CENTRAL BANK OF MONTENEGRO

INFLATION REPORT
QUARTER III, 2017

Year XIII, Number 41

PUBLISHED BY: Central Bank of Montenegro
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1. INFLATION INDICATORS

After the negative average rate in the previous year, consumer prices in Montenegro grew in the first nine months of 2017. Namely, in this period, annual growth rates of consumer prices were recorded in all months, and observed by quarters, the highest growth was recorded in the third quarter of 2017 (1.7%). Positive annual inflation rates have been recorded in all countries in the region and in most EU countries, mostly as a result of the rise in oil prices at the world market, following the 12-year minimum recorded in the previous year, as well as the higher prices of certain food products.

Table 1

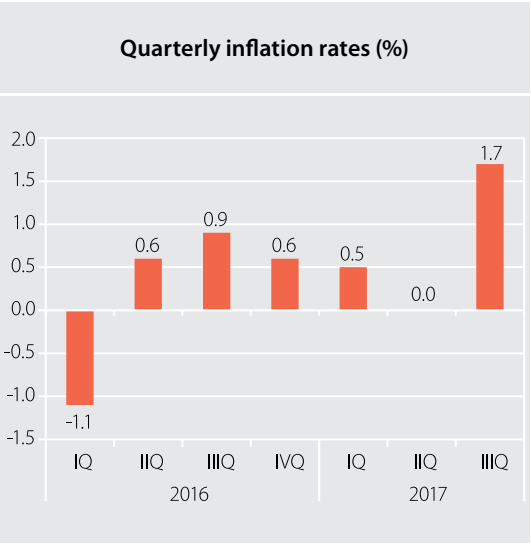
Inflation, %							
	2016				2017		
	III	VI	IX	XII	III	VI	IX
Change relative to the previous year-end	-1.1	-0.5	0.4	1.0	0.5	0.5	2.2
Annual change	-0.9	-1.3	-0.3	1.0	2.7	2.1	2.8

Source: Monstat

In the third quarter, in Montenegro, prices were recorded in all categories, except for prices in *education* (where the zero rates were recorded) (Table 2). Observing price developments on a monthly basis, consumer price growth was recorded in all three months: July (0.2%), August (0.5%) and September (0.9%). The annual growth of consumer prices in September was 2.8%, while the average rate (period per period) was 2.4%.

During the third quarter, the highest increase in prices was recorded in the category *alcoholic beverages and tobacco* by 10.9%, mostly due to the increase in tobacco prices by 16% as a result of an increase in excise taxes on tobacco products[1] aimed at gradual harmonization of excise duties legislation with EU directives (i.e. reaching the excise

Graph 1

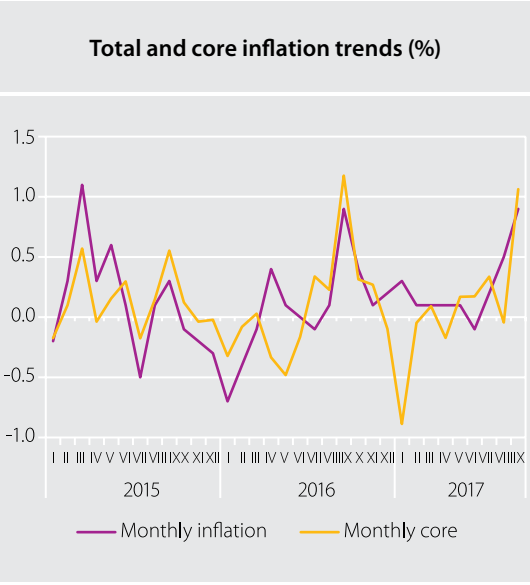


Source: Monstat and CBCG calculations

[1] Law on Amendments to the Law on Excise Duties "OGM 50/2017, July 2017

duties on tobacco products to the prescribed minimum). Prices increased in the category *clothing and footwear* of 8.4%, due to the increase in clothing prices by 7.2% and footwear by 9.9%. This influenced the category *clothing and footwear* to achieve the largest positive contribution to the total inflation of 0.7 percentage points. The prices also increased in the category *transport* by 1.5% due to the growth of prices of fuels and lubricants for motor vehicles of 2.7%, then in the category *housing, water, electricity, gas and other fuels* by 1.3%, due to price increases in the area of electricity, gas and other fuels by 1.7%. During this period prices increased in the following categories: *hotels and restaurants* (0.9%), *other goods and services* (0.8%), *furniture, household equipment and routine maintenance of apartments* (0.5%), and in the categories *food and non-alcoholic beverages*, *health*, *recreation and culture* and *communications* by 0.1%. Prices in *education* in the third quarter remained unchanged.

Graph 2



Source: Monstat

Monthly **core** inflation in July and September had a higher level of official monthly inflation, when it recorded a positive rate, while in August there was a slight decrease. Official monthly inflation recorded a positive rate in all three months.

Table 2

Share of selected categories in total inflation[2]

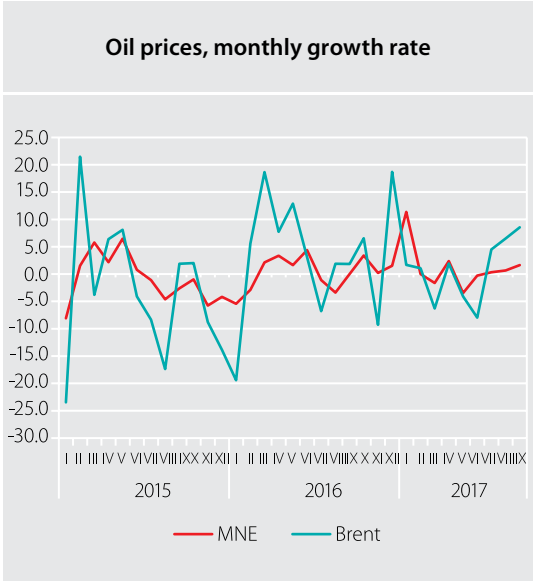
	Weights	IX 17/VI 17 Index	Growth rate	Contribution
TOTAL	1,000.0	101.7	1.7	1.7
Food and non-alcoholic beverages	351.7	100.1	0.1	0.1
Alcoholic beverages and tobacco	38.6	110.9	10.9	0.4
Clothing and footwear	85.1	108.4	8.4	0.7
Housing, water, electricity gas and other fuels	155.3	101.3	1.3	0.2
Furniture, household equipment and routine maintenance of apartments	41.2	100.5	0.5	0.0
Health	40.9	100.1	0.1	0.0
Transport	107.0	101.5	1.5	0.2
Communication	49.9	100.1	0.1	0.0
Recreation and culture	33.2	100.1	0.1	0.0
Education	19.3	100.0	0.0	0.0
Hotels and restaurants	31.3	100.9	0.9	0.0
Miscellaneous goods and services	46.5	100.8	0.8	0.0

Source: Monstat and CBCG calculations

[2] Due to the weight structure, the contribution of the share of certain categories is not recorded before the second, i.e. third decimal.

