

INFLATION REPORT QUARTER I, 2020

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1. INFLATION INDICATORS

Compared to December 2019, CPI inflation in Montenegro in March 2020 amounted to -0.4%, mostly as the result of declining prices in the categories of transport (-4.8%) and clothing and footwear and housing, water, electricity, gas and other fuels (by -1% each) (Table 2). The consumer prices monthly trend shows that the price decrease was present in February and March (of respective -0.1% and -0.3%), while prices grew in January (by 0.1%). Average consumer prices rate (the first three months of 2020 in relation to the same period of 2019) amounted to 0.8%, while prices in March 2020 remained unchanged compared y-o-y.

Table 1

Inflation, %					
	2019				2020
	III	VI	IX	XII	III
Change in relation to the previous year-end	0.7	0.3	0.4	1.0	-0.4
Annual change	0.8	-0.1	-0.2	1.0	0.0

Source: MONSTAT

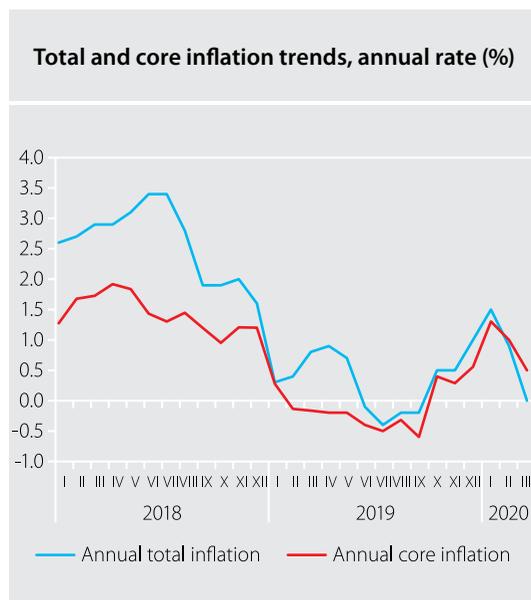
Compared to December 2019, six out of twelve categories that make up 47.9% of the consumer basket recorded prices decline in Montenegro in March 2020. The highest price increase was recorded in *transport* (-4.8%), contributing to the highest decrease of -0.5 percentage points in total inflation decline. The decline in this category also resulted from the significant decline in the prices of fuels and lubricants for personal transport equipment (-9.6%) because of the oil prices fall at the international market caused by the Covid-19 pandemic. During this reporting period, the following categories also recorded price decline: *furnishing, household equipment and routine household maintenance* (-1.3%), *clothing and footwear*, and *housing, water, electricity gas and other fuels* (by -1% each), *miscellaneous goods and services* (-0.7%) and *hotels and restaurants* (by -0.6%). Prices under *alcoholic beverages and tobacco* category recorded the highest price increase (2.4%) due to a rise of 3.3% in the prices of tobacco resulting from the increased excise duties early this year. Prices also increased in *food and non-alcoholic beverages* (1.1%), *health* (0.9%) and *recreation and culture* (0.4%). Compared to December 2019, prices under *communication* and *education* remained unchanged in March 2020.

Table 2

Share of selected categories in total inflation ¹				
	Weights	III 20 / XII 19	Growth rate	Contribution
TOTAL	1000	99.6	-0.4	-0.4
Food and non-alcoholic beverages	341.1	101.1	1.1	0.4
Alcoholic beverages and tobacco	40.4	102.4	2.4	0.1
Clothing and footwear	86.1	99.0	-1.0	-0.1
Housing, water, electricity gas and other fuels	154.0	99.0	-1.0	-0.2
Furnishing, household equipment and routine household maintenance	39.4	98.7	-1.3	0.0
Health	40.8	100.9	0.9	0.0
Transport	109.4	95.2	-4.8	-0.5
Communication	48.5	100.0	0.0	0.0
Recreation and culture	32.0	100.4	0.4	0.0
Education	18.7	100.0	0.0	0.0
Restaurants and hotels	47.6	99.4	-0.6	0.0
Miscellaneous goods and services	42.0	99.3	-0.7	0.0

Source: MONSTAT and CBCG calculations

Graph 1



Source: MONSTAT and CBCG calculations

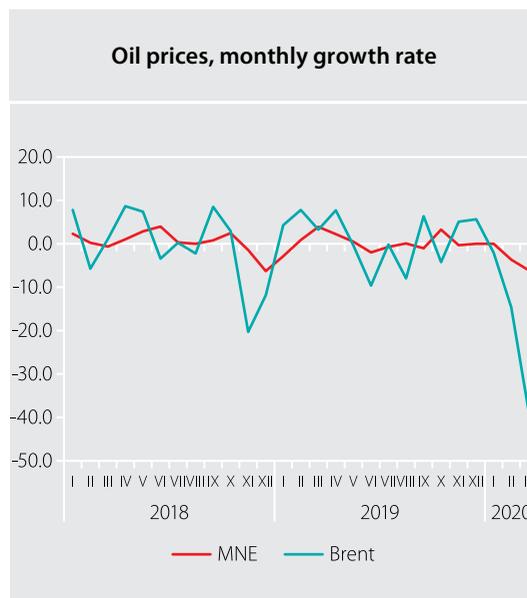
During the first quarter, the *monthly core inflation* in January and March 2020 was slightly higher than official monthly inflation. However, it remained at the official monthly inflation in February. Core inflation had a positive rate during January, while it was negative in February and March, the same as the official monthly inflation.

The *annual core inflation rate* in March 2020 amounted to 0.5% and was by 0.5 percentage points higher than total inflation. Annual core inflation was below total inflation in January, whereas it was higher than total inflation in February and March, maintaining the positive rate throughout the whole Q1 (Graph 1).

¹ Note 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 or the third decimal.

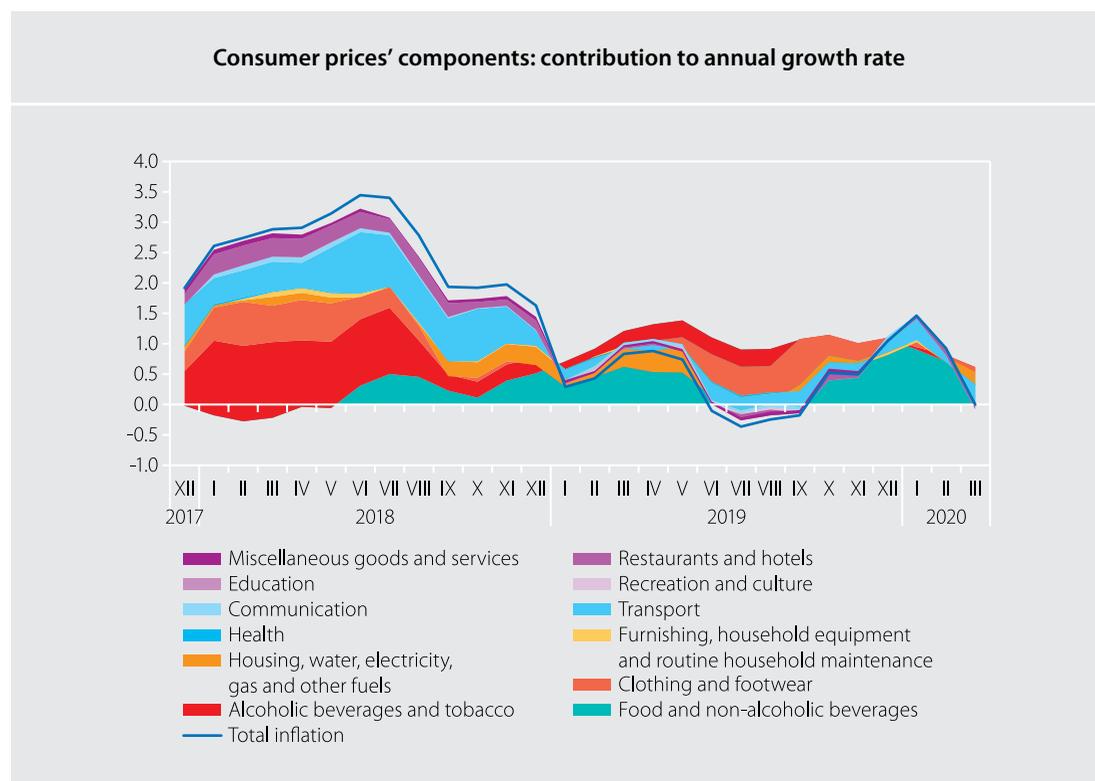
Oil demand dropped significantly in Q1, according to World Bank estimates², by two-thirds of total demand, due to the measures against the global spread of the pandemic that affected travel and transportation. The average price of the OPEC reference basket in Q1 2020 amounted to 51.5 USD/barrel, which is a decrease of 18.4% in relation to Q4 2019. The average price of Brent in Q1 was 50.2 USD/barrel, which is 20.7% less in relation to the price recorded in Q4 2019. The latest World Bank report³ projected the oil price in 2020 to average to 35 USD/barrel, and 42 USD/barrel in 2021.

