



CENTRAL BANK OF  
MONTENEGRO

# **INFLATION REPORT QUARTER III, 2013**

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# 1. INFLATION INDICATORS

In Q3 2013, consumer prices increased by 0.7%. In the reporting quarter, the highest increase was recorded in prices of *alcoholic beverages and tobacco* (5.3%), *housing, water, electricity and other fuels* (3.1%) and *transportation* prices (3.0%). Observed by months, in Q3, growth of consumer prices was recorded in July (0.7%) and September (0.1%), while in August they declined by 0.1%. At the annual level, consumer prices in September amounted to 1.8%, while the average rate (period-on-period) amounted to 2.9%.

In Q3, prices of *alcoholic beverages and tobacco* increased by 5.3%, mostly due to the growth of tobacco prices by (7.3%) because of the increase of the excise duties on tobacco products (the Proposal of the Law amending the Law on Excise Taxes). Prices of *housing, water, electricity, gas and other fuels* increased by 3.1%, mostly due to the increase of prices of electricity (4.6%) and solid fuels (2.6%), which

affected this category to record the highest contribution to total inflation (0.5 percentage points). *Transportation* prices increased by 3.0%, mostly due to the prices of fuels and lubricants by 5.8% which made this category to become second in size in total inflation (0.3 percentage points). Prices of *clothes and footwear* increased by 1.1%, *communications* 1%, *other products and services* 1.8%, whereby all of these categories recorded the same contribution in total inflation (0.1 percentage points). *Health care* and *hotels and restaurants* categories recorded respective prices' growth of 0.4% and 0.6%. Prices of *food and non-alcoholic beverages* decreased by 1.1%, whereby the lowest decline was recorded in prices of fruits (9.2%), vegetables (7.9%) and *culture and entertainment* (2.4%), while prices of *household equipment and routine household maintenance* decreased by 0.2%. prices in the category *education* did not change in Q3.

**Table 1 - Inflation, %**

	2012				2013		
	III	VI	IX	XII	III	VI	IX
Change in relation to previous year end	2,2	3,2	4,3	5,1	0,5	0,4	1,1
Annual change	2,7	3,9	4,4	5,1	3,3	2,2	1,8

Source: Monstat

**Graph 1 - Consumer prices, monthly rate**



In September, **core inflation** monthly rate amounted to 0.02%. As of the beginning of the year, except in March and August, core inflation was lower than the official monthly inflation, while in January, February, May and July it was negative.

In Q3 2013, price of reference OPEC basket was 106.9 USD/barrel, or some 5.9% higher than in Q2 2013. In Q3 2013, price of average reference OPEC basket was 110.4 USD/barrel, or 7.6% higher than in Q2 2013. Middle East political instability and pressures related to situation in Syria affected the growth of raw oil prices at the world's markets, especially in mid-August and the beginning of September 2013.

Prices of fuels and lubricants in Montenegro increased by 5.8% in Q3.

**Table 2 - Share of individual categories in total inflation**

	Weights	XII 13/VI 13 Index	Rate	Contribution	Share in total inflation
<b>TOTAL</b>	<b>1000</b>	<b>100.7</b>	<b>0.7</b>	<b>0.7</b>	<b>100.0</b>
Food and non-alcoholic beverages	386,4	98.9	-1.1	-0.4	-61.7
Alcoholic beverages and tobacco	37,9	105.3	5.3	0.2	28.2
Clothes and footwear	70,7	101.1	1.1	0.1	11.3
Housing, water, electricity, gas and other fuels	153,1	103.1	3.1	0.5	66.6
Housing and routine maintenance	46,9	99.8	-0.2	0.0	-1.3
Health	38,2	100.4	0.4	0.0	2.3
Transportation	101,0	103.0	3.0	0.3	42.6
Communications	57,1	101.0	1.0	0.1	8.3
Entertainment and culture	27,2	97.6	-2.4	-0.1	-9.0
Education	15,7	100.0	0.0	0.0	0.0
Hotels and restaurants	23,0	100.6	0.6	0.0	2.1
Other goods and services	42,8	101.8	1.8	0.1	10.6

*We would like to note that, despite the index changes, the share of certain categories is recorded only at the second or the third digit, due to the weighting structure.*