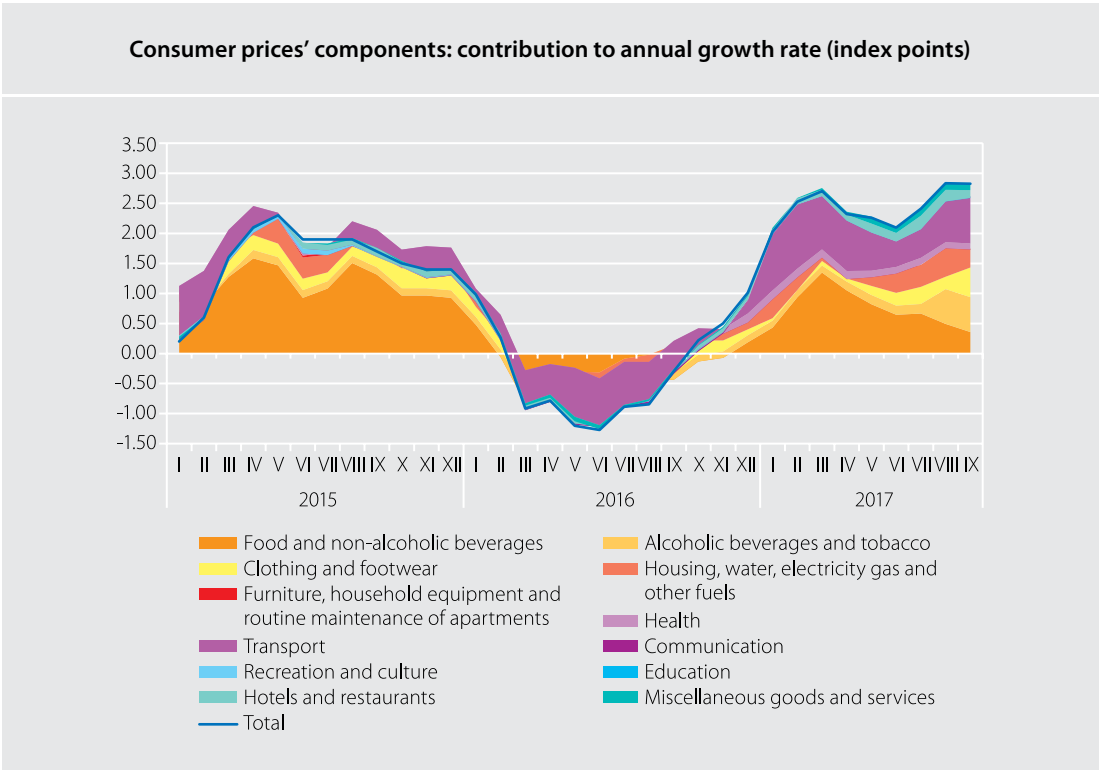
In the third quarter of 2017, oil prices rose in relation to the second quarter. The price of the OPEC reference basket amounted on average to 50 USD/barrel in Q3 2017, being 2.9% higher than in relation to Q2 2017. The average price of Brent in Q3 was 52.1 USD/barrel, which is an increase of 4.5% in relation to the price recorded in Q2 2017. The highest price of Brent in the third quarter was recorded in September, when it was 56.07 USD/barrel, which is also the highest price since July 2015. A slight recovery in the price in the third quarter is the result of a decrease in oil reserves due to increased global demand, stabilization in oil production by American shale oil producers (after production growth in the first half of the year) and better compliance in the implementation of the agreement[3] on the reduction of oil production between OPEC members, as well as states that are not members of this cartel.

Graph 3



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

Graph 4

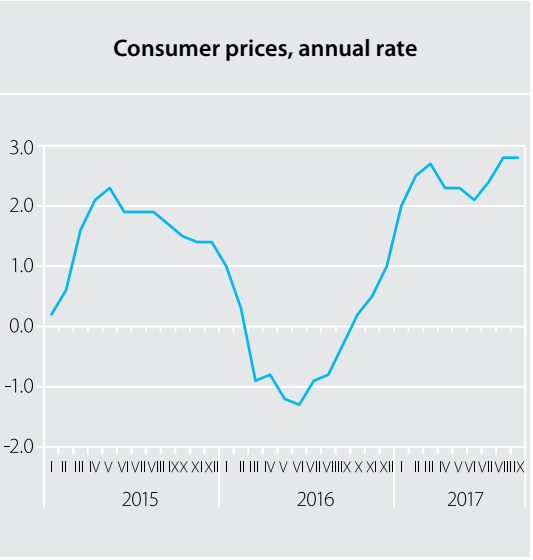


Source: Monstat and CBCG calculations

[3] At the meeting of OPEC countries, held at the end of May of the current year, the Agreement on the reduction of oil production (which was made at the end/November 2016 to raise the price of that energy product) was extended until March 2018.

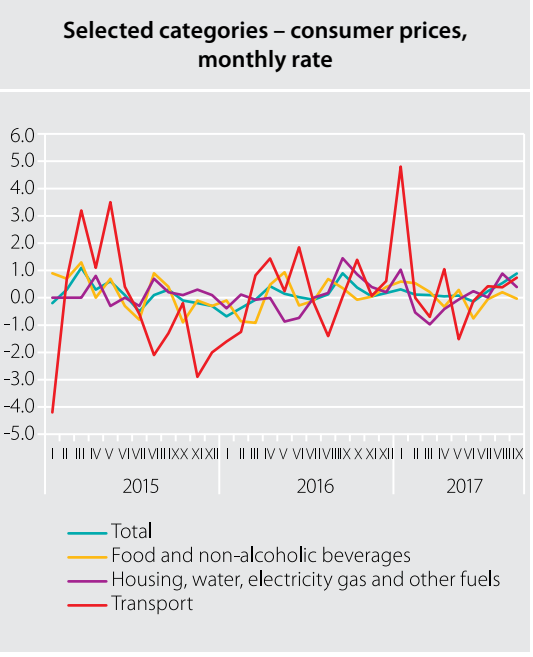
According to the World Bank report[4], a slight increase in oil prices is forecast for 2018, from an average price of 53 USD/barrel, as estimated for 2017 to 56 USD/barrel, mostly as a result of a gradual increase in demand for this energy and agreed reduction of production by exporting countries.

Graph 5



Source: Monstat

Graph 6



Source: Monstat

Annual prices growth of 7.2% in the *transport* category gave the largest contribution to the increase (0.8 percentage points) in the total annual inflation rate of 2.8%. The annual price increase in September was also recorded in the following categories: *alcoholic beverages and tobacco* 15%, *clothing and footwear* 5,8%, *hotels and restaurants* 4,1%, *health* 2.5%, *other goods and services* 2,1%, *housing, water, electricity, gas and other fuels* 2% , *food and non-alcoholic beverages* 1% and *communications* 0.1%. Annual prices decline was recorded in the following categories: *recreation and culture* (-0.7%) and *furnishing, household equipment and routine household maintenance* (-0.3%). Prices under *education* remained unchanged at the annual level.

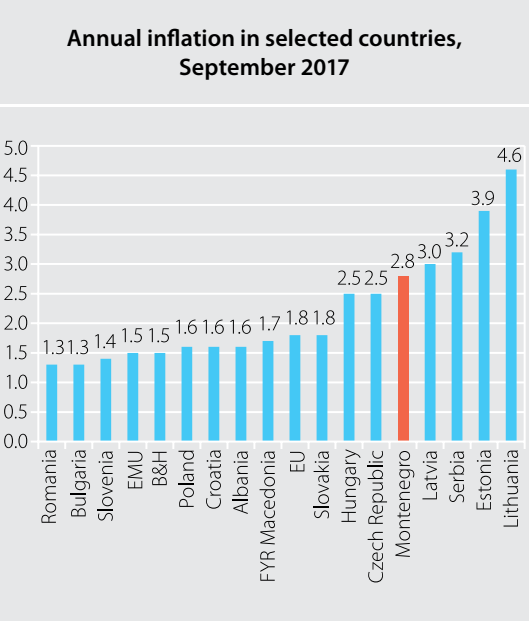
**The producers` prices of manufactured products** in September recorded a decline 0.2% in relation to end-2016. Prices decline was recorded in mining and quarrying by 1.7% and manufacturing industry by 3.6%, while electricity, gas and steam supply prices increased by 5.3%. The producers` prices of manufactured products recorded an annual fall of 0.1%.

