

# INFLATION REPORT QUARTER II, 2021

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

**WEB SITE:** <http://www.cbcg.me>

**CENTRAL BANK COUNCIL:** Radoje Žugić, PhD, Governor  
Nikola Fabris, PhD, Vice-Governor  
Miodrag Radonjić, Vice-Governor  
Zorica Kalezić, PhD, Vice-Governor  
Milorad Jovović, PhD  
Ruždija Tuzović  
Nikola Milović, PhD

**DESIGNED BY:** Nikola Nikolić  
Nikola Marđonović

**TRANSLATED BY:** Department for Financial Stability,  
Research and Statistics

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# 1. INFLATION INDICATORS

Consumer prices increased by 1% during the second quarter of 2021, with prices in the categories of food and non-alcoholic beverages, hotels and restaurants and transport making the largest contribution to growth (Table 2). Observation of consumer prices monthly trends shows that the price increase was recorded in all three months of Q2, specifically 0.6% in April, 0.3% in May and 0.2% in June. Consumer prices in the first six months of 2021, compared to the same period last year, were on average higher by 1.2%, while prices in June compared to the same month last year were higher on average by 2.4%.

**Table 1**

Inflation, %						
	2020				2021	
	III	VI	IX	XII	III	VI
Change in relation to the end of the previous year	-0.4	-0.9	-0.5	-0.9	1.4	2.4
Annual change	0.0	-0.2	0.1	-0.9	0.8	2.4

Source: MONSTAT

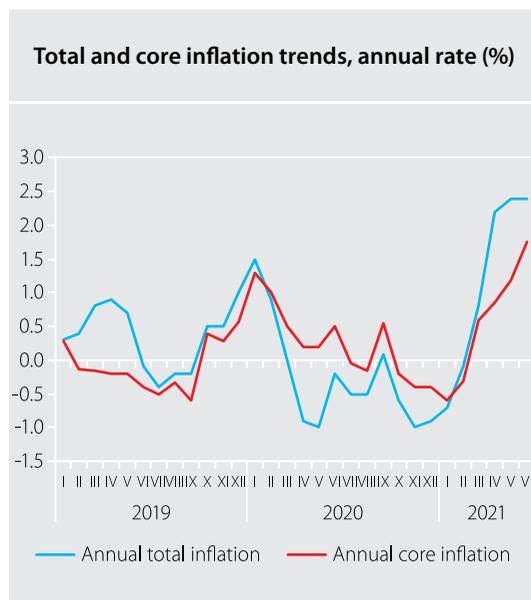
In the second quarter, price growth in Montenegro was recorded in eight of the twelve categories that account for 69.3% of the consumer basket (Table 2). The highest contribution to growth (0.7 pp) was due to the increase in prices in the category *food and non-alcoholic beverages*, with a growth of 2%. The growth in this category was mostly influenced by the increase in prices of oils and fats (12.4%), fruits (7.4%), prices of sugar, jam, honey, chocolate and sweets (3.1%), prices of vegetables (1.5%) and meat (1.1%). With the gradual recovery of the tourism sector in the observed period, there was an increase in prices in the category *hotels and restaurants* of 7.8%, mostly as a result of an increase in prices of accommodation services (16.2%). During this period, prices also increased in the following categories: *furnishing, household equipment and routine household maintenance* (1.8%), *transport* (1.6%), *health care and miscellaneous goods and services* (0.7% each), *recreation and culture* (0.6%) and *alcoholic beverages and tobacco* (0.4%). The decline in prices was recorded in categories of *housing, water, electricity gas and other fuels* (-2%), *clothing and footwear* (-0.8%) and *communications* (-0.1%). Prices in the category *education* remained unchanged in Q2 2021.

Table 2

Share of selected categories in total inflation <sup>1</sup>				
	Weights	VI 21 / III 21	Growth rate	Contribution
TOTAL	1000	101.0	1.0	1.0
Food and non-alcoholic beverages	341.1	102.0	2.0	0.7
Alcoholic beverages and tobacco	40.4	100.4	0.4	0.0
Clothing and footwear	86.1	99.2	-0.8	-0.1
Housing, water, electricity gas and other fuels	154.0	98.0	-2.0	-0.3
Furnishing, household equipment and routine household maintenance	39.4	101.8	1.8	0.1
Health	40.8	100.7	0.7	0.0
Transport	109.4	101.6	1.6	0.2
Communication	48.5	99.9	-0.1	0.0
Recreation and culture	32.0	100.6	0.6	0.0
Education	18.7	100.0	0.0	0.0
Restaurants and hotels	47.6	107.8	7.8	0.4
Miscellaneous goods and services	42.0	100.7	0.7	0.0

Source: MONSTAT and CBCG calculations

Graph 1



Source: MONSTAT and CBCG calculations

During the second quarter, *monthly core inflation* in April was below, while in May and June it was at the level of official monthly inflation. Core inflation was positive in all three months of the second quarter.

The *annual core inflation rate* in June 2021 amounted to 1.8% and was lower by 0.68 pp than the total inflation. Annual core inflation in all three months of the second quarter had a positive rate as well as total annual inflation (Graph 1).

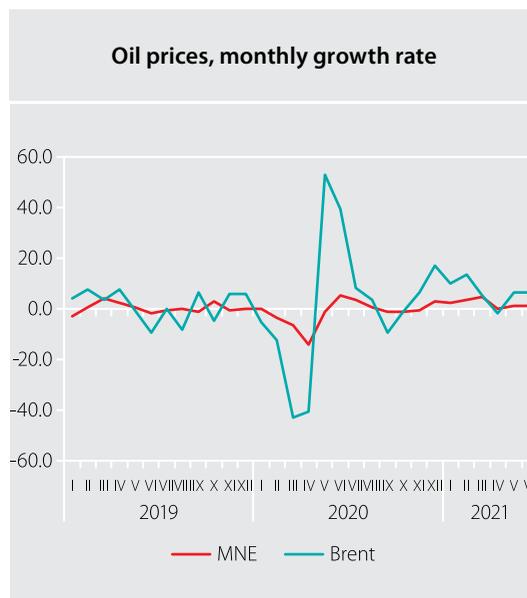
After a large decrease in oil prices globally in 2020 due to the crisis caused by COVID-19, their significant growth was recorded.

<sup>1</sup> 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.

In the observed quarter, the OPEC reference basket price averaged 67.3 USD/barrel, being 12.3% higher than the average price seen in the previous quarter. In this period, the average price of Brent stood at 68.6 USD/barrel, or 12.8% more compared to the average price in the Q1 2021. The highest price since October 2018 was recorded in June, due to the expected growth in demand for this energy generating product in the second half of 2021. According to the latest World Bank Report<sup>2</sup> from June for 2021 and 2022, the price of oil is projected to average 62 USD/barrel.