Graph 2



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

Graph 3



Source: MONSTAT and CBCG calculations

² "Commodity Markets Outlook" - April 2020

³ The World Bank - "Commodity Markets Outlook" - April 2020

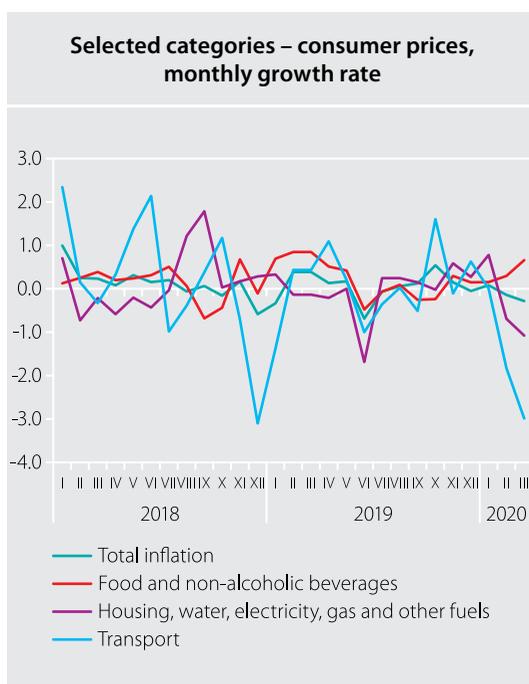
Graph 4



Source: MONSTAT

In March 2020, consumer prices remained at the March 2019 level. The annual price growth in the food and non-alcoholic beverages category of 1.5% contributed most to the growth (of 0.5 percentage points) to the overall annual inflation rate. On the other hand, the decline in prices under transport of 3.3% recorded the highest negative contribution (-0.4 percentage points). Annual price growth was also reported in *alcoholic beverages and tobacco* (2.5%), *hotels and restaurants* (1.2%), *health* (0.7%), and *education and miscellaneous goods and services* (0.1% each). Prices drop was recorded in *housing, water, electricity gas and other fuels* by -1.5%, *clothing and footwear* by -0.8%, *recreation and culture* by -0.6%, and *furnishing, household equipment and routine household maintenance* by -0.4%.

Graph 5



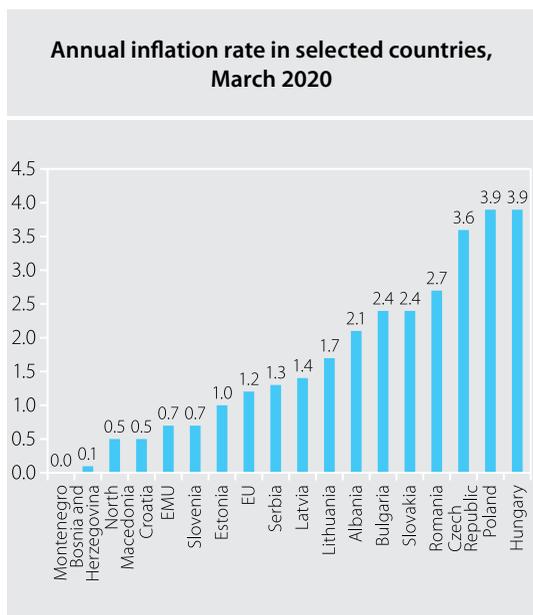
Source: MONSTAT

Compared to December 2019, **producers' prices of manufactured products** recorded -0.6% decline in March 2020 due to the price decline in mining and quarrying and manufacturing industry sectors of respective -2.6% and -0.2%. Prices under electricity, gas and steam supply sector remained unchanged. At the annual level, producers' prices of manufactured products increased by 1.1%.

Comparison of annual inflation recorded in Montenegro with inflation recorded in selected countries in March shows that, except for Montenegro's zero rate, all selected countries recorded positive annual rates. The highest positive annual inflation rate was recorded in Poland (3.9%) while Bosnia and Herzegovina recorded the lowest positive annual inflation rate (0.1%).

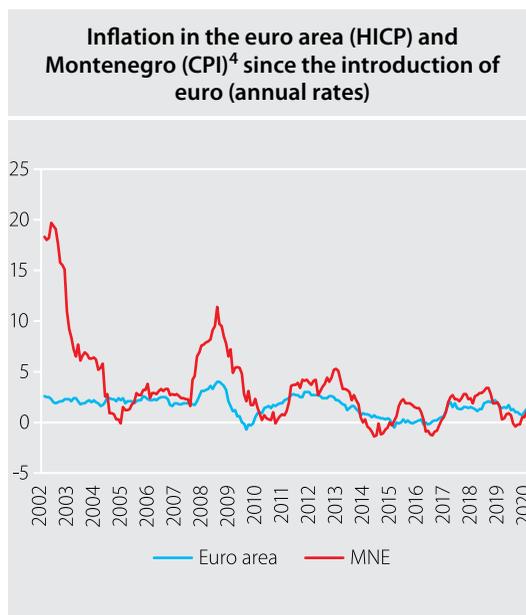
The annual HICP inflation rate reported in the euro area amounted to 0.7%, CPI inflation in Montenegro amounted to 0.0%, while annual HICP inflation in Montenegro was -0.2%.

Graph 6



Source: National statistical offices and Eurostat

Graph 7



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

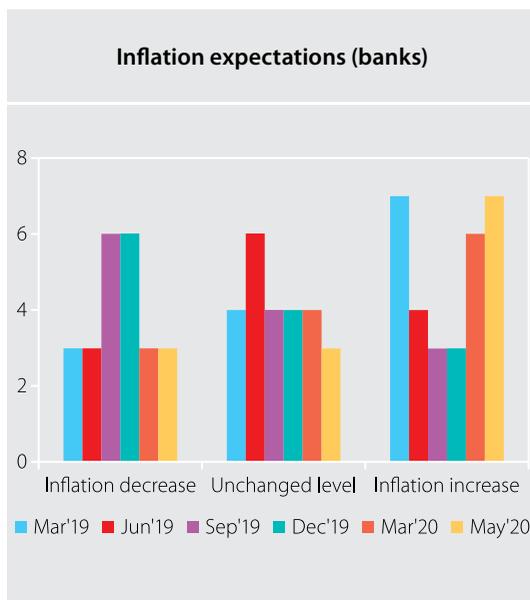
2.1. Banks' expectations

Concerning inflation expectations of banks, based on the May 2020 survey, seven banks expect inflation to grow, while three banks each expect inflation at the same level or lower inflation in 2020 in relation to 2019 (Graph 8).