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 Lithuania (4.6%) while Romania and Bulgaria recorded the lowest positive annual inflation rate (by 1.3%). From the neighboring countries, positive rate was recorded by Bosnia and Herzegovina (1.5%), Albania (1.6%), Croatia (1.6%), Macedonia (1.7%) and Serbia (3.2%).

[4] "Commodity Markets Outlook" - October 2017

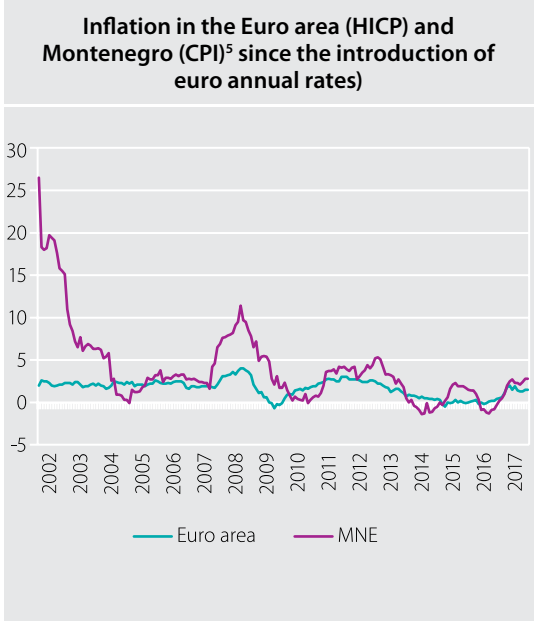
The annual HICP inflation rate reported in the Euro area amounted to 1.5%, CPI inflation in Montenegro amounted to 2.8%, while annual HICP inflation in Montenegro was 3.3% in September.

Graph 7



Source: Statistical offices of the selected countries and Eurostat

Graph 8



Source: Monstat and Eurostat

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

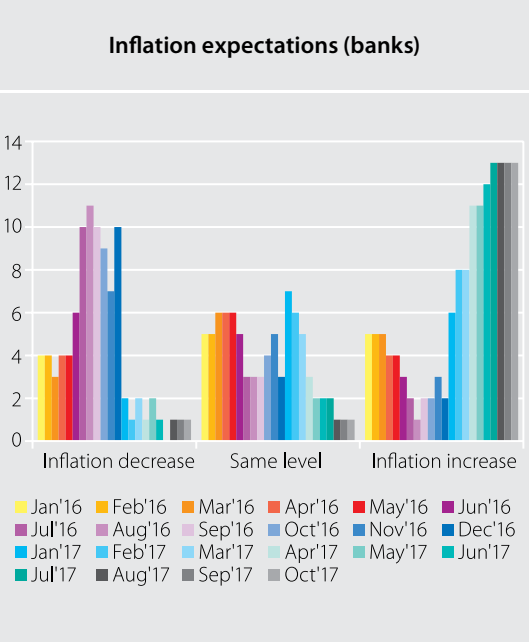
2. INFLATIONARY EXPECTATIONS

2.1. Banks' expectations

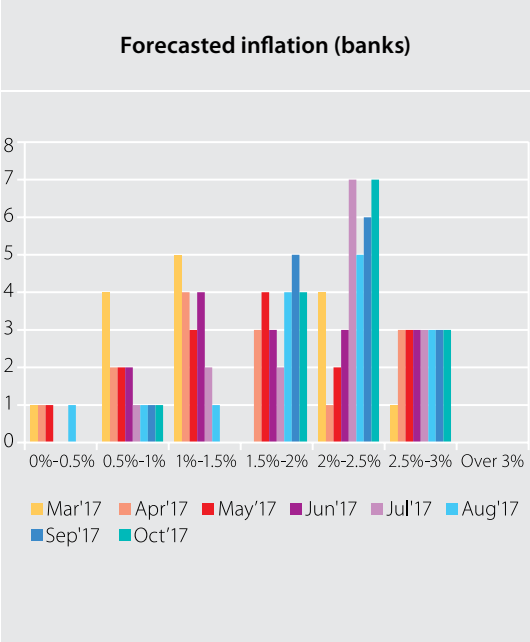
Based on a survey conducted in October this year, it can be concluded that thirteen banks expect a higher rate of inflation, while two banks expect a lower or the same inflation rate in 2017 compared to 2016 (Graph 9)

As shown in Graph 10, there are different expectations of banks on the trend and the level of inflation by the end of this year. Of the total number of banks surveyed, seven banks expect inflation to range between 2% and 2.5% by the end of the year, and four banks expect inflation between 1.5% and 2%. The inflation rate between 2.5% and 3% is expected by three banks, while one bank expects inflation to range from 0.5% to 1%.

Graph 9



Graph 10

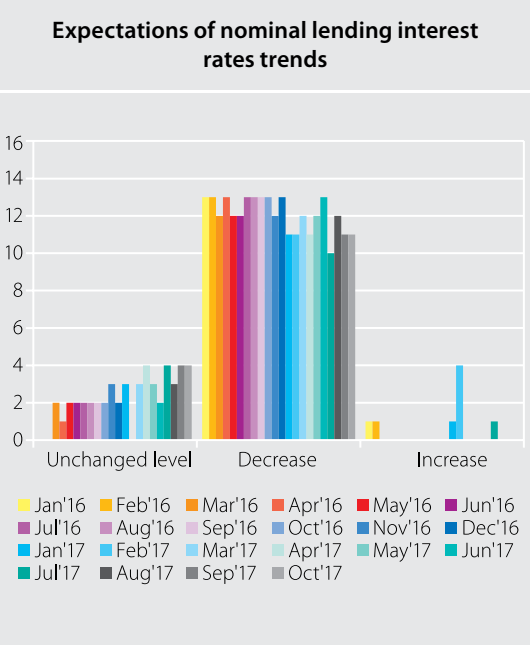


In consideration of expectations on the nominal lending interest rates trends, eleven banks expect this rate to decline, while four banks expect it to remain at the same level. With regard to the movement

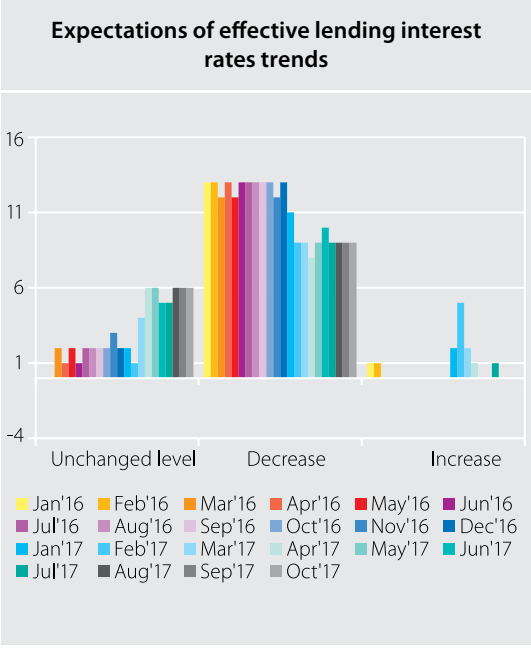
of effective active interest rates, nine banks expect a decline, while six banks believe that they will remain at the same level.