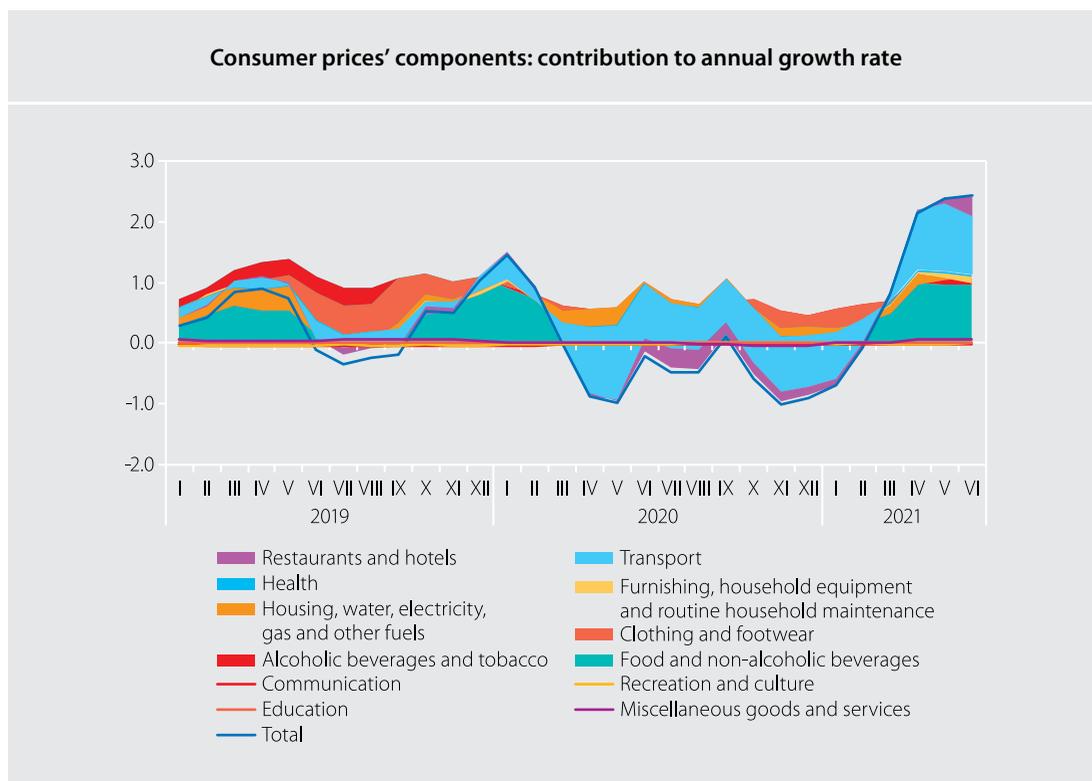
Prices growth in June of 8.7% in the *transport* and 2.8% in the *food and non-alcoholic beverages* categories gave the largest contribution to the increase (1.0 pp, each) in the total annual inflation rate of 2.4% (Graph 3).

**Graph 2**



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

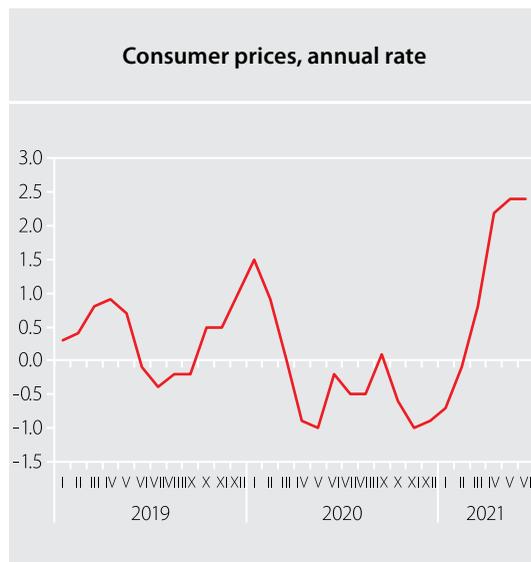
**Graph 3**



Source: MONSTAT and CBCG calculations

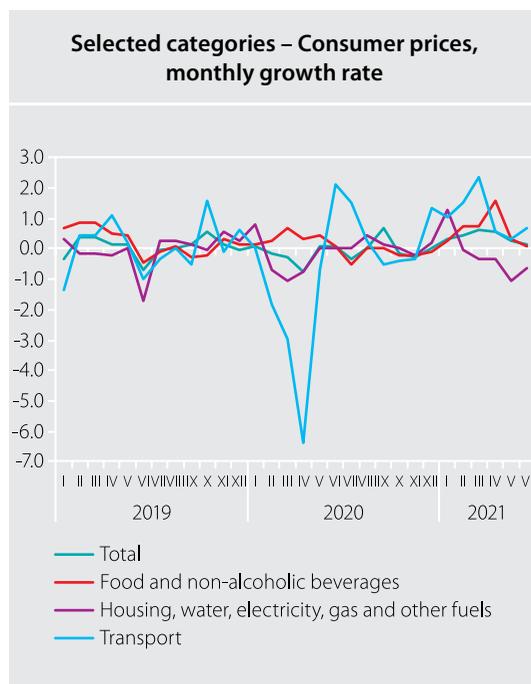
<sup>2</sup> Source: World Bank "Global Economic Prospects", June 2021.

Graph 4



Source: MONSTAT

Graph 5



Source: MONSTAT

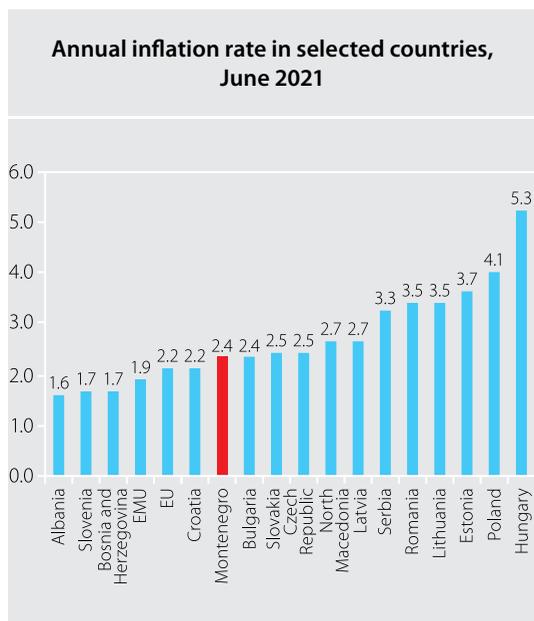
Annual price growth was also recorded in the following categories: *hotels and restaurants* (6.5%), *alcoholic beverages and tobacco* (3.2%), *furnishing, household equipment and routine household maintenance* (2.6%), *miscellaneous goods and services* (1.3%), *health* (1.1%) and *recreation and culture* (0.2%). Annual price decline was recorded in the following categories: *housing, water, electricity gas and other fuels* (-0.5%), *communications* (-0.4%), *clothing and footwear* (-0.1%), while prices in the category *education* remained unchanged compared to June 2020.

In June 2021, **producers' prices of manufactured products** recorded 1.5% growth in relation to December 2020. This was due to the growth recorded in mining and quarrying sector (3.7%) and manufacturing industry (1.6%). In the electricity, gas and steam supply sector, prices remained unchanged. At the annual level, producers' prices of manufactured products rose by 1%.

Comparison of annual inflation in Montenegro with that recorded in selected countries reveals that all the selected countries recorded positive annual inflation rate in June (Graph 6). Albania has the lowest annual rate, followed by Bosnia and Herzegovina and Slovenia, while Hungary has the highest annual inflation rate (5.3%).

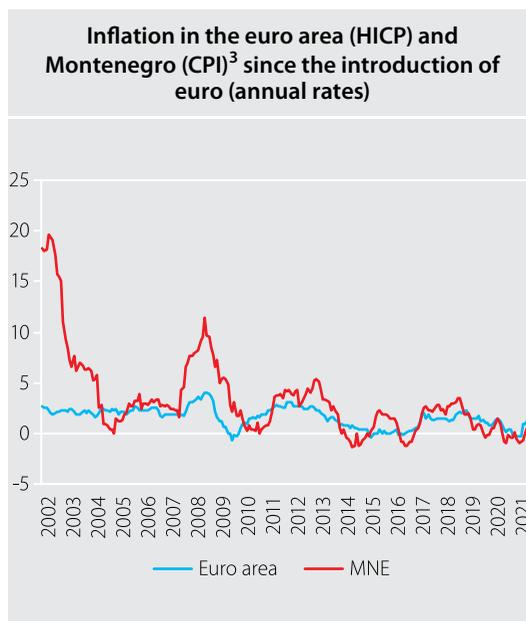
The annual inflation rate recorded in the euro area, measured by the Harmonized Index of Consumer Prices was 1,9% in June. Energy prices had the largest impact on inflation, with an annual growth rate of 12.6%. Inflation in Montenegro measured by consumer prices was 2.4%, while annual inflation in June, measured by the harmonized index, was 2.8%.