*Source: MONSTAT and CBM calculations*

**Graph 2 – Oil prices, monthly growth rate**



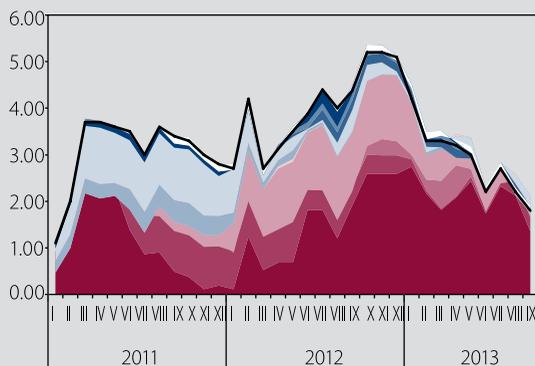
Source: MONSTAT and "Monthly Oil Market Reports", OPEC

**Graph 4 – Consumer prices, annual rate**



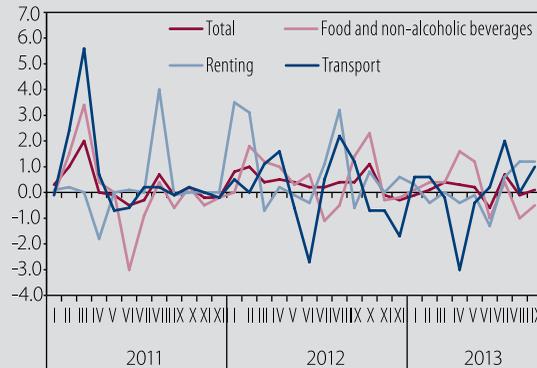
Source: Monstat

**Graph 3 - Consumer prices' components: contribution to annual growth rate (index points)**



Monstat and CBCG calculations

**Graph 5 – Selected categories – consumer prices, monthly growth rate**



Source: Monstat

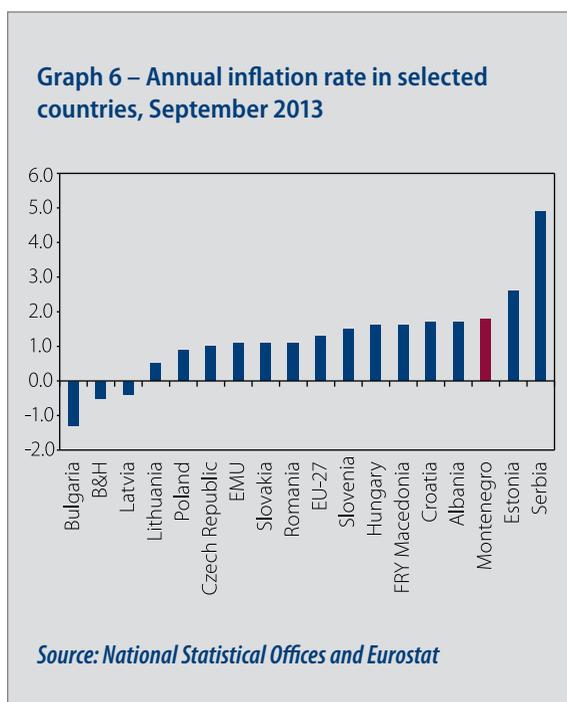
est growth was recorded by prices in categories *alcoholic beverages and tobacco* (8.1%) followed by prices from category *food and non-alcoholic beverages* (3.5%) and prices from the category *other products and services* (3.9%), while the largest annual decline was recorded in the category *transportation* (2.3%) and *culture and entertainment* (2.9%).

In September 2013, the annual inflation of 1.8% was 0.4 percentage points lower in relation to the annual growth rate from June. The high-

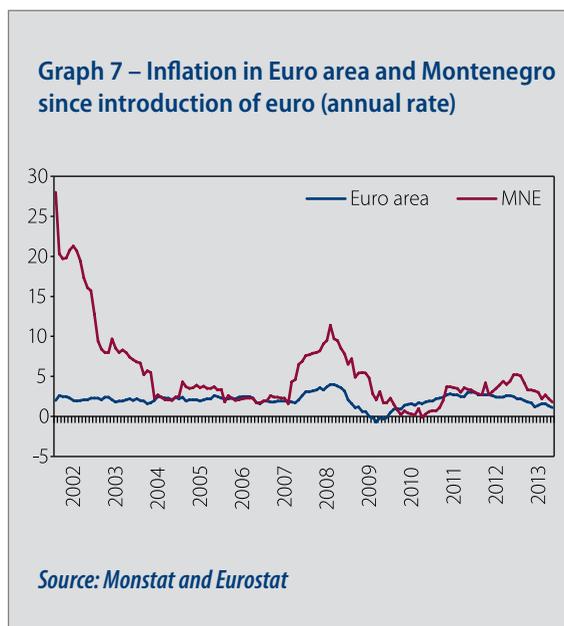
In relation to end-013, **producers' prices of manufactured products** declined by 0.6%, whereby the prices in the processing industry recorded a decline of 1.0%, while the prices of electricity, gas and

steam declined by 0.7%. Mining and quarrying prices increased by 4.0%. Producers' prices of manufactured products recorded y-o-y decrease of 0.4%.