In reference to deposit interest rates trends, eight banks expect them to decline, seven banks expect no change in relation to 2016.

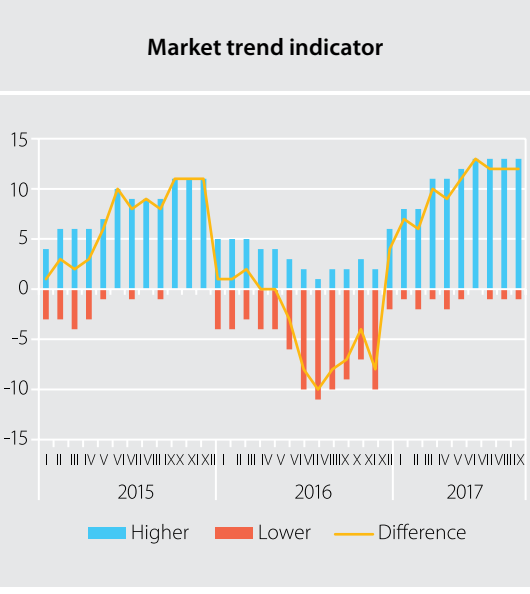
Graph 11



Graph 12



Graph 13



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. Inflation forecasts were significantly low, with some oscillations, while over the first nine months of 2017 they have been increasing.

2.2. Expectations of economy (except banks)

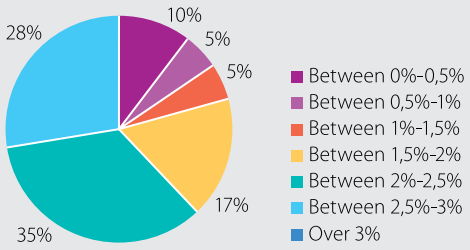
Inflation

In the total number of surveyed companies, majority (35%) expected the inflation in 2017 to range between 2% and 2.5%. Some 28% of surveyed companies expected inflation to range between 2.5% and 3%, inflation between 1.5% and 2% was expected by 17%, while inflation between 0% and 0.5% was expected by 10% of surveyed companies. Some 5% of surveyed companies expected inflation to range between 0.5% and 1% and also 5% of companies expects it to range between 1% and 1.5%. Some 85% of surveyed companies expect wages and salaries to remain unchanged in 2017, 12% of the surveyed companies expect them to increase, while 3% expect wages and salaries to decrease. Regarding the number of employees, in the same period, 65% of respondents believe that the number will not change, 25% expect an increase, while 10% believes the number of employees will decrease in the current year compared to the previous year.

The majority of surveyed companies (66%) expected the prices of production inputs to remain unchanged, and 78% expect the prices of their products (services) not to change in 2017.

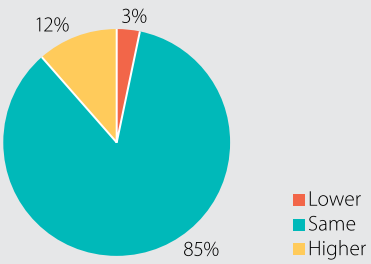
Graph 14

Expected inflation in 2017 in relation to 2016



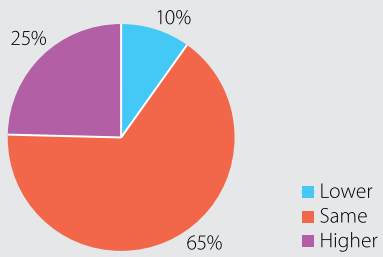
Graph 15

Expected wages and salaries in 2017 in relation to 2016

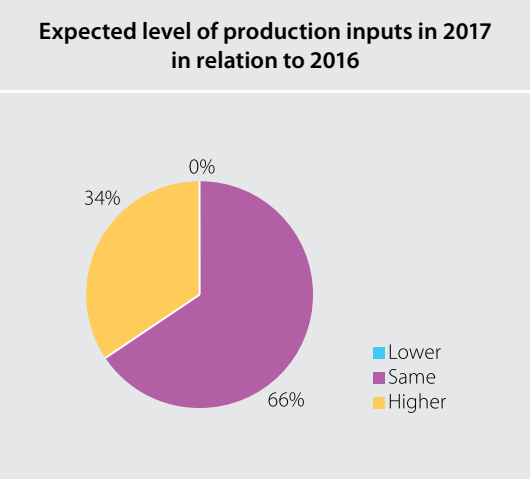


Graph 16

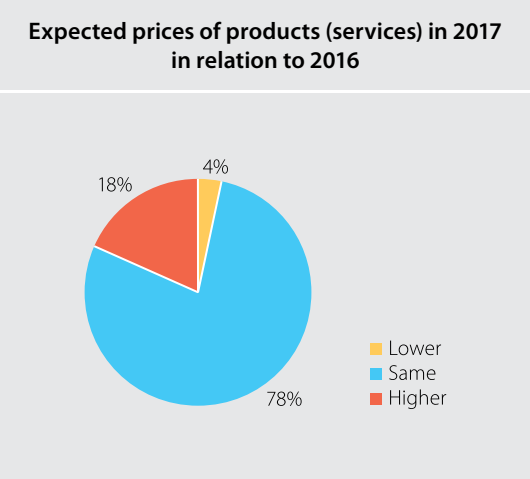
Expected number of employees in 2017 in relation to 2016



Graph 17



Graph 18

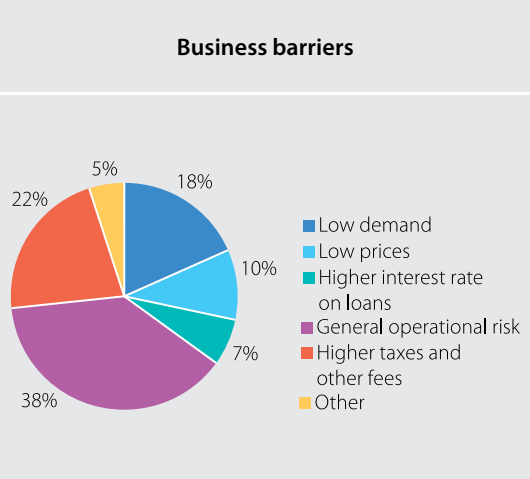


Business Environment

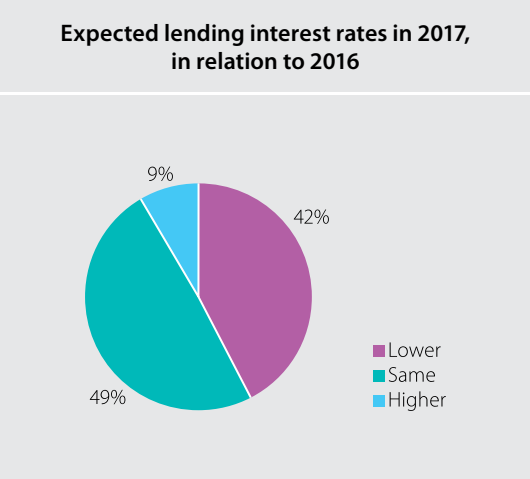
In the area of business barriers, survey results showed that most of the surveyed companies saw general operational risks (38%), high taxes and other forms of duties (22%) and low demand (18%) as main obstacles.

In reference to lending interest rates, 49% of surveyed companies expected the same level, 42% expected them to decline, while 9% expected higher lending interest rates in 2017 relative to 2016.