**Graph 6**



Source: National statistical offices (CPI) and Eurostat (HICP for EU countries)

**Graph 7**



Source: MONSTAT and Eurostat

<sup>3</sup> Costs of living were used for measuring inflation in Montenegro until 2009, after which consumer prices were introduced.

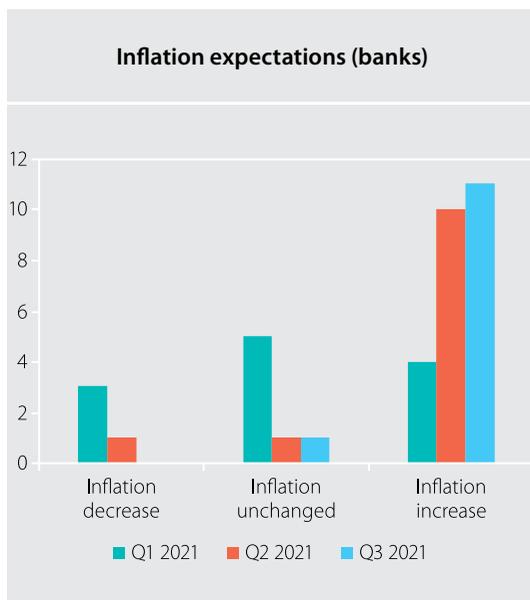
## 2. INFLATIONARY EXPECTATIONS

### 2.1. Banks' expectations

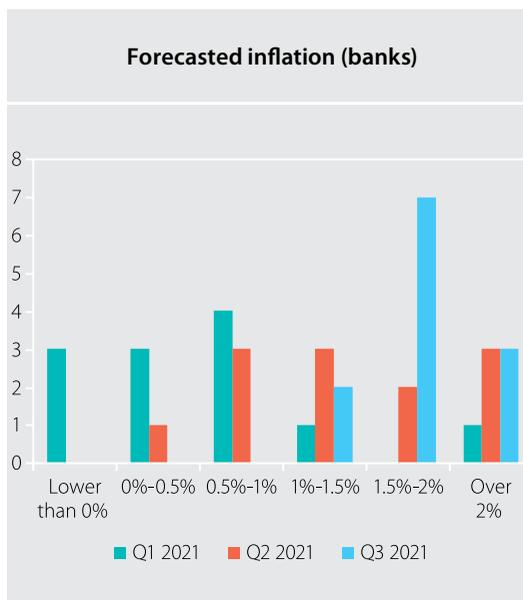
In reference to inflation expectations of banks, based on the survey conducted in August this year, eleven banks expect inflation to grow, while one bank expects inflation at the same level as in 2020 (Graph 8).

When it comes to inflation levels, expectations varied among banks. Seven banks expect inflation to be between 1.5% and 2%, three banks expect inflation above 2%, and two banks expect inflation between 1% and 1.5%. No bank expects an inflation rate lower than 1% (Graph 9).

Graph 8



Graph 9



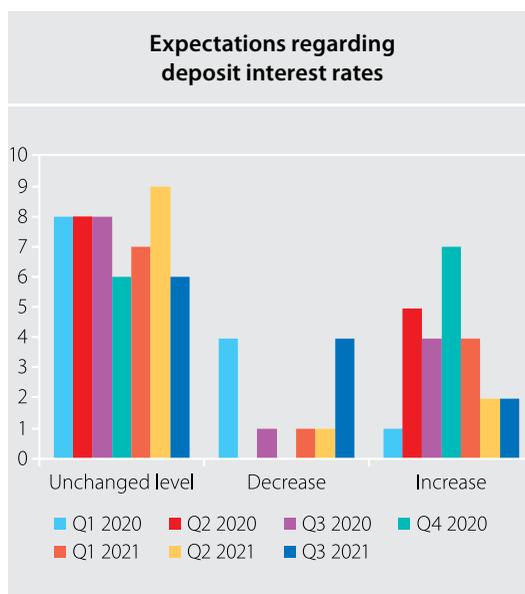
Regarding the expectations on the movement of nominal lending interest rate, seven banks expect the same level, three banks expect a fall in the nominal lending interest rate, while two banks expect their growth. As for the expectations regarding the effective lending interest rate, six banks expect the same level, four banks expect their growth, while two banks expect a decline compared to 2020 (Graph 10).

Regarding the expectations on the trends of deposit interest rates, six banks believe that they will remain at the same level, seven banks expect growth, while no bank expects a decline in deposit interest rates (Graph 11).

**Graph 10**



**Graph 11**



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 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 its value is positive, 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 expectations are, and vice versa, higher positive value means higher inflation level expectations. A survey conducted in the first three quarters of 2021 indicates an increase in banks' inflation expectations for the level of inflation in 2021.

**Graph 12**

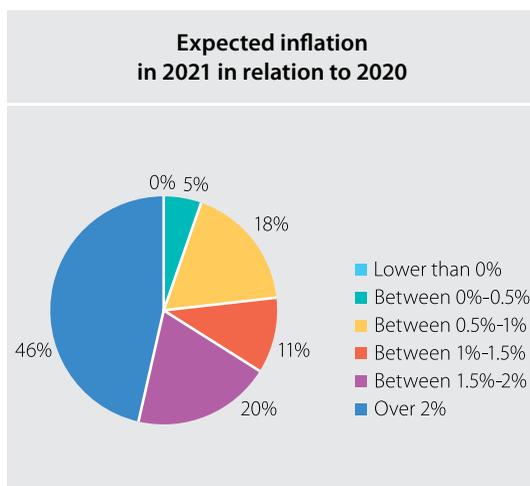


## 2.2. Expectations of the economy (except banks)

### Inflation

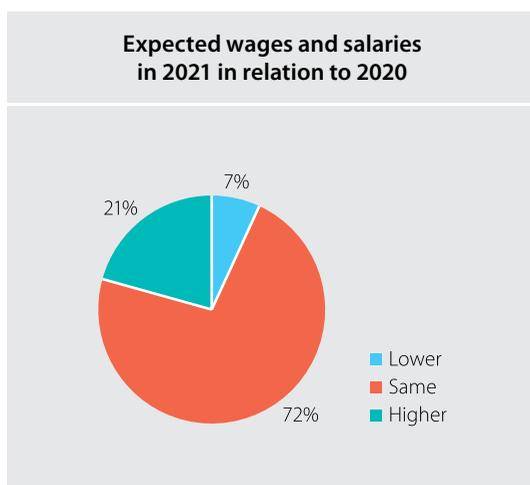
In the total number of surveyed companies, majority (46%) expected the inflation in 2021 to exceed 2%. Inflation between 1.5% and 2% was expected by 20% of companies, while 18% of surveyed companies expected the inflation to range between 0.5% and 1%. Inflation between 1.0% and 1.5% is expected by 11% of surveyed companies, while 5% expected inflation between 0% and 0.5%. No economic entity that participated in the survey expects inflation lower than 0% (Graph 13).