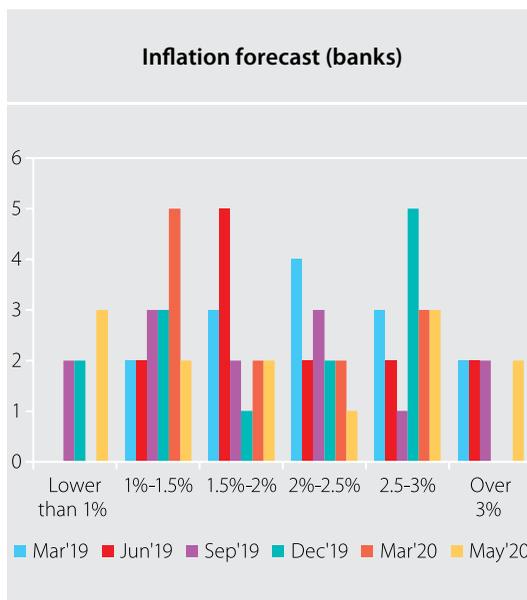
The expectations concerning inflation levels in 2020 varied among banks. Three banks expect inflation rate lower than 1%, and the same number of banks expected inflation between 2.5% and 3%. Two banks each expected inflation between 1% and 1.5%, between 1.5% and 2% and above 3%, while one bank expects inflation between 2% and 2.5% (Graph 9).

Concerning the expectations regarding the nominal lending interest rate trends in 2020, six banks expect this rate to grow, seven banks expect it to remain at the same level, and none of the banks expects the nominal lending interest rate to decline. The banks' expectations regarding the effective interest rates are the same.

Graph 8

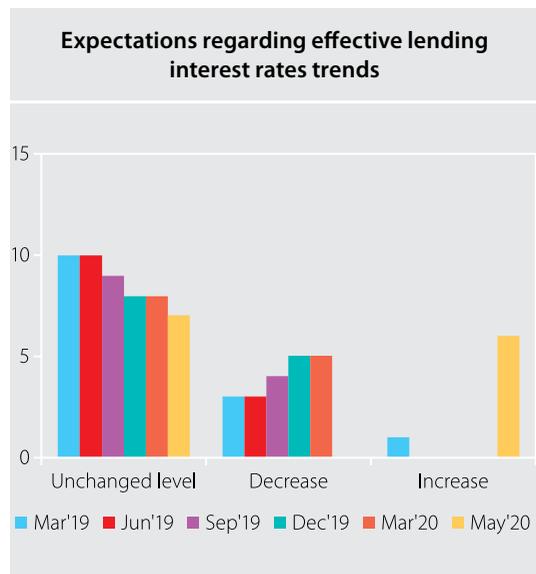


Graph 9

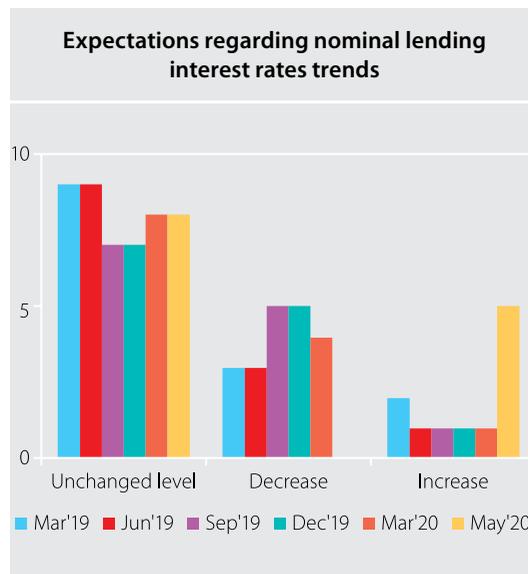


Concerning deposit interest rates trends, eight banks expect no change, five banks expect growth, while none of the banks expects a decrease in deposit interest rates.

Graph 10



Graph 11



To calculate inflation forecast, 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 forthcoming period, and *vice versa*. However, if its value is zero, an unchanged inflation rate can be expected in the upcoming period. The more negative the value, the lower the inflationary forecast shall be. Vice versa, higher positive value means higher inflationary forecast. During most of the previous year, inflation expectations were declining, while they increased during the first five months of 2020.

Graph 12

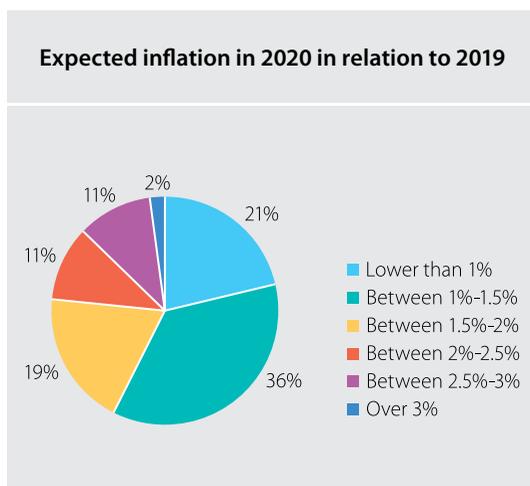


2.2. Expectations of economy (except banks)

Inflation

In the total number of surveyed companies, majority (36%) expected the inflation in 2020 to range between 1% and 1.5%. Some 21% expected inflation below 1%, while 19% of surveyed economic entities expected the inflation to range between 1.5% and 2%. Some 11% each expects respective inflation between 2% and 2.5%, and between 2.5% and 3%. Only 2% of the surveyed companies expected it to be above 3% (Graph 13).

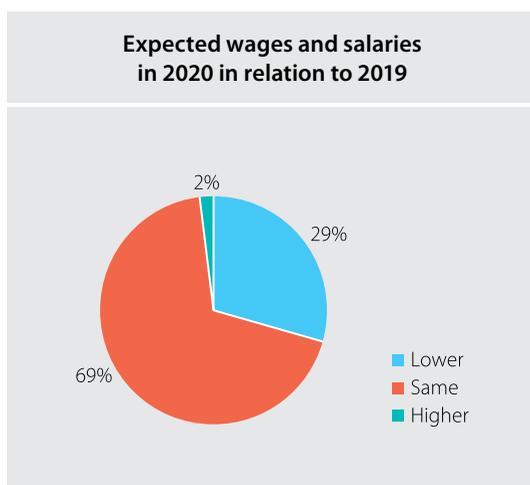
Graph 13



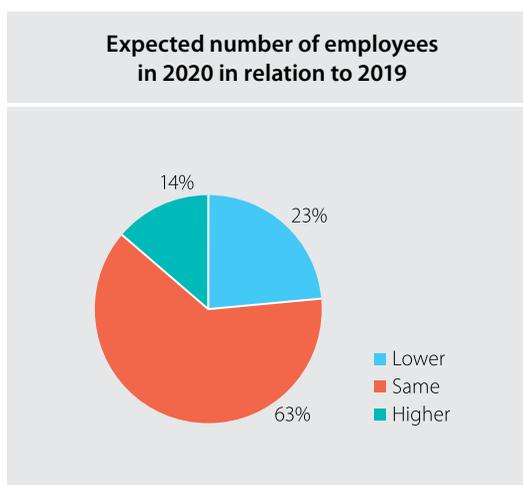
As much as 69% of surveyed companies expect wages and salaries to remain unchanged in 2017, 29% of the surveyed companies expect them to decline, while only 2% expect wages and salaries to increase. Concerning the number of employed persons, 63% of surveyed companies expected it to remain unchanged, 23% expected this number to decrease, and 14% expected it to decrease in relation to the previous year.