Graph 19



Graph 20

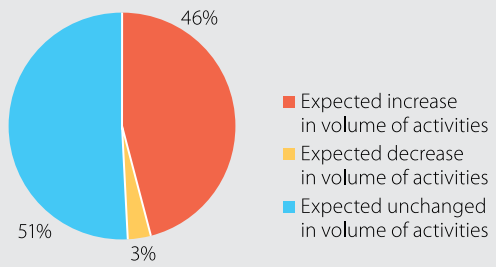


Investments

Out of the total number of surveyed companies, 46% planned to increase the volume of activities in 2017, while 61% planned new investments. Most investments (67%) referred to the increase in fixed assets, while high interest rates and unfavourable conditions for capital borrowings (25%), low demand and other obstacles (24% each), high interest rates and (12%), high production costs and other obstacles were described as main barriers to new investments (by 21%).

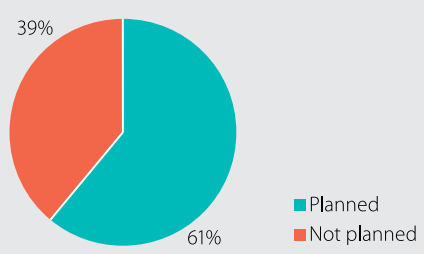
Graph 21

Expected volume of activities in 2017



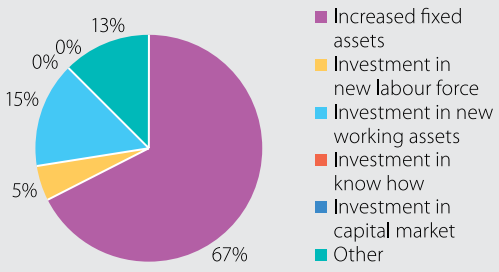
Graph 22

New investments in 2017



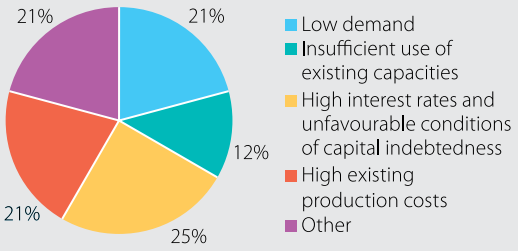
Graph 23

Types of new investments planned in 2017



Graph 24

Obstacles to new investments in 2017



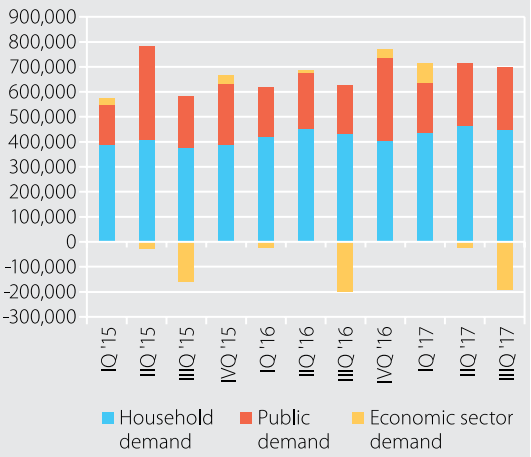
3. INFLATION DETERMINANTS

3.1. Demand

According to preliminary data for the third quarter of 2017, aggregate demand registered a fall in relation to the previous quarter, while compared to the third quarter of 2016, it increased. Looking at the structure of total demand and compared to the structure of the previous quarter, the participation of the household sector and public spending increased, while the share of the corporate sector declined.

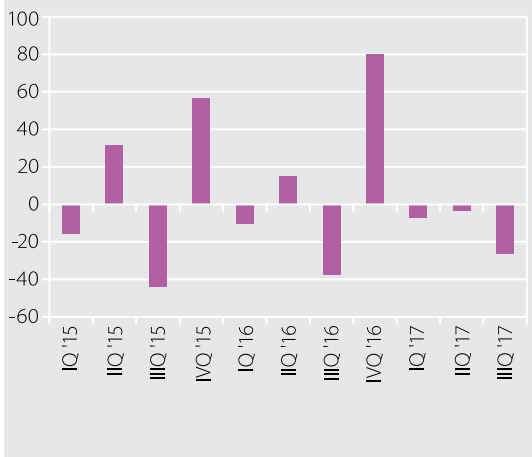
Graph 25

Aggregate demand, in thousand euros



Graph 26

Quarterly aggregate demand rates



Box 1 - Aggregate demand calculation methodology

For the purpose of complete monitoring of aggregate demand as a determinant of inflation, the CBCG has developed the aggregate demand calculation methodology. The starting point of this methodology states that the aggregate demand represents the sum of the demand of three sectors: personal spending (households), investment spending (corporate sector), and public spending. However, taking into account the lack of numerous data necessary for calculating the aggregate demand, the existing

data should not be treated as the indicator of the exact amount of aggregate demand, but as an 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

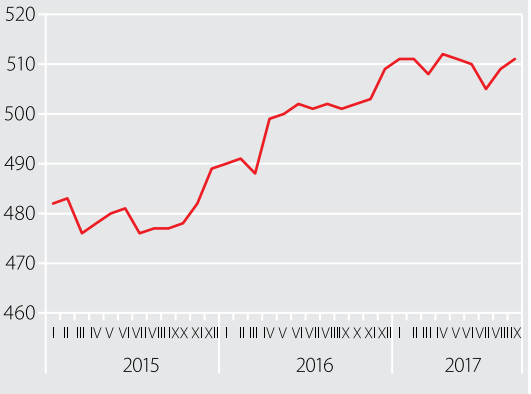
3.1.1. Salaries and other available demand determinants

In Q3 2017, an average gross salary in Montenegro amounted to 762 euros, while an average salary without taxes and contributions amounted to 508 euros. Observed in relation to the previous quarter, average wages, as well as average wages without taxes and contributions, registered a decrease of 0.5%, 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 declined in July and September, while they recorded minor increase in August.

Graph 27

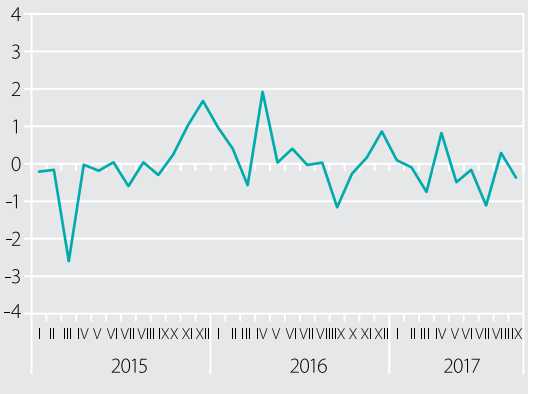
Average wages and salaries without taxes and contributions in Montenegro



Source: Monstat

Graph 28

Real wages and salaries (monthly growth rate)



Source: Monstat

Loans granted to the household sector during the nine months of 2017 grew on average monthly rate of 0.9%, as well as in the same period of the previous year. At the end of Q3 2017, total household loans amounted to 1,103.5 million euros, which was 85.5 million euros or 8.4% more than at the end of the previous year, i.e. 104.6 million euros or 10.5%, more than in same period of the previous year.

At end-Q3 2017, debt per capita[6] amounted to 1,773 euros, recording increase by 136.9 euros in relation to end-2016, and by 167.6 euros compared y-o-y.

Total MFIs loans disbursed to households amounted to 55.3 million euros at end-September 2017 which was 3.9 million euros or 7.7% more than at the end of 2016, and 6.8 million euros or 14% higher compared y-o-y.