Graph 13

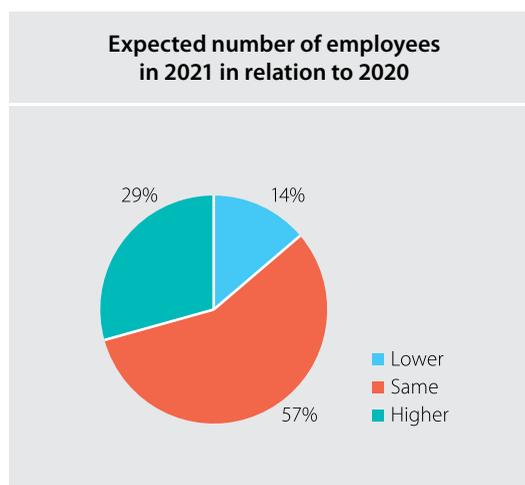


As much as 72% of surveyed companies expected wages and salaries to remain unchanged in 2021, 21% of the surveyed companies expected them to increase, while 7% expected wages and salaries to decline in relation to the previous year (Graph 14). With regard to the number of employed persons, 57% of surveyed companies expected it to remain unchanged, 29% expected this number to increase, and 14% expected it to decrease in relation to the previous year (Graph 15).

Graph 14

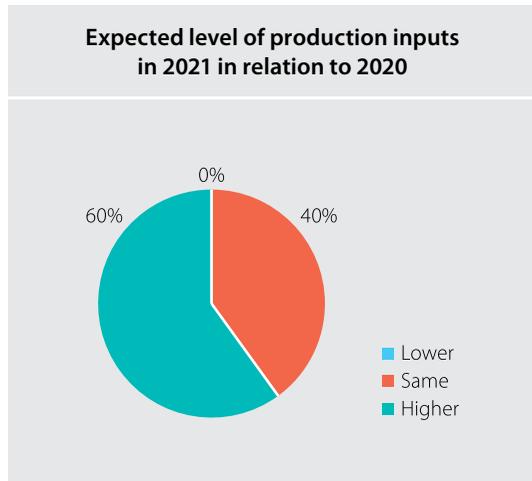


Graph 15

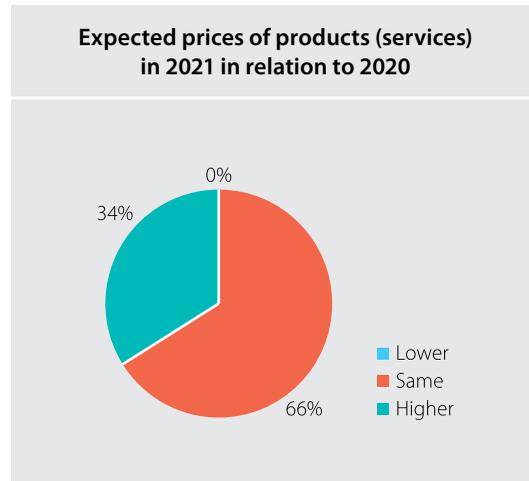


The majority of surveyed companies (60%) did not expect higher prices of production inputs (Graph 16), whereas 66% did not plan to change the prices of their products (services) in 2021 (Graph 17).

**Graph 16**



**Graph 17**

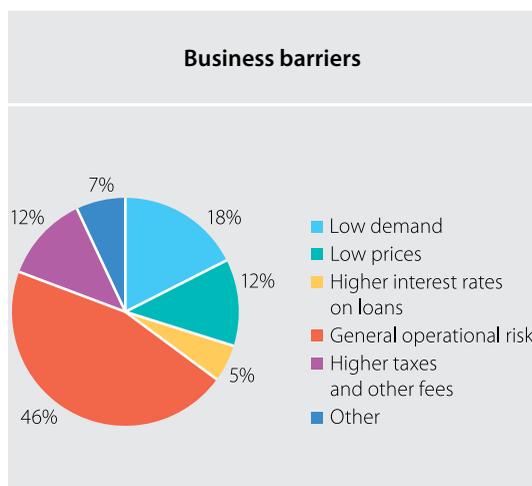


**Business Environment**

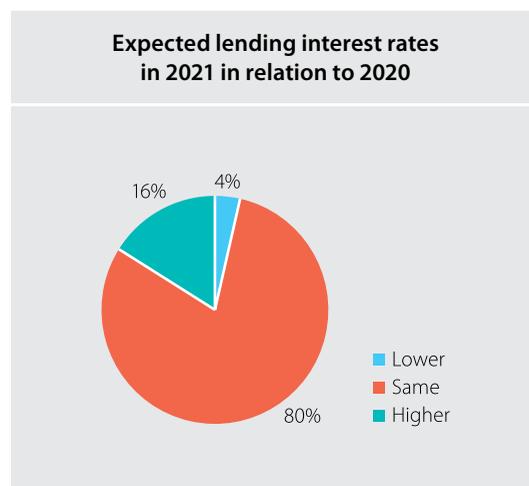
In the area of business barriers, survey results showed that most of the surveyed companies saw general operational risks (46%), low demand (18%), and high taxes and other forms of duties (12%) as main obstacles.

At the same time, 80% of surveyed companies expect the same level, 16% higher, while 4% of surveyed companies expect a lower level of lending interest rates in 2021 compared to 2020 (Graph 19).

**Graph 18**



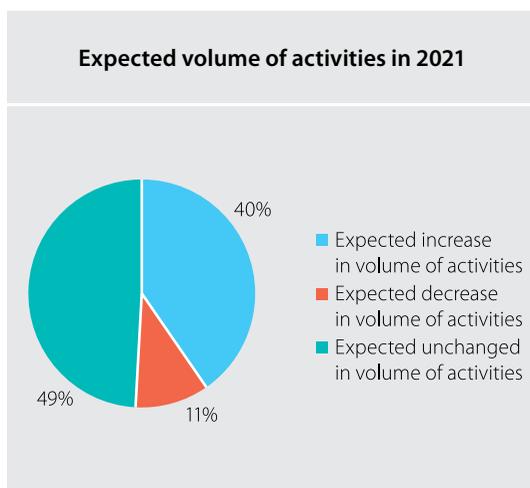
**Graph 19**



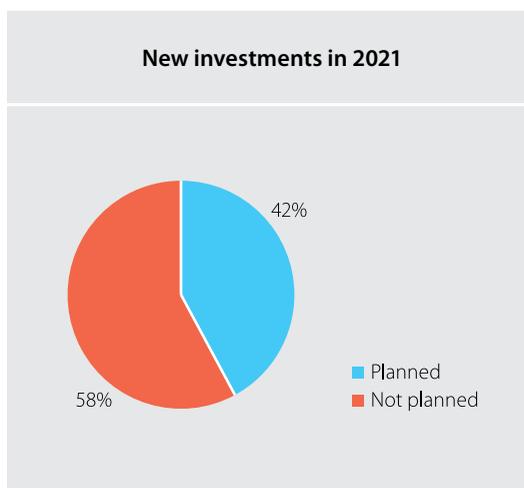
## Investments

Out of a total number of surveyed companies, 40% planned the increase in the volume of activities by the end of 2021 (Graph 20), while 42% planned new investments. (Graph 21). Most investments (67%) referred to the increase in fixed assets (Graph 22), while the biggest obstacles to new investments are insufficient utilization of existing capacities low demand, and other barriers (Graph 23).