The majority of surveyed economic entities (60%) did not expect changes in the prices of production inputs, whereas 64% did not plan to change the prices of their products (services) in 2020.

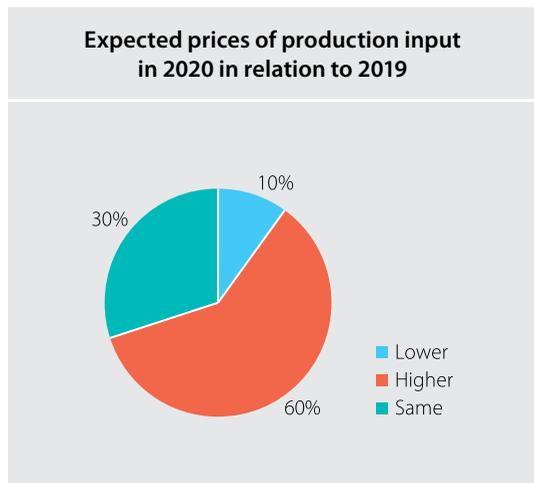
Graph 14



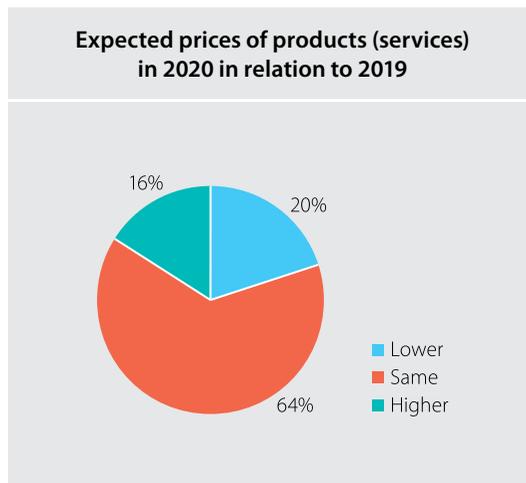
Graph 15



Graph 16



Graph 17

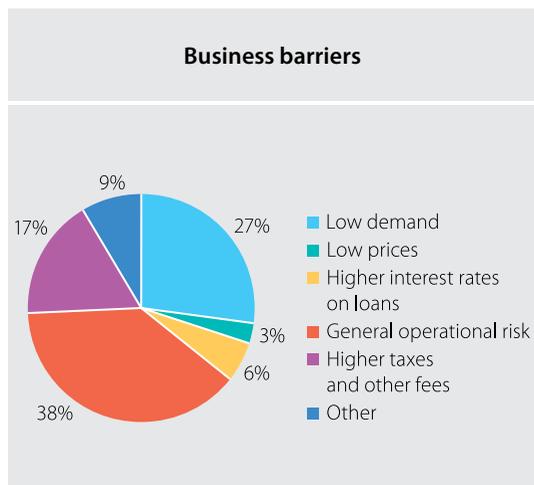


Business Environment

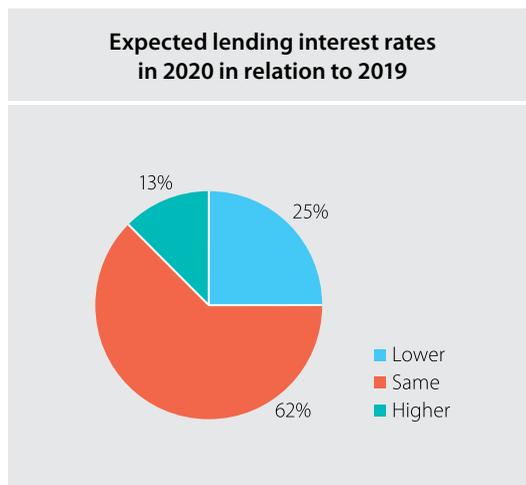
In the area of business barriers, survey results showed that most of the surveyed companies saw general operational risks (38%), low demand (27%), and high taxes and other forms of duties (17%) as main obstacles.

As far as lending interest rates are concerned, 62% of surveyed companies expected unchanged levels, 25% expected them to decline, while 13% expected higher lending interest rates in 2020 relative to 2019.

Graph 18



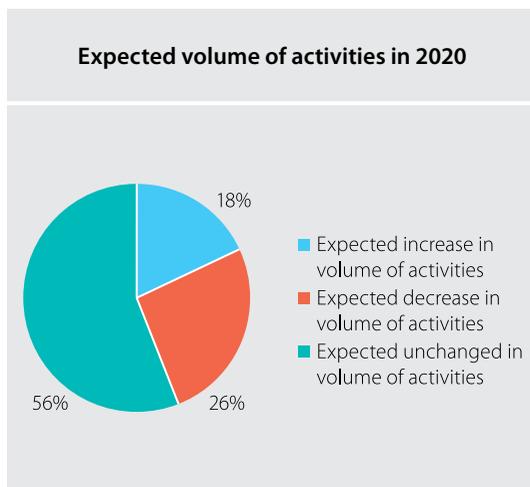
Graph 19



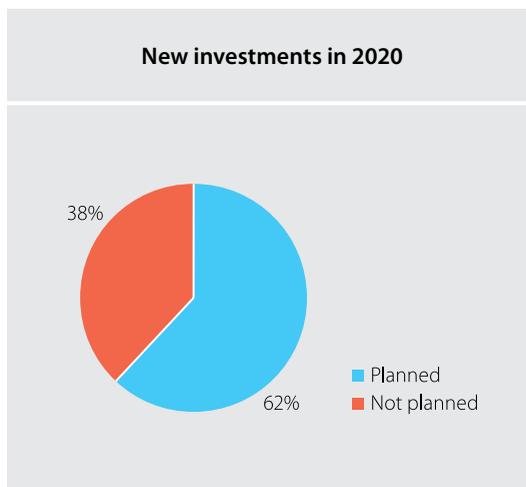
Investments

Out of a total number of surveyed companies, 56% did not plan to change the volume of activities in 2020, while 62% planned new investments. Most investments (47%) referred to increasing fixed assets. Concerning the main barriers to new investments, the surveyed entities stated the following: insufficient exploitation of existing capacities, low demand, and other barriers.

