 2018 are wider.
2. Moderate growth of prices of food products in the international market is expected in 2017. In addition, in the projection we assumed fluctuation in prices of agricultural products of +/- 5%, conditioned by their seasonal character.
3. An increase in excise duties on cigarettes, alcohol, coal and sweetened carbonated water as is announced in the fiscal strategy measures.
4. Increase in VAT by 2 percentage points in 2018.
5. Potential increase in electricity prices of 5%;
6. A standstill in wages and real estate prices

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

6. EXPECTED INFLATION IN 2017

In Q1 2017, aggregate demand recorded a quarterly decline, which is a usual seasonal drop. However, in relation to Q1 2016, it increased. Household and corporate sectors demand is trending upwards, while government demand is declining due to the implementation of the fiscal consolidation measures.

We have factors pressuring the inflation growth on one hand and anti-inflationary factors on the other. This explains the results of our expected inflation rate survey, which showed rather heterogeneous expectations of banks and the corporate sector.

Aggregate demand increase as well as 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.

On the other hand, there are factors with anti-inflationary effect. Economic activity is increasing, which is reflected in the corporate sector expectations; further decline in the public spending levels and expected interest rate reduction will have anti-inflationary effect.

Our expert inflation assessment is slightly above the model assessment and ranges between 1% and 3%. It remained unchanged in relation to the previous projection.

Table 3

Estimated inflation rate		
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.