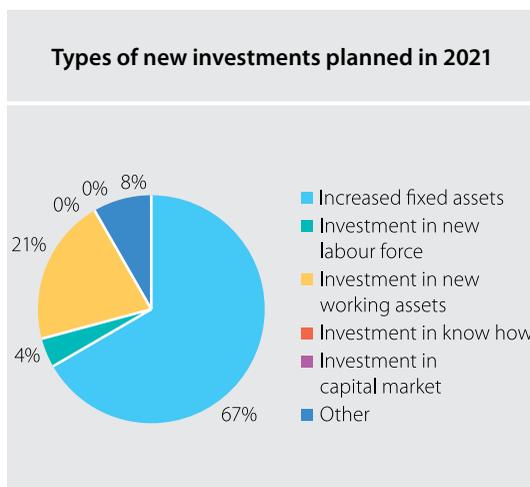
**Graph 20**



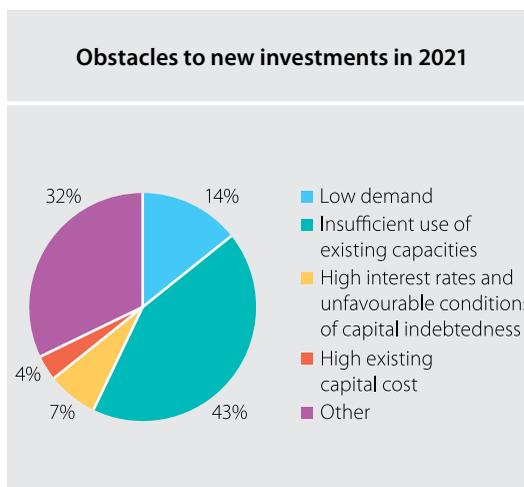
**Graph 21**



**Graph 22**



**Graph 23**

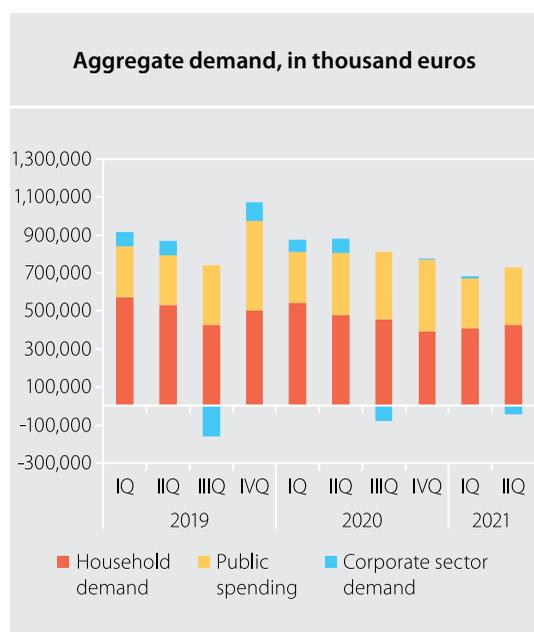


## 3. INFLATION DETERMINANTS

### 3.1. Demand<sup>4</sup>

As per preliminary data, in Q2 2021, the aggregate demand recorded mild monthly increase, yet a decline in relation to Q2 2020. Observing the structure of total demand in the second quarter of 2021, in relation to the structure from the previous quarter, the share of household demand and public spending increased, while the share of the corporate sector in total demand decreased (Graph 24).

Graph 24



Graph 25



#### Box 1 - Aggregate demand calculation methodology

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

<sup>4</sup> At the time of writing of this report, data for frozen foreign currency deposits for the second quarter of 2021 were not available.

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

$$AD = C + I + G$$

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

I = -net savings of economy (deposits – loans)

G = public spending – 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 2021, an average gross salaries in Montenegro amounted to 791 euros, while an average salaries without taxes and contributions amounted to 530 euros. Observed in relation to the previous quarter (first quarter of 2021), average gross and net wages and salaries increased by 0.3%. Compared to the second quarter of the previous year, average gross and net wages and salaries increased by 1.5% each.

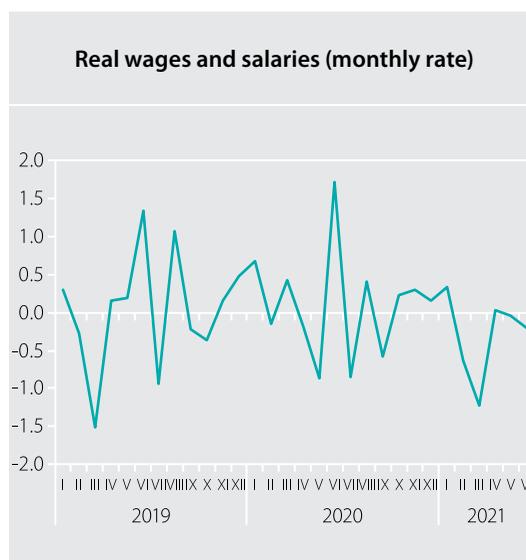
Taking into account the consumer prices, i.e. trends in wages and salaries in real amounts, it can be concluded that real wages and salaries in Q2 2021 reported decline in June, while they remained the same in April and in May.

Graph 26



Source: MONSTAT

Graph 27



Source: MONSTAT

Retail sector loans<sup>5</sup> reported positive trend in the period January-June 2021. On average per month, loans to this sector grew at a rate of 0.3% during the mentioned period, while during the same period last year they recorded an average monthly growth of 0.4%.

At the end of June 2021, total retail loans amounted to 1,415.9 million euros, which was 21.8 million euros or 1.6% more than at the end of the previous year, i.e. 24.9 million euros or 1.8% more than in same period of the previous year (Graph 28).

Debt per capita<sup>6</sup> amounted to 2,281 euros at the end of June 2021, and recorded an increase of 39.14 euros compared to the end of 2020, while compared to the same period last year it increased in the amount of 44.22 euros.

Total MFIs loans disbursed to retail sector amounted to 63.2 million euros at end-June 2021 which was by 310,000 euros or 0.5% less than at end-2020, and by 3.7 million euros or 5.5% less compared y-o-y.

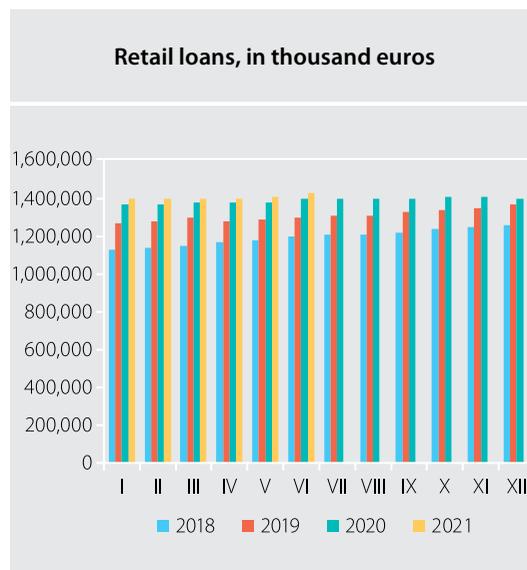
At end-June 2021, retail sector deposits amounted to 1,279.9 million euros, which is by 25.8 million euros or 2.1% more than at end-2020, or by 37.4 million euros or 3% more than in the same period of the previous year.

The loans to deposits ratio of the retail sector was 1.11 at the end of June 2021 and was unchanged compared to the end of 2020, while it was lower compared to the end of June 2020 when it was 1.12.

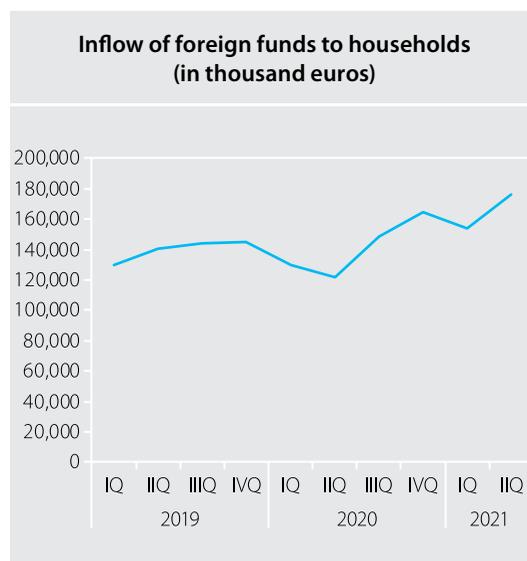
At end-June 2021, the retail sector generated a net debt in the total amount of 136.1 million euros.