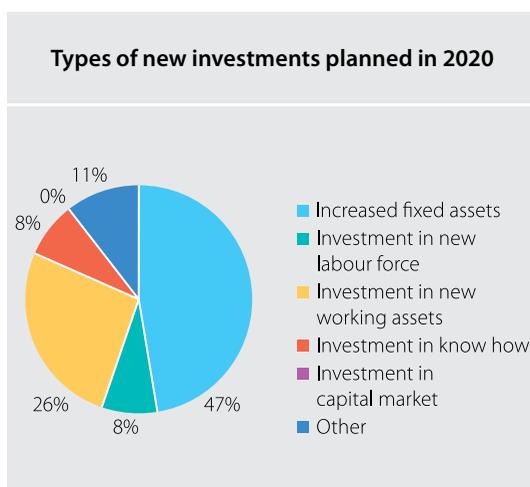
Graph 20



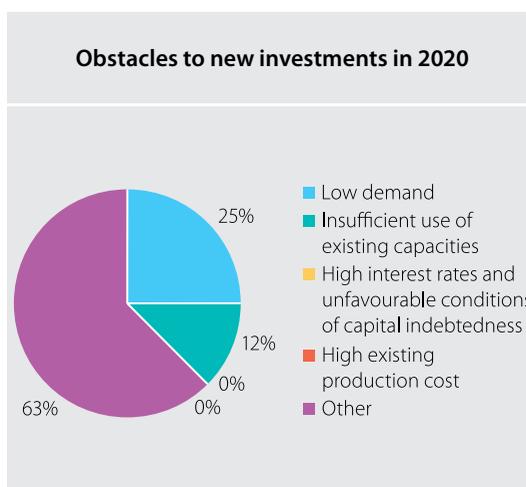
Graph 21



Graph 22



Graph 23

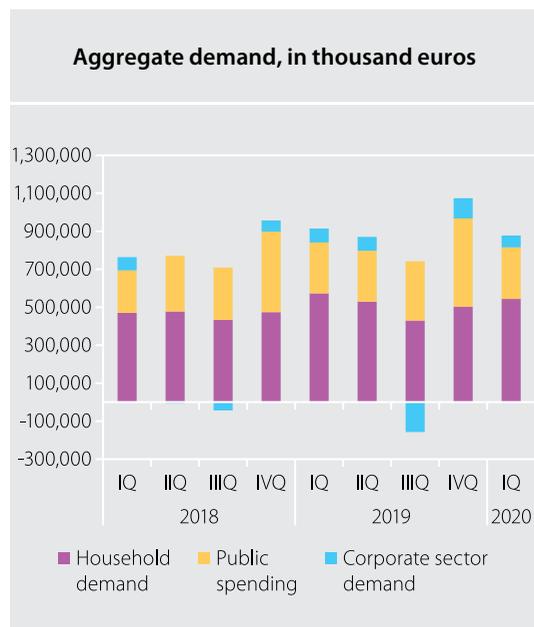


3. INFLATION DETERMINANTS

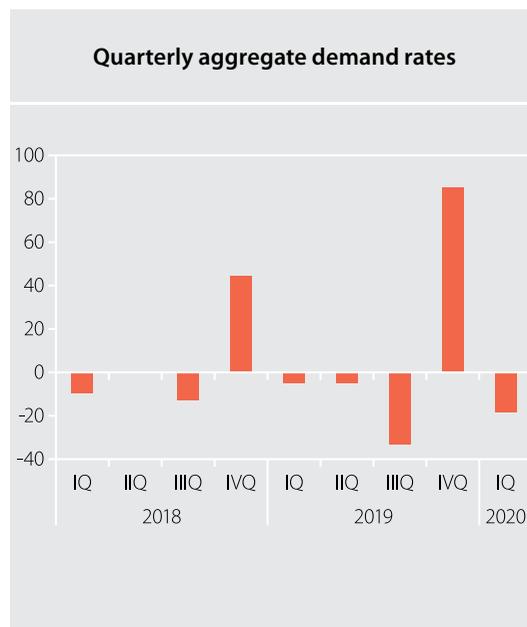
3.1. Demand

According to preliminary data, aggregate demand in Q1 2020 recorded quarterly and the year-on-year decline. The total demand structure in Q1 2020 compared to the previous quarter structure shows an increased household demand, yet a decline in public spending and corporate sector demand.

Graph 24



Graph 25



Box 1 - Aggregate demand calculation methodology

For more complete monitoring of aggregate demand as an inflation determinant, the CBCG has developed the aggregate demand calculation methodology. The starting point of this methodology is 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 an indicator of the aggregate demand exact amount, 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. The following equation expresses the methodology of aggregate demand calculation:

$$AD = C + I + G$$

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)

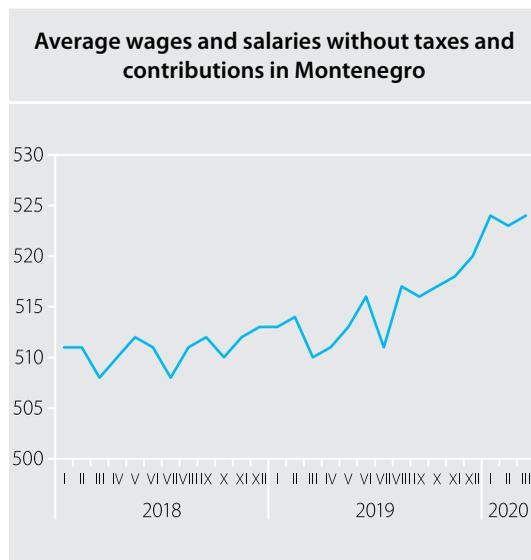
AD – aggregate demand, C – personal spending, I – investment spending, G – public spending

3.1.1. Salaries and other available demand determinants

In Q1 2020, an average gross salary in Montenegro amounted to 786 euros, while an average salary without taxes and contributions amounted to 524 euros. Compared to Q4 2019, the average gross and net wages and salaries increased by 1%, respectively. Compared y-o-y, the average salary and the average salary without taxes and contributions rose by 2.2% and 2.3%, respectively.

If we take into account the consumer prices, i.e. the wages and salaries trend observed in real terms, it can be concluded that real wages and salaries increased in the first and third month, while they declined in the second month of Q1 2020.

Graph 26



Source: MONSTAT

Graph 27



Source: MONSTAT

Borrowing to the household sector⁵ was marked by a positive trend in Q1 2020. At the end of the observed period, total retail sector loans amounted to 1,370.3 million euros, or by 12.6 million euros or 0.9% more than at end-2019, i.e. by 83.1 million euros or 6.5% more than in the same period of 2019 (Graph 28). The average monthly growth of loans granted to this sector was 0.3%, while the growth at the average rate of 14% was recorded in the same period of 2019.

At end-March 2020, debt per capita⁶ amounted to 2,203.5 euros, recording an increase of 21.3 euros in relation to end-2019, and a y-o-y increase of 134.6 euros.

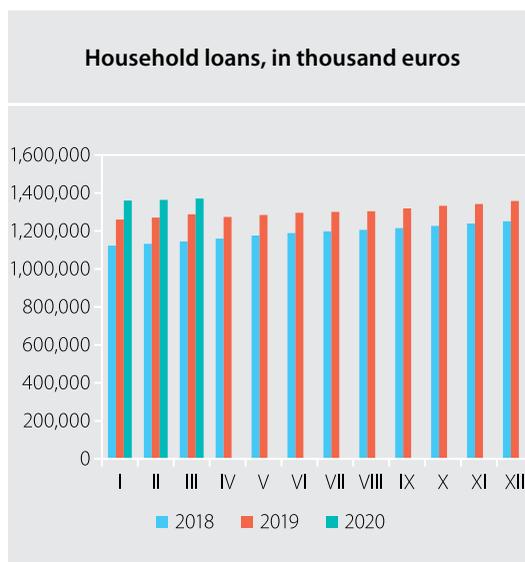
Total MFIs loans disbursed to households amounted to 65.6 million euros at end-March 2020, which was 1.4 million euros or 2.2% more than at the end of 2019, and 3.3 million euros or 5.1% higher compared y-o-y.

At end-March 2020, household deposits amounted to 1,249.9 million euros, which is by 66.6 million euros or 5.1% less than at the end-2019, or by 671,000 euros (0.1%) more than in the same period of the previous year.

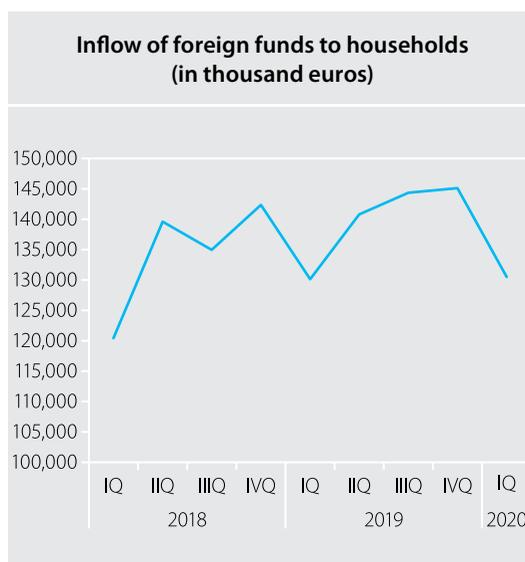
At end-March 2020, loans to deposits ratio for this sector amounted to 1.1 being higher compared to end-2019 when it stood at 1.04, as well as compared y-o-y when it amounted to 1.03. At the end of Q1 2020, the household sector had a net debt⁷ to banks of 120.4 million euros, which was by 82.4 million euros more compared y-o-y.