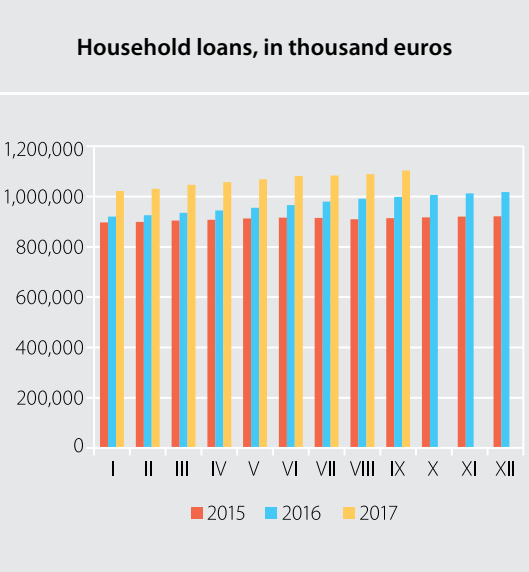
During Q3 2017, deposits of the household sector recorded an average monthly growth of 0.06% (the average monthly growth of 0.4% was recorded in the same period of 2016). This sector's deposits amounted to 1,614.2 million euros, which is by 80 million euros or 5.2% more than at the end-2016, or by 128.1 million euros (8.6%) more than in the same period of the previous year.

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

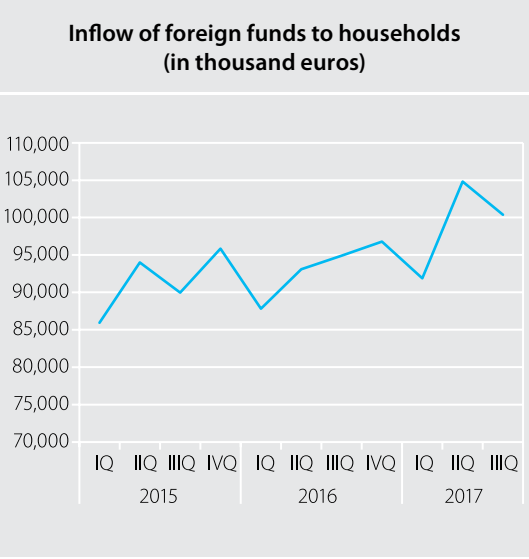
Household sector reported total net savings in the amount of 510.7 million euros at end-Q3 2017, which represented a quarterly decrease of 5.4 million euros or 1.1%, yet a y-o-y increase of 23.6 million euros or 4.8%.

In the third quarter of 2017, balance of payments statistics show that there was a slight decrease in the inflow of funds from abroad, i.e. remittances, as well as employee compensation, compared to the previous quarter.

Graph 29



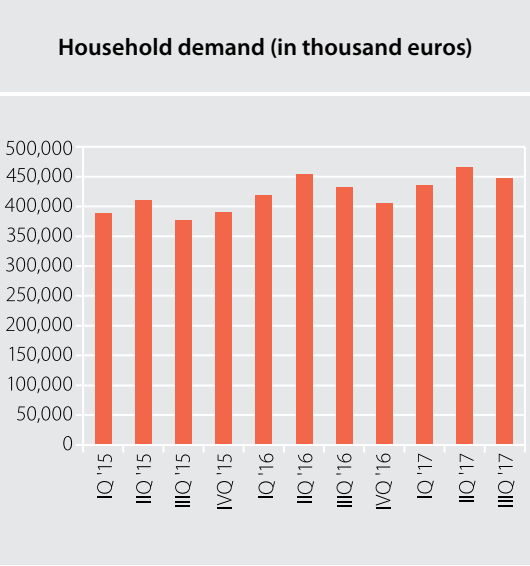
Graph 30



Source: CBCG

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

Graph 31



Observing the total demand of the household sector by quarters, it is noted that demand in the third quarter of this year is lower than the demand from the previous quarter. Demand growth was recorded in comparison with the demand from the third quarter of 2016.

3.1.2. Budget Analysis

Budget of Montenegro

According to Ministry of Finance preliminary data, total revenues[7] of the Budget of Montenegro amounted to 1,554.3 million euros in the first nine months of 2017.

Source revenues amounted to 1,116.1 million euros or 26.6% of estimated GDP[8], and they recorded minor increase of 0.1% in relation to the plan, and they showed a y-o-y increase of 3%. In the structure of source revenues, tax revenues accounted for the main share of 64.6%, followed by contributions with 29.6%, other revenues with 2.3%, fees with 1.2%, donations with 1.1%, duties with 0.9%, and receipts from loan repayment and funds transferred from the previous year with 0.3%.

Tax revenues amounted to 720.7 million euros, recording a y-o-y increase of 8.7%, and being by 2% above the plan. All taxes, except personal income tax and other public revenues, recorded y-o-y increase. In nominal terms, the highest annual increase in revenues was recorded in Value Added Tax in the amount of 31.3 million euros or 8.4% and excise dutiesas (29.3 million euros or 21.5%) as result of the implementation of the amended Law on Excise Taxes.

Revenues arising from contributions amounted to 330.7 million euros being slightly below planned, and recording a y-o-y growth of 6.1%.

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

[8] Source: Ministry of Finance, Estimated GDP for 2017 amounts to 4.202,1 million euros

Consolidated budget expenditures amounted to 1,218.8 million euros, and made up 29% of GDP. Expenditures were by 7.6% lower in relation to the plan for the nine months of 2017 and by 9.7% or 107.3 million euros higher in relation to the same period of 2016 mainly due to a 75.8 million euros increase in capital budget for the construction of Bar-Boljare highway.

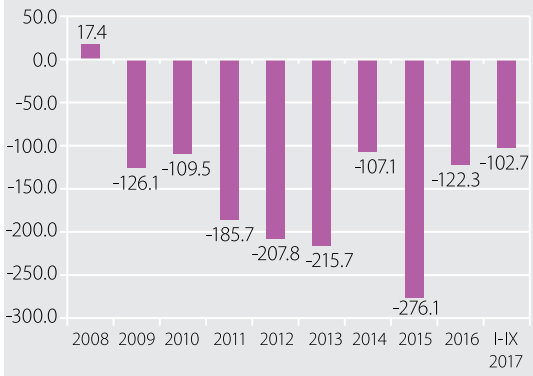
Current budget expenditures amounted to 556.8 million euros or 2.4% below the plan. Almost all current expenditures, except for services and interests, were below planned, while expenditures for gross wages remained at the same level.

The Montenegrin capital budget amounted to 101.1 million euros or 2.4% of GDP.

The deficit of the budget of Montenegro[9] was estimated to 102.7 million euros, or 2.4% of GDP for the first nine months of 2017.

Graph 32

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



Source: Ministry of Finance

3.1.3. Corporate sector

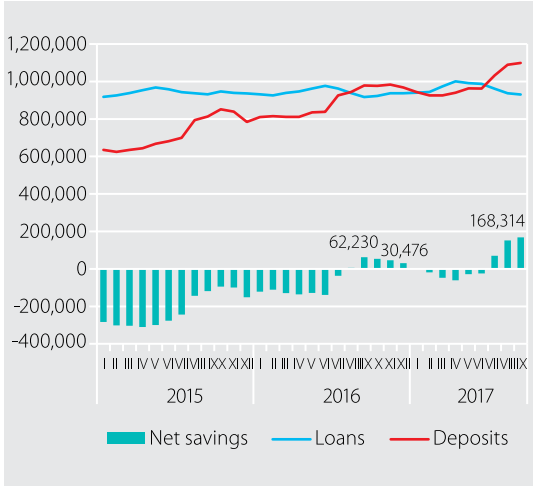
Since the data on the corporate sector investments are not available, net corporate sector indebtedness can be used for approximation.