In the first two quarters of 2021, compared to the same period in 2020, the balance of payments statistics recorded an increase in cash inflows based on employee compensation, as well as inflows based on total remittances from abroad (Graph 29).

Graph 28



Graph 29

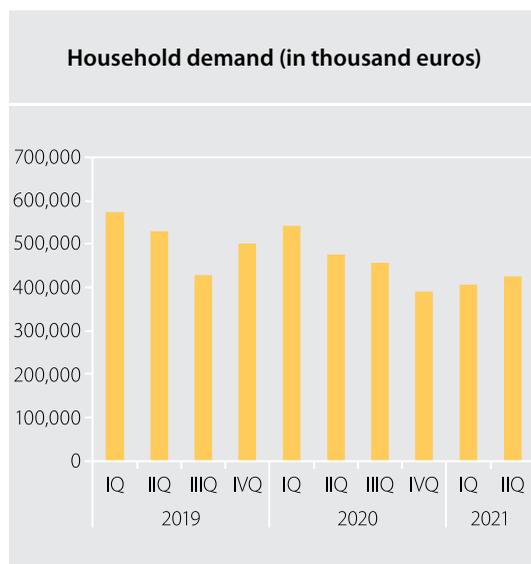


Source: CBCG

<sup>5</sup> The retail sector includes resident natural persons and entrepreneurs.

<sup>6</sup> Population estimate for 2021: Estimate as at 1 January 2021, Source: MONSTAT.

Graph 30



Looking at the total demand of the retail sector by quarters, it is noticed that the demand of the households in the second quarter of this year is higher compared to the previous quarter, and lower than the demand of the households from the second quarter of 2020 (Graph 30).

### 3.1.2. Budget analysis

According to Ministry of Finance and Social Welfare preliminary data, total revenues<sup>7</sup> of the Budget of Montenegro amounted to 846.2 million euros in the period January-June 2021.

*Source revenues* amounted to 788 million euros or 17% of projected GDP<sup>8</sup>, and compared to the plan they grew by 1.9%, and compared to the same period in 2020 were higher by 5.4%, which is a result of the easing of epidemiological measures, which limited certain economic activities. In the structure of source revenues, tax revenues accounted for the main share of 64%, followed by contributions with 30%, fees with 2.2%, other revenues with 1.6%, donations with 1%, duties and receipts from loan repayment with 0.6%, each.

Tax revenues amounted to 504.4 million euros, recording a year-on-year increase of 4.7%, yet being 6.1% above the plan. All taxes, except corporate income tax and real estate transfer tax, increased compared to the first six months of the previous year. Nominally, the largest decline in taxes compared to the comparable period last year was recorded in VAT in the amount of 20 million euros.

Revenues from contributions amounted to 236.5 million euros being 2.8% under the plan, and rising by 7.3% y-o-y.

<sup>7</sup> Revenues include source revenues (direct and indirect taxes and non-tax revenues), borrowings and loans from domestic and foreign sources, and revenues from sale of property.

<sup>8</sup> Source: Ministry of Finance and Social Welfare, Estimated GDP for 2021 amounts to 4.64 billion euros.

In the six months of 2021, *consolidated budget expenditure* amounted to 948.2 million euros or 20.5% of GDP. Compared to the plan for the first six months of the current year, the realized expenditures were lower by 7.5%, and compared to the comparable period of the previous year by 1.5% or 14 million euros.

Current budget expenditures in the observed period amounted to 414.8 million euros and were lower than planned by 8.7%, which was determined by the reduction of all items within this group of expenditures, and especially the reduction based on expenses for services. A comparison with the first half of 2020 shows a decrease of 1.3% or 5.5 million euros, with an increase in gross earnings and contributions paid by the employer (increase in the gross earnings fund in the health and education sectors) and subsidies (measures to support vulnerable categories of the population).

Capital expenditures amounted to 62.5 million euros or 1.3% of GDP.

*The cash deficit* of the Budget of Montenegro in H1 2021 was estimated to 160.2 million euros, or 3.5% of GDP.

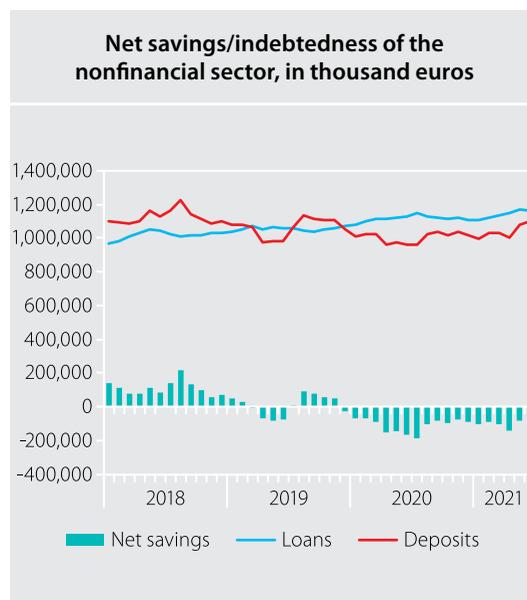
### 3.1.3. Non-financial sector<sup>9</sup>

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

At end-June 2021, loans to nonfinancial sector were higher than this sector's deposits. At end-June 2021, net indebtedness of the nonfinancial sector amounted to 61.5 million euros (Graph 31).

Long-term loans accounted for the main share of 77.4% in the structure of loans to this sector, which indicates that loans to the corporate sector were mainly used for the increase in the volume of economic activity.

Graph 31



<sup>9</sup> The non-financial sector includes state companies and private companies.

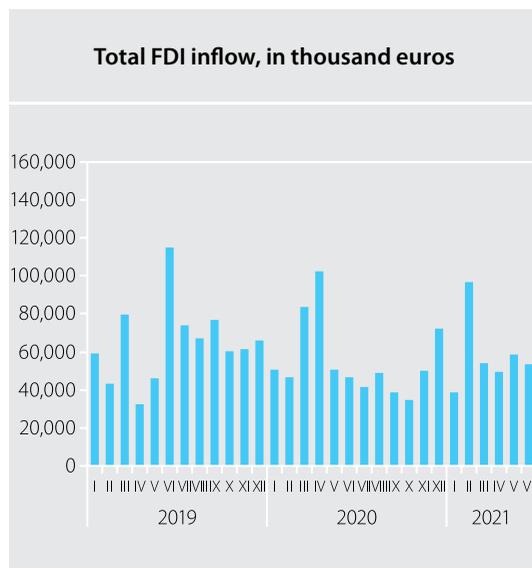
### 3.1.4. External demand and the current account

According to preliminary data, in the period January-June 2021, the current account deficit amounted to 408.7 million euros and was 36.5% lower year-on-year. The decline in the current account deficit is the result of a reduction in the foreign trade deficit, as well as an increase in the surplus on services accounts, primary and secondary income.

In the goods account, in the period January-June 2021, there was a decrease in the deficit for 9.2 million euros or 1.1%, compared y-o-y. Total visible exports amounted to 241.5 million euros, recording a 32.3% growth, while total visible imports amounted to 1.1 billion euros, recording a 4.9% growth y-o-y. In the services account, an increase of the surplus by 301.2% (to 180.7 million euros) was recorded due to the increase of revenues on this basis by 43.6%. The surplus on the primary income account amounted to 40.9 million euros, which is 12.4 million euros more than in the same period last year. This trend is the result of an increase in inflows based on the compensations to employees. In the observed period, the secondary income account run a surplus in the amount of 190 million euros, or by 69.8% more y-o-y.