The balance of payments statistics for Q1 2020 reveals a mild decline in the inflow of monetary resources arising from compensations to employees, whereas the inflow from remittances re-

Graph 28



Graph 29



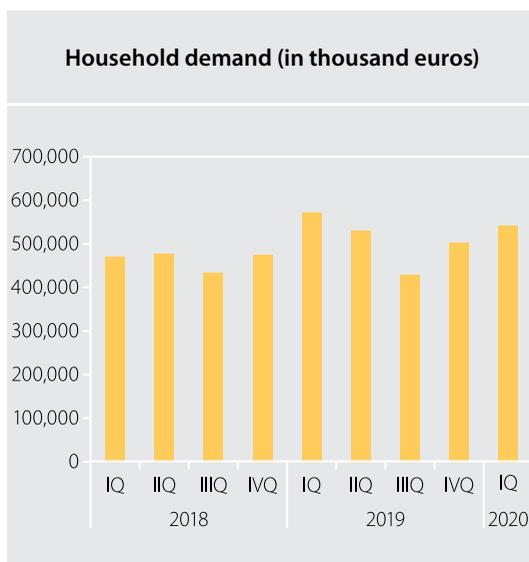
Source: CBCG

⁵ The retail sector includes resident natural persons and entrepreneurs.

⁶ Population estimate for 2020: Estimate as at 1 January 2020 amounts to 621,873. Source: MONSTAT

⁷ The difference between taken loans and deposits in banks.

Graph 30



mained at nearly the same level compared to Q1 2019.

Observation of the total retail sector demand by quarters shows that household demand in Q1 2020 was higher compared to the previous quarter yet lower compared y-o-y.

3.1.2. Budgetary analysis

According to Ministry of Finance preliminary data, total revenues⁸ of the Budget of Montenegro amounted to 419.9 million euros in Q1 2020.

Source revenues amounted to 375.2 million euros or 8.1% of estimated GDP⁹, and they increased by 2.4% in relation to the plan, and showed a year-on-year increase of 1%. In the structure of source revenues, tax revenues accounted for the main share of 66.3%, followed by contributions with 27.5%, other revenues with 2.1%, donations with 1.6%, fees with 1.5%, duties with 0.6%, and receipts from loan repayment with 0.4%.

Tax revenues amounted to 248.6 million euros, recording a year-on-year increase of 3.8%, and were 2.5% above the plan. All taxes except corporate income tax and other state taxes recorded an increase compared to the three months of 2019. In nominal terms, the highest growth of revenues in relation to the previous year was recorded in excise duties in the amount of 7.4 million euros or 17.7% as the result of an increased collection of excise duty on tobacco.

Revenues from contributions amounted to 103.2 million euros being 4.2% above plan, and recording year-on-year growth of 3.8%.

In the three months of 2020, *budget expenditure* amounted to 451.5 million euros or 9.8% of GDP. Compared to the plan for three months of 2020, the expenditures were lower by 20.8%, yet being

⁸ Revenues include source revenues (direct and indirect taxes and non-tax revenues), borrowings and loans from domestic and foreign sources, and revenues from the sale of property.

⁹ Source: Ministry of Finance; estimated GDP for 2020 amounts to 4.61 billion euros.

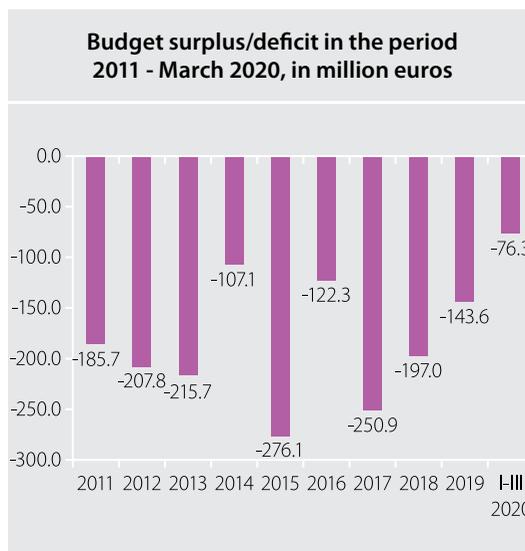
higher by 2% or 8.9 million euros y-o-y, mainly due to the increased transfers to the institutions, individuals, NGOs and the public sector.

During the observed period, current budget expenditures amounted to 201.4 million euros and were lower than planned by 16.3%. Compared y-o-y, they increased by 7.6% or 14.2 million euros due to decreased gross wages and contributions paid by the employer.

Capital expenditures amounted to 26.2 million euros or 0.6% of GDP.

Montenegro's fiscal deficit for the first three months of 2020 was estimated at 76.3 million euros or 1.7% of GDP.

Graph 31



Source: Ministry of Finance

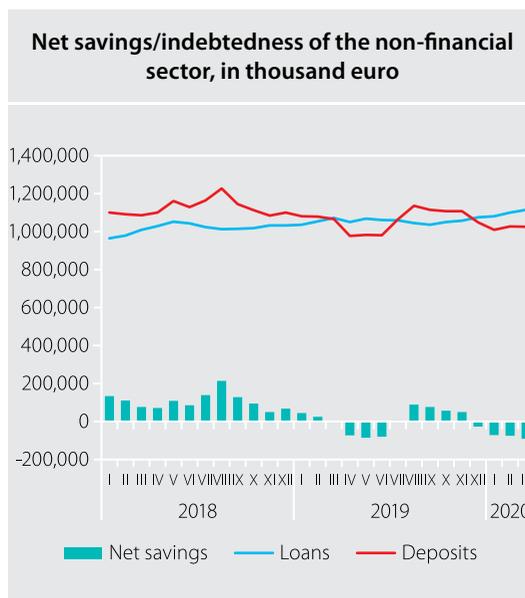
3.1.3. Non-financial sector¹⁰

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

At end-March 2020, loans to non-financial sector were higher than this sector's deposits. At end-Q1 2020, net savings of the non-financial sector amounted to 90.5 million euros. At end-Q1 2019, the net debt of the non-financial sector was lower and amounted to 5.7 million euros. (Graph 32)

At end Q1 2020, long-term loans accounted for the main share of 76.7% in the structure of corporate sector loans, which indicates that loans to this sector were mainly used for increasing economic activity volume.

Graph 32



¹⁰ The non-financial sector includes state companies and private companies.

3.1.4. External demand and the current account

Preliminary data show that the current account deficit in Q1 2020 amounted to 322 million euros¹¹, which is a y-o-y increase of 1.8%. The current account deficit increase resulted from an increased foreign trade deficit and decreased surplus in the primary and secondary income accounts.