In September 2017, corporate sector recorded net savings of 168.3 million euros at the end of the observed period and, in relation to the end of the third quarter of the previous year, was 2.7 times higher or 106.1 million euros (Graph 33).

Long-term loans accounted for the main share (79.5%) in the structure of corporate sector loans, which indicates that loans to this sector were mainly used for increasing economic activity volume.

Graph 33

Net indebtedness of the corporate sector, in thousand euros

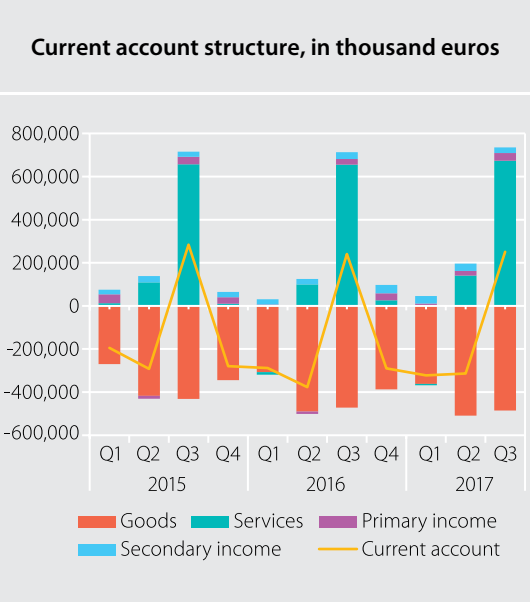


[9] (Methodology for *surplus/deficit* calculation, OGM, 53/09). Deficit represents the difference between the source revenues and the consolidated expenditures.

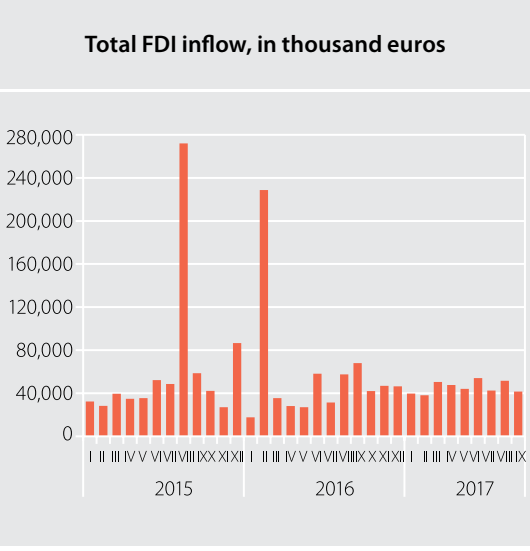
3.1.4. External demand - balance of payment

In the period January-September 2017, the current account deficit recorded a decline. According to preliminary data, the current account deficit amounted to 385.8 million euros or 9.2% less than in the same period in 2016. This trend is the result of an increase in surpluses on service accounts, primary and secondary income. According to preliminary data, the deficit at the goods account amounted to 1.4 billion euros or 6.9% more than in the previous year due to an increase in visible import. Total visible import amounted to 1.6 billion euros and was 8.1% higher than in the same period of 2016, as a result of an increase in imports of oil and oil products, electricity and non-metallic mineral products. Total visible export amounted to 275.6 million euros, showing an increase of 14.9%. Exports of mineral ores and waste, other transport equipment and equipment and non-ferrous metals had the biggest impact on export growth.

Graph 34



Graph 35



Source: CBCG

In the international invisible trade, Montenegro recorded a surplus of 807.9 million euros in the period January-September 2017, which is 8.8% more than in the same period of the previous year and represents a result of a significant increase in revenues from travel/tourism and transport services. Primary income account recorded a surplus in the amount of 67.9 million euros, which represents a significant increase in relation to the corresponding period of 2016 (20.6 million euros). Such trend is the result of an increase in inflows based on compensation of employees and interest, as well as a smaller outflow on the basis of paid dividends. Secondary income account ran a surplus of 95.2 million euros, or 16.7% more than in the same period of 2016.

The developments at the financial account are characterized by the increase in net capital inflows compared to 2016. Preliminary data shows that net foreign direct investments (FDI) inflow amounted to 311.7 million euros which is a y-o-y increase of 10.6%. Total FDI inflow in the reporting period amounted to 409,8 million euros, while the outflow of 98.1 million euros was recorded in the same period. In the FDI inflow structure, equity investments amounted to 223.8 million euros, representing 54.6% of the total inflow in the observed period in 2017, while the inflow in the form of intercompany debt amounted to 177.3 million euros or 31.4% more than in the

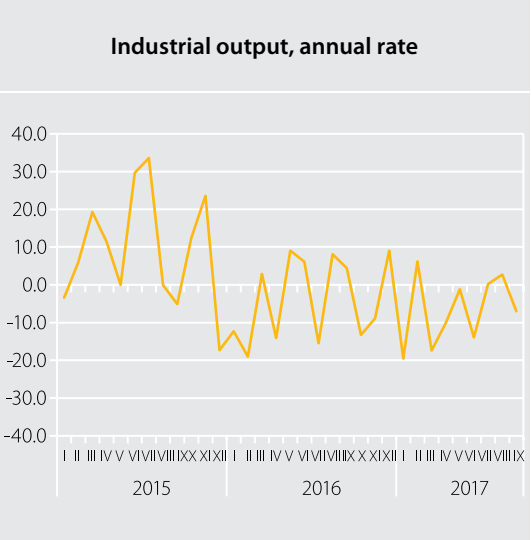
same period of 2016. The inflow of monetary assets arising from the withdrawal of residents' funds invested abroad amounted to 8.7 million euros.

In the period January-September 2017, the investment portfolio account recorded a net inflow of 13.6 million euros, while a net outflow of 2.7 million euros was recorded in the previous year. The other investments account recorded a net outflow of 24.6 million euros.

3.2. Supply and production

Total industrial output in the first nine months of this year registered a 6.7% decrease compared to the same period of the previous year. Production decline was recorded in manufacturing industry by 4.5% and electricity, gas and steam supply by 28.8%, while growth was recorded in mining and quarrying sector by 115.3%[10]. Observation of monthly data on the industrial output trends shows that the highest fall was recorded in January (-36.6%) and April (-14.6%), while industrial output increased in in February (34.1%) and July (23%).

Graph 36



Source: Monstat

In the first nine months of 2017, a total of 824,412 tourists stayed in collective accommodation establishments, which is a y-o-y increase of 16.9%. The number of domestic tourists' arrivals in collective accommodation establishments increased by 7.9%, while the number of foreign tourists grew by 18%. Tourist overnights amounted to 3.6 million, which is a y-o-y increase of 9.8%. Foreign tourists realized 90% of total overnights.

Total **production of forest assortments** in the first nine months of this year amounted to 243,688 m³ of forest assortments, which is 25.4% more than in the same period of the previous year.[11]

According to preliminary data, the value of executed **construction works** for the first nine months of this year was higher by 43.4% compared to the comparative period, while the construction activity was measured by the effective working hours increased by 21.6%.