Preliminary data suggests that net foreign direct investments (FDIs) inflow for the period January-June amounted to 205.6 million euros, which is a year-on-year decline of 20.7%. This trend in foreign direct investments is the result of a significantly higher outflow, as well as a decrease in inflows based on intercompany debt compared to the same period last year. Total FDI inflow stood at 349.6 million euros (fall of 7.7%), with equity investments amounting to 170.7 million euros (51.2% increase), and the inflow in the form of intercompany debt adding up to 162.6 million euros or 34.4% less y-o-y. In the structure of equity investments, investments in companies and banks amounted to 80.2 million euros (15.8% increase) while real estate investments amounted to 90.5 million euros (107.4% increase).

**Graph 32**



Source: CBCG

The inflow arising from the withdrawal of funds invested abroad amounted to 16.3 million euros. In the structure of total FDI inflow, inflow based on intercompany debt amounted to 46.5% of total FDI inflow, followed by real estate investments 25.9% and investments in companies and banks 22.9%. Total FDI outflow in January - June 2021 amounted to 144 million euros, which is 20.4% more than in the same period in 2020. In the outflow structure, outflow from residents' investments abroad amounted to 14.7 million euros, while withdrawal of non-residents' funds invested in Montenegro amounted to 129.3 million euros.

In the period January-June 2021 portfolio investments account recorded net outflow of 297 million euros, while the net outflow in the other investments account amounted to 55 million euros.

## 3.2. Supply and production

According to preliminary MONSTAT data, industrial production in the first six months of this year grew by 10.6% y-o-y. Electricity, gas and steam supply recorded output growth of 39.4%, while mining and quarrying and manufacturing industry recorded output decrease of 26% and 0.2%, respectively. Industrial production trends by quarters are shown in the Graph 33.

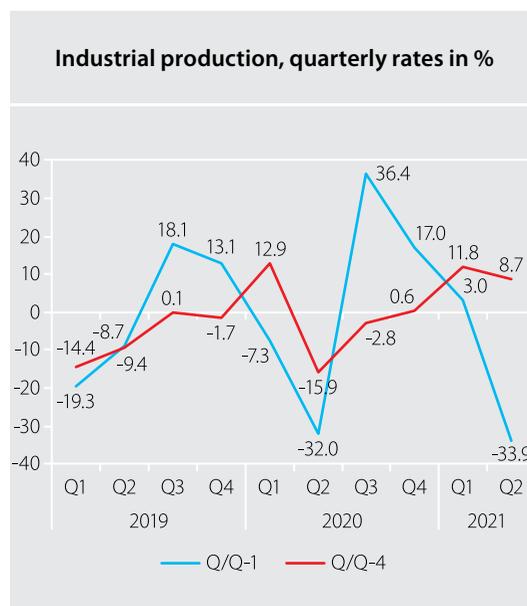
During the six months of 2021, a total of 174,360 tourists stayed in collective accommodation<sup>10</sup> establishments, which is a year-on-year increase of 61%. The number of domestic tourists arrivals in collective accommodation establishments increased by 26%, while the number of foreign tourists grew by 72.2%. Tourist overnights amounted to 549,886, which is a year-on-year increase of 115.5%.

Some 20.905 m<sup>3</sup> of forest assortments were produced in the first six months of 2021, which is a year-on-year decrease of 80.5%<sup>11</sup>.

According to preliminary Monstat data, construction recorded decline of value of executed construction works (1.3%), and an increase of effective working hours of 1.5%, compared to the same period of 2020.

In Q2 2021, according to preliminary MONSTAT data, air passenger transport recorded a year-on-year growth of 20.6%, while air cargo transport increased by 35.3%. Number of passengers in railway transport decreased by 5.2% while cargo transport fell by 34.7%. In Q2 2021, road passenger transport recorded year-on-year decrease of 17.5% , while road cargo transport increased by 0.5% y-o-y.

Graph 33



Source: MONSTAT

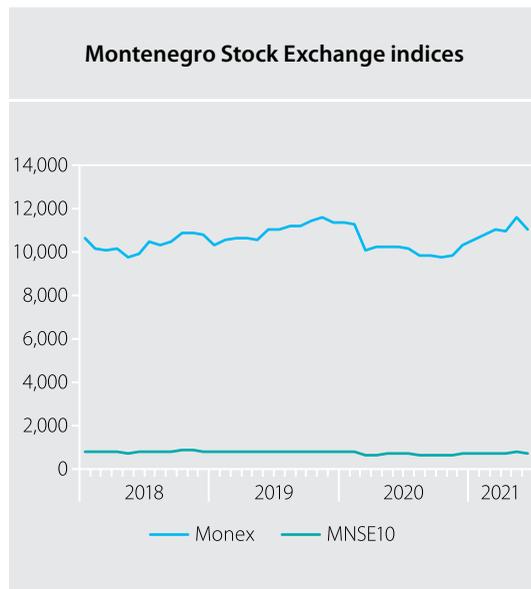
<sup>10</sup> Since 2017, MONSTAT has been publishing only monthly data on collective accommodation.

<sup>11</sup> Presented through weighted index, while presented through non-weighted index production declined by 79.6%.

### 3.3. Stock exchange indices

At the end of June 2021, the MNSE10 and Monex indices increased compared to the end of the previous year, as well as compared to the same period last year (Graph 34).

Graph 34



Source: Montenegro Stock Exchange

The SE index Monex<sup>12</sup> at the end of June 2021 amounted to 11,056.71 and recorded an increase of 728.07 index points or 7% compared to the end of 2020, while compared to the end of June 2020 it recorded an increase of 797.56 index points or 7.8%.

The MNSE10<sup>13</sup> index stood at 744.08 at end-Q2 2021 rising by 31.25 index points or 4.4% compared to the end of 2020. Compared to the same period of the previous year this index was higher by 33.89 index points or 4.8%.

<sup>12</sup> The MONEX is a benchmark Montenegro Stock Exchange index aimed at providing a more precise description of the share price trends in the official and in 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.

<sup>13</sup> The MNSE10 is the blue-chip index at the Montenegro Stock Exchange and it is aimed at providing a more precise description of the price trends of the most representative shares in the official and the free market of the Montenegro Stock Exchange AD Podgorica. It includes the top ten companies in the Montenegrin market.

## 4. MONETARY POLICY

In the period January - June 2021, there were no changes to the existing decisions, nor were new ones passed regarding the Central Bank of Montenegro monetary policy instruments.

## 5. INFLATION FORECAST FOR TWO QUARTERS OF 2021 AND TWO QUARTERS OF 2022

### 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 consequently reflected in the inflation rate trend (increase in energy prices, increase/decrease in the foreign trade deficit, and the like).