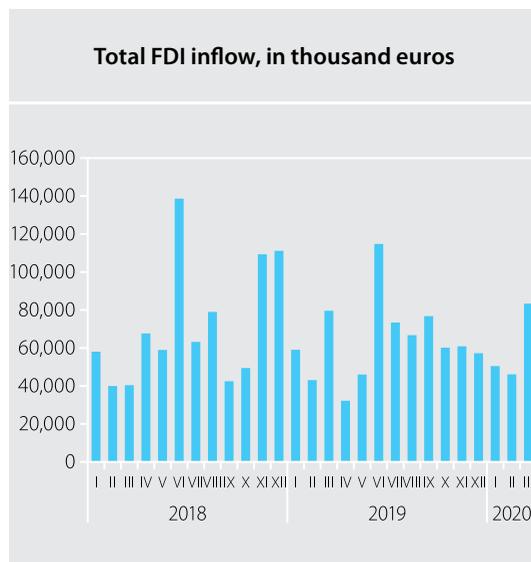
The increase in the deficit in the commodity account continued in Q1 2020, and the foreign trade deficit increased by 4.1%. Total visible exports stood at 95.4 million euros, decreasing by 5.7%, while the value of visible imports at the same time amounted to 521.5 million euros, which represents a 2.2% increase year-on-year. On the other hand, there was a 53.8% increase in the surplus in the services account (to 39.7 million euros). Such a trend at the services account was the result of mild revenues increase with the simultaneous 7.1% expenditures decline. Primary income account ran a surplus of 8.9 million euros, yet 15.1% less compared y-o-y. Such a trend is the result of decrease in revenues from compensations to employees and interest repayments. Secondary income account ran a surplus of 55.5 million euros or 1.6% more y-o-y.

Preliminary data show that net foreign direct investments (FDIs) inflow for the period January-March 2020 amounted to 134.2 million euros, which is a year-on-year growth of 62.2%. Such a trend was the result of a higher outflow from intercompany debt inflow along with outflow decline. Total FDI inflow stood at 180 million euros, with equity investments amounting to 89.8 million euros (27.2% decline), and the inflow in the form of intercompany debt adding up to 82.4 million euros or 62% more y-o-y. In the equity investments structure, investments in companies and banks amounted to 62.5 million euros (a 26.4% decline), while real estate investments amounted to 27.3 million euros and were 29% lower

y-o-y. The inflow from the withdrawal of investments from abroad amounted to 7.8 million euros. In the total FDI inflow structure, income from intercompany debt accounted for 45.7% of total FDI, followed by investments into companies and banks, and investments into immovable properties with respective 34.7% and 15.2%. The total FDI outflow in the period January-March 2020 amounted to 45.8 million euros, which is 53.8% less compared y-o-y. In the outflow structure, the outflow from residents' investments abroad amounted to 8.3 million euros, while the withdrawal of non-residents' funds invested in Montenegro amounted to 37.5 million euros.

In Q1 2020, portfolio investments account recorded net outflow of 248.4 million euros, while the net inflow in the other investments account amounted to 6.7 million euros. The developments in this account are characterised by the

Graph 33



Source: CBCG

¹¹ Montenegro's balance of payments' data published in accordance with the new IMF methodology (IMF Balance of Payment Manual, sixth edition - BMP 6).

increase in liabilities of all sectors based on borrowings, with a simultaneous increase in deposits of local banks abroad.

3.2. Supply and demand

Total industrial output recorded a 12.9% y-o-y increase in Q1 2020. All sectors recorded output increase, amounting respectively to 21.3%, 17%, and 6.9% in mining and quarrying, manufacturing industry, and electricity, gas and steam supply sectors.

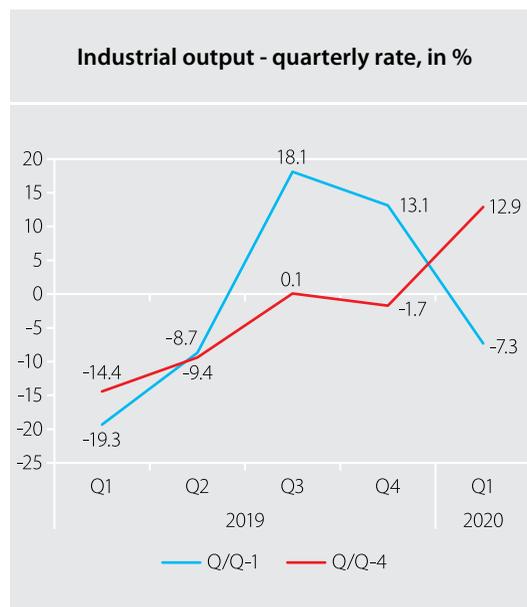
During the first three months of 2020, 89,900 tourists stayed in collective accommodation establishments, which is a decrease of 26.3% y-o-y. Tourist overnights amounted to 190,642, which is a year-on-year decrease of 18.7%.

In the first three months of 2020, the total output of forest assortments amounted to 17,840 cubic metres, which represents a year-on-year growth of 137.8%¹².

The preliminary data show that the value of executed construction works amounted to 171 million euros in Q1 2020, recording a 4.6% y-o-y growth. Construction activity measured by effective working hours grew by 7.6%.

In the first three months of 2020, air passenger transport recorded a year-on-year decrease of 11%, while air freight transport decreased by 24.3%. In Q1 2020, road passenger transport recorded year-on-year decrease of 23.5%¹³, while road freight transport increased by 9.1%¹⁴. Passenger railway transport declined by 19.8%¹⁵, while freight railway transport increased by 39.3%¹⁶.

Graph 34



Source: MONSTAT

¹² Expressed by weighted index, while expressed by non-weighted index production increased by 136.2% over the same period.

¹³ Presented through the number of passengers, while it decreased by 17.5% expressed through passenger-kilometres.

¹⁴ Presented through transported goods in thousand tonnes, while it increased by 8.8% presented in ton-kilometres.

¹⁵ Presented through the number of passengers in thousands, while presented through passenger-kilometres the decline was 17%.

¹⁶ Presented in thousand tonnes, while presented through passenger tonnes the increase was 28.8%.

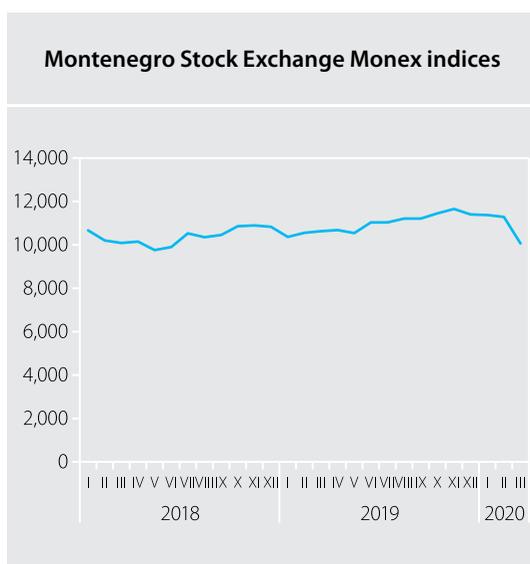
3.3. Stock exchange indices

At end-Q1 2020, the Monex and MNSE10 indices recorded a decline in relation to end-2019. The year-on-year comparison reveals a decline in both indices (Graphs 35 and 36).

At end-March 2020, Monex SE index¹⁷ amounted to 10,060.53 recording decline of 1,343.1 index points or 11.8% in relation to end-2019, and a year-on-year decrease of 578.2 index points or 5.4%.

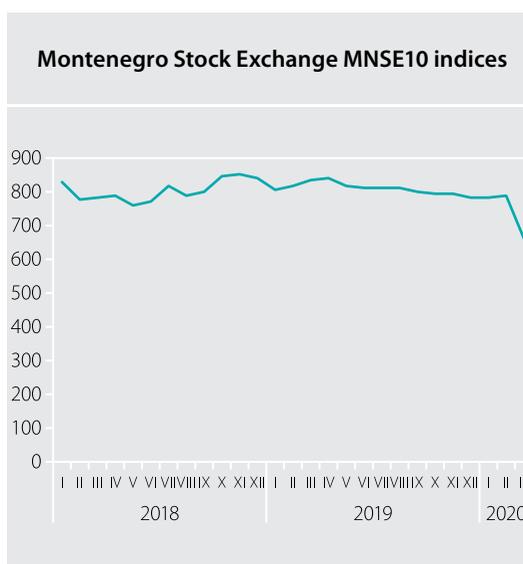
MNSE10 index¹⁸ stood at 657.27 at end-Q1 2020 and recorded a decline of 120.34 index points or 15.5% compared to end-2019, while it was lower by 175.01 index points or 21% y-o-y.