According to MONSTAT data, during the first nine months of 2017, road transport recorded 0.5%[12] more passengers than in the same period of 2016, while cargo transport increased by 4.9%[13]. Number

[10] Significant growth was recorded in metal ores mining, due to the renewal of the extraction of bauxite ore that was not recorded in 2016.

[11] This is presented by weighted index, while presented by non-weighted index the output was 25.5% lower in the same period.

[12] Expressed through the number of passengers, by passenger km, decline of passenger transport was 0.1%.

[13] In terms of transported goods expressed in thousands of tons and tons km transport of goods decreased by 4.7%.

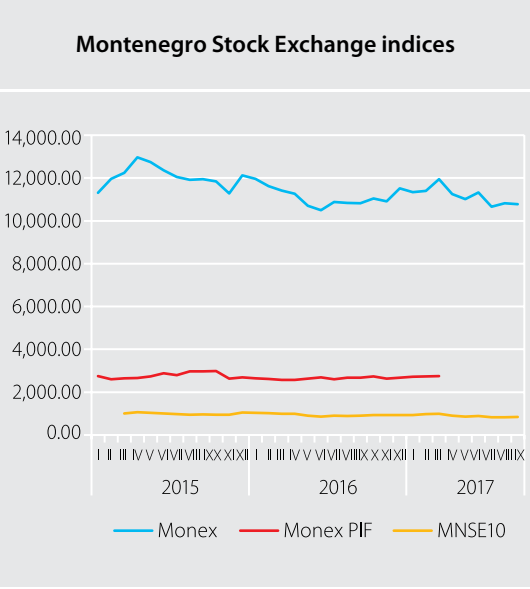
of passengers in railway transport decreased by 28.5%[14]. Cargo transport increased by 38.4% compared to the same period last year. In the first nine months of 2017, air transport recorded 1.9 million passengers, or 17.4% more than in the same period 2016, while cargo transport declined by 3.5%.[15]

Total turnover in ports amounted to 1.6 million tons, recording a y-o-y increase of 29.5%, whereby exports accounted for 58.9%, while 40.9% referred to imports.[16] In the observed period, exports grew by 44.8%, and imports increased by 17.9%.

3.3. Stock exchange indices

At the end of the third quarter of 2017, both indexes fell against the end of the previous year, as well as in relation to the same period of the previous year (Graph 37).

Graph 37



Source: the Montenegro SE

At end-September 2017, index Monex[17] amounted to 10,772.53 recording decrease of 738.1 index points or 6.4% in relation to end-2016, and a y-o-y decrease of 48.3 index points or 0.4%.

MNSE10[18] index stood at 834.61 at end-Q3, and recorded a decrease of 93.7 index points or 10.1% compared to end-2016, while it was lower by 58.3 index points or 6.5% compared to Q3 2016.

[14] Presented as transported passengers in thousands, as travellers' kilometres, the decline amounted to 30.2%.

[15] Presented as thousand tons, while presented as ton-kilometres, the increase amounted to 47.3%.

[16] The sum of exports and imports does not give figure 100 due to the difference referring to the goods transit.

[17] MONEX is a benchmark Montenegro SE index aimed at describing the trends in prices of stocks at the stock exchange and free market of the Montenegro SE as precise as possible. With the new Methodology, the legal heir of the MONEX20 index - MONEX index - has more companies in its index basket.

[18] 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 includes the "best" companies from 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[19] 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.

[19] (OGM 15/17).

5. INFLATION FORECAST FOR 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 Fan Chart is aimed at considering uncertainties in the real economy flows, which result in the inflation rate movement, and periodically reflected in inflation rate trend (increase in energy prices, increase/decrease in the foreign trade deficit).

Montenegro's fan chart for 2018 was based on the following three estimated components:

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 are "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

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[20].

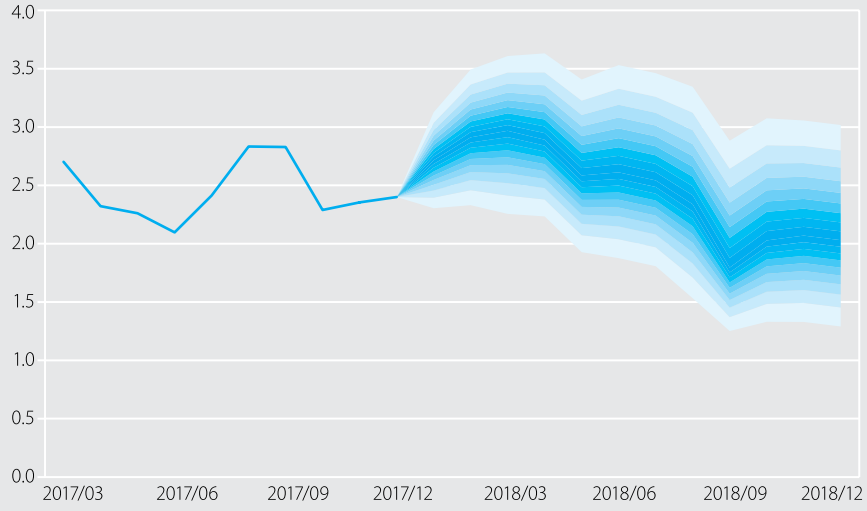
[20] More detailed explanation of ARIMA model of Montenegro was presented in the Central Bank Working Paper 11 "Inflation forecasting: Empirical research of retail price index of Montenegro for 2007 – implementation of ARIMA model", 2007.

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, 21)[21], has sufficient confidence level for forecasts.

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

Graph 38

CPI projections of Montenegro for 2018



Source: CBCG, 2018

The mean value of the given model is 2.5. The value of central projection' asymmetricity ratio ranged between 0.8 and 1, while standard deviation was 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.[22] 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.

[21] 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.

[22] 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 2018, indicates that there is a *90% probability that the CPI inflation will range between 1.3% and 3.6%, depending on the month, with the central tendency of 2.5%*. The Fan Chart central projection (the darkest part) represents a 10% probability span (Graph 38).

The starting assumptions for forecasting inflation in 2018 are:

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 at 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 rate of inflation relate to a decline in oil prices and weaker inflation in the Euro area than projected.

Internal factors:

- Increase in excise duties on tobacco and tobacco products, ethyl alcohol, carbonated drinks with sugar and excise duties on coal will affect the rise in prices.
- Increase in VAT rate by 2 percentage points, i.e. from 19% to 21%.
- Increase in electricity price by 3% in January, with possible further increase by 5% by the end of the year.
- A standstill in wages and real estate prices.

External factors:

- For 2018, forecasts indicate that oil prices will remain at the same level as in 2017, with the monthly fluctuation of +/-5%.
- Following the rise in metal prices and food prices at the international market in 2017, it is expected that these prices will remain stable in 2018.

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

6. EXPECTED INFLATION IN 2018

A survey conducted among businessmen suggests that growth in economic activity can be expected in 2018. The CBCG projection suggests that GDP growth of around 3% can be expected in 2018. Projections of all relevant international financial institutions also indicate that solid economic growth can be expected in 2018. Production growth will surely have an anti-inflationary effect.

On the other hand, there are factors that will influence inflation growth in 2018. They are primarily related to the increase in VAT, the increase in excise duties as part of fiscal consolidation measures, and the expected increase in electricity prices. Also, the recovery of oil and food prices on a global scale can be expected.

Our expert's assessment is similar to model assessment and we expect that the inflation rate in 2018 will range from 1.75% to 3.75%.

Table 3

Estimated inflation rate in 2018		
Optimistic assessment	Realistic assessment	Pessimistic assessment
1.75	2.75	3.75

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.