Fan Chart graph for the last two quarters of 2021 and the first two quarters of 2022 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 uncertainty degree ratios are obtained through analytical assessment and calculation of the 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 inflation chart - ARIMA model for two quarters of 2021 and two quarters of 2022*

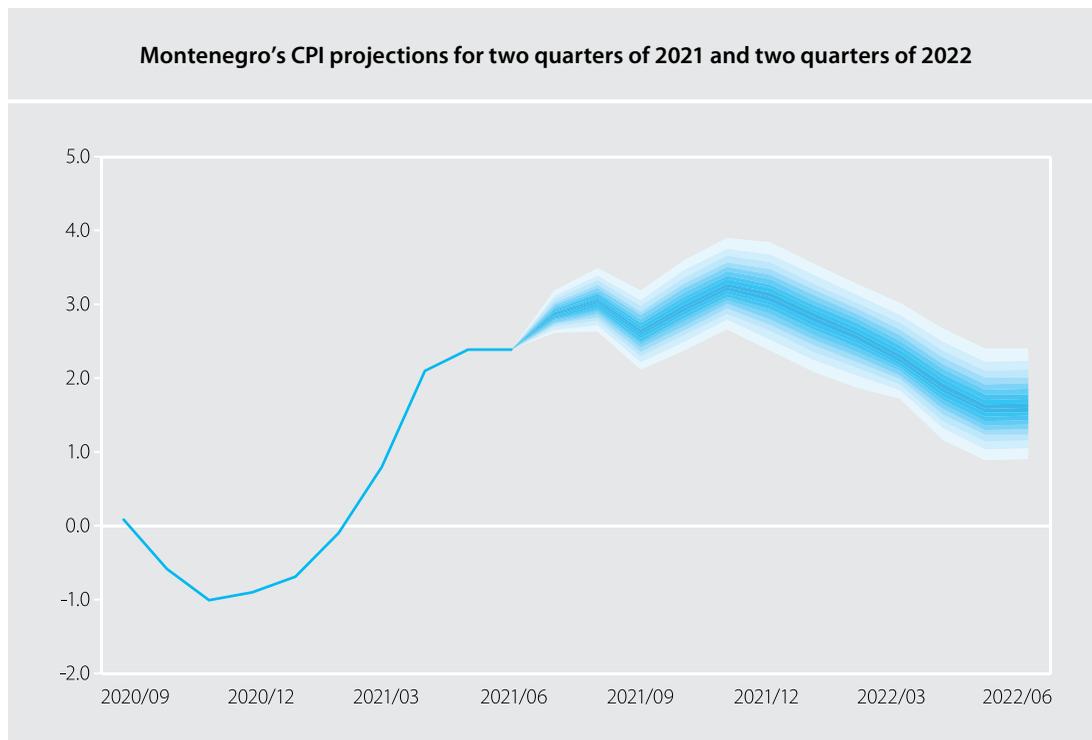
With a view to developing a fan chart, an ARIMA (Autoregressive Integrated Moving Average) model of time series of inflation of Montenegro presented via Consumer Price Index<sup>14</sup> was developed.

<sup>14</sup> A detailed explanation of the ARIMA model of Montenegro was presented in the working study of the Central Bank No. 11 “Inflation Forecast”. Empirical research on the retail price index trend of Montenegro for 2007 - applying the ARIMA model.

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 (3, 1, 2)<sup>15</sup> has sufficient confidence level for forecasts.

The monthly forecast value was used as the value of central projection of the CPI graph for last two quarters of 2021 and first two quarters of 2022. Obtained values represent the distribution mode, i.e. values with the highest frequency in the distribution of this time series.

**Graph 35**



Source: CBCG, 2021

Mean value of the obtained model is 2.5. The value of the coefficient of asymmetry varies in the range of 0.5 to 1, and the relative standard deviation is 0.25. Model projection of inflation is located in the central span of the distribution. This indicates that the corresponding range of uncertainty of future inflation is symmetrical. The fan chart describes 90% probability of inflation distribution. The central projection is usually in the deepest shade of the fan chart, i.e. in the central 10% of probability<sup>16</sup>. The fan chart has an equal number of bands (eight) on either side of the central band whereby every band

<sup>15</sup> 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.

<sup>16</sup> 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)

of the same colour, both above and below the central band, cumulatively describes the next 10% of inflation trend probability. As uncertainty grows over time, the fan chart spreads.

The fan chart of inflation in Montenegro, based on the ARIMA model assessment for the last two quarters of 2021 and two quarters of 2022, indicates that there is a *90% probability that the CPI inflation will range between 1% and 3.9%, depending on the month, with the central projection of 2.55%. At the same time, inflation for December 2021 is forecasted to range between 2.4% and 3.84%, with the central trend of 3.1%.* The Fan Chart central projection (the darkest part) represents a 10% probability span (Graph 35).

The projected growth of the inflation rate in 2021 mainly reflects the base effect, i.e. the weakening effect of a significant drop in oil prices in 2020, caused by the reduction of global oil demand during the pandemic. The risks related to the projected inflation rate shown on the fan chart are set symmetrically. Risks in terms of achieving the projected inflation rate relate to the oil and food prices trend. Also, the prices trend in the following period will be affected by the pace of recovery of domestic demand.

#### **The projection was based on the following assumptions:**

1. After a plunge on the international market in 2020, international institutions expect the oil prices to return to the pre-crisis level. The expected rise in oil prices will largely affect the increase in inflation this year. However, this growth will be only temporary as a reduction of crude oil futures prices is expected in 2022.
2. The projection assumes mild inflationary pressures coming from our major trading partners. In the projected period, we primarily expect inflationary pressures from the euro area. According to the ECB's<sup>17</sup> forecasts from June, the average inflation in the euro area will amount to 1.9% this year, and in the fourth quarter, it will reach a maximum level of 2.6%. The inflation growth in 2021 is, for the most part, attributed to factors that have a temporary impact and are related to the pandemic, i.e. to the supply-side disruptions and so-called „lockdowns“. The ECB's expectations indicate that inflation will gradually decrease in the next two years, and that next year inflation will reach the level of 1.5%, and in 2023 the level of 1.4%. In most countries in the region, inflation is also projected to grow this year, while it is expected to slow down next year.
3. In this projection period, we expect an increase in food prices due to the expected growth in the prices of primary agricultural products on the international market. The projection assumes an increase in the prices of domestic food and agricultural products by up to 15%.
4. Pursuant to the Law on Excise Taxes, the excise duties on tobacco and tobacco products, alcohol and alcoholic beverages, carbonated beverages with added sugar, as well as excise duties on sugar, cocoa and ice cream products will be increased.
5. Real estate price growth of up to 10% due to the announced increase in the price of construction materials.

Deviation of any of the abovementioned parameters would require the forecast adjustment.

<sup>17</sup> Source: ECB (2021): ECB staff macroeconomic projections for the euro area, June 2021.

## 6. EXPECTED INFLATION IN 2021

This year's inflation is already higher than that recorded last year. This is mainly due to external factors but inflation is not significantly different from in other economies in transition. At the global level, inflation this year was mostly influenced by the growth of prices of oil and oil derivatives, food products and a number of stock exchange products.

As we stated in the previous Report, there are many dilemmas and there is still a high degree of uncertainty. The dilemma remains whether this is only a temporary rise in inflation or an announcement of acceleration, whether it is a consequence of many years of expansionary monetary policies or the result of rising demand, why consumer prices are rising faster than services, and the like. All forecasts at the global level indicate that inflation will be higher this year in relation to the previous. For example, in the EU, which has struggled with inflation below the targeted for years, according to the Eurostat estimates, it reached a level of 3% in August, which is over 50% higher than the inflation rate target.

When it comes to inflation expectations of both banks and surveyed companies in Montenegro, their common feature is that inflation is expected to rise. However, there are quite divergent expectations regarding the expected level of inflation, which is a common occurrence when there is a high degree of uncertainty and the absence of adequate past experiences.

Data from the first half of the year indicate that significant economic growth has been achieved. On one hand, it could affect demand growth that could encourage inflation growth, while a growing supply of goods could have disinflationary impact on the other hand.

The model estimate projects inflation within the 2.4% and 3.84% range, with the central projection at 3.1%. Our expert assessment is similar and it projects annual inflation between 2% and 4%, with the central projection at 3%.

**Table 3**

Estimated inflation rate at end-2021		
Lower threshold	Central projection	Upper threshold
2%	3%	4%

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