Graph 35



Source: Montenegro Stock Exchange

Graph 36



Source: Montenegro Stock Exchange

¹⁷ The MONEX is a benchmark Montenegro Stock Exchange index aimed at providing a more accurate 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.

¹⁸ 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 Montenegro Stock Exchange AD Podgorica free market. It includes the top ten companies in the Montenegrin market.

4. MONETARY POLICY

During Q1 2020, there neither were changes to the existing ones, nor were new decisions made regarding the Central Bank of Montenegro monetary policy instruments.

5. INFLATION FORECAST FOR 2020 AND Q1 2021

5.1. Model assessment

Montenegro's inflation fan chart is a graphic representation of the distribution of inflation rate forecast probability 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 three quarters of 2020 and Q1 2021 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 chart - ARIMA model for three quarters of 2020 and Q1 2021

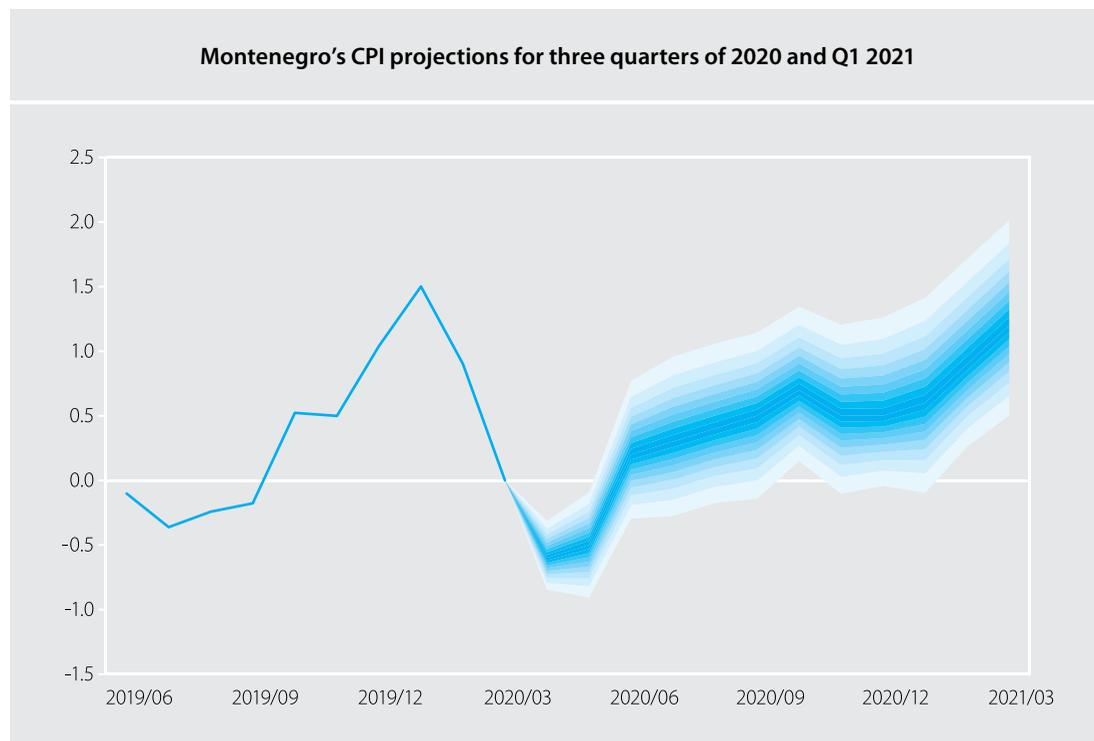
With a view to developing a Fan Chart, an ARIMA (AutoRegressive Integrated Moving Average) model was developed of time series of Montenegro's inflation showed through the Consumer Price Index¹⁹.

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“, 2007.

ARIMA model was used for short term forecasts (12 months), whereby iteration of 533 ARIMA models was made, which were ranked based on their efficiency and quality of diagnostics. The selected ARIMA model, ARIMA (2,1,2)²⁰ has sufficient confidence level for forecasts.

The monthly forecasts value was used as the value of central projection of the CPI graph for three quarters of 2020 and Q1 2021. Obtained values represent the distribution mode, i.e. values with the highest frequency in the distribution of this time series.

Graph 37



Source: CBCG, 2020

Mean value of the obtained model is 0.4. 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 presents a 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

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)

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

The expected effects of the coronavirus pandemic (COVID-19) and of subsequent mitigation measures for this pandemic also had an impact on inflation and economic growth forecasts. The average inflation rate in 2020 decreased compared to the previous projection (from 0.8% to 0.4%). The Fan Chart of inflation in Montenegro, based on the ARIMA model assessment for three quarters of 2020 and Q1 2021, indicates that there is a *90% probability that the CPI inflation will range between -0.9% and 2%, depending on the month, with the central projection of 0.4%. At the same time, inflation at end December 2020 is forecasted to range between 0% and 1.2%, with the central projection of 0.5%*. The Fan Chart central projection (the darkest part) represents a 10% probability span (Graph 36).

The projection is based on projected energy and food prices, and inflation projections in the euro area. The risks related to the projected inflation rate shown on the Fan Chart are set symmetrically. The most prominent risks relate to the prices of oil and food, which will be conditioned by the aggregate demand.

The starting assumptions for forecasting inflation are:

1. Inflation in the euro area will be lower than previously projected. According to ECB forecasts²², inflation will be 0.4% this year and will reach 1.2% in 2021. The Coronavirus pandemic, which is also an extreme economic shock, has affected the economic activity reduction in the euro area, and consequently inflation.
2. After a sharp drop in international oil prices in Q1, expectations point to oil prices remaining low due to a pronounced imbalance between high supply and significantly reduced demand.
3. Prices of raw materials excluding energy at the international market are assumed to record a mild growth this year.
4. The excise duties trend in 2020 determines the increase of excise duties on tobacco and those on coal, while excise duties on carbonated beverages and excise duties on ethyl alcohol remain at the 2019 level, according to the Law on Excise Duties. Consequently, the excise duties will be 3.9% higher compared to 2019.
5. Food and agricultural products prices increase up to 5%.

Reasonably, deviation of any of the abovementioned parameters would require the forecast correction.

²² Source: ECB (2020): The ECB Survey of Professional Forecasters (SPF), May 2020.

6. EXPECTED INFLATION IN 2020

An event that will have a decisive effect on all macroeconomic variables trends, including the inflation trend, is a pandemic. It resulted in a global decline in the economic activity level and the dismissal of a large number of workers. Consequently, the global aggregate demand dropped, leading to a decrease in a significant number of products, the most notable in oil price trends.

Montenegro is facing a similar scenario, expecting aggregate demand level decline in the upcoming period. Combined with the global price decline of many products, it will result in very low inflation.

Compared to 2019 year-end, inflation in Q1 2020 was negative, yet it stood at zero level compared y-o-y. The global economic recovery may bring a gradual inflation growth. It is certain that there will be no significant inflation pressures this year. Therefore, a low inflation rate is forecasted for 2020.

For end-2020, our model assessment projected inflation in the range from 0% to 1.2%, with the central trend of 0.5%. It is similar to our expert projection, which suggests inflation to range from -0.2% to 1.8%, with a central trend of 0.8%.

Table 3

Estimated inflation rate		
Optimistic assessment	Realistic assessment	Pessimistic assessment
-0.2%	0.8%	1.8%

This estimation is based on the assumptions as those on which the model estimation is based. Deviation of any of the mentioned parameters from the expected values would also require the estimation revision.