The comparison of annual inflation recorded in Montenegro to the inflation in selected countries shows that the following countries recorded higher inflation rate: Estonia (2.6%) and Serbia (4.9%). Negative RAE was recorded in Latvia (-0.4%), Bosnia and Herzegovina (-0.5%) and Bulgaria (-1.3%).



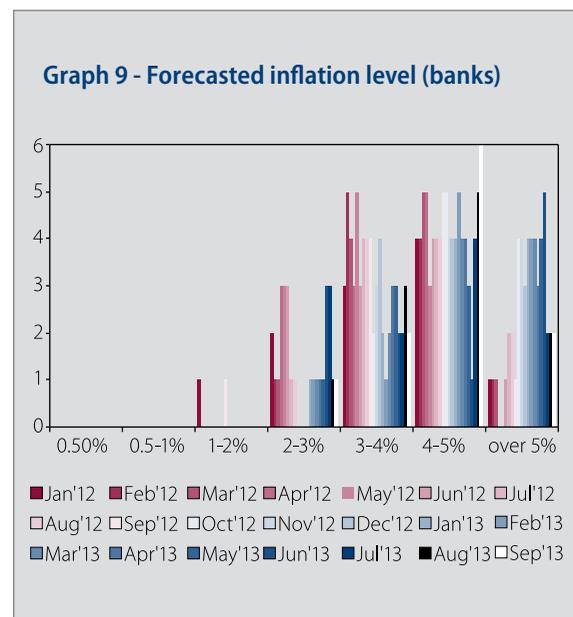
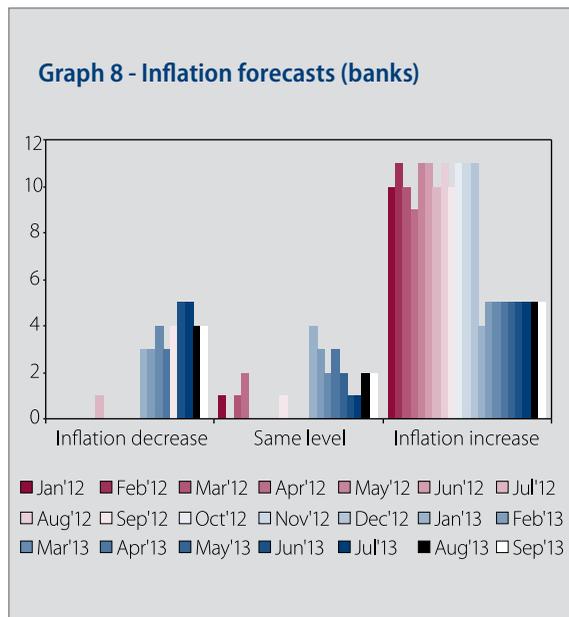
Measured by Harmonized Index of Consumer Prices (HICP), annual inflation growth rate recorded in Euro area amounted to 1.1%, growth in Montenegro measured by consumer prices amounted to 1.8%, while annual inflation in Montenegro, measured by HICP amounted to 1.5%.



## 2. INFLATION FORECASTS OF BANKS

Regarding inflation forecasts of banks, based on the survey conducted in September 2013, five banks expected higher inflation rate, two banks expected the same inflation rate, while four banks expected lower inflation rate in relation to 2012 (Graph 8).

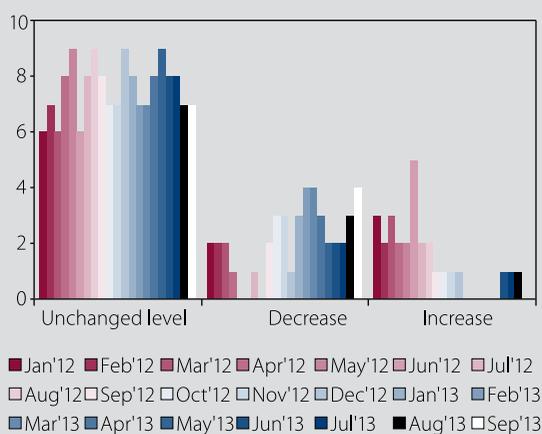
There were different expectations of banks with regards to the inflation by the end of this year. Six banks expected inflation to range from 4% to 5%. One bank expected the inflation to range from 2% to 3% while two banks expected the inflation to range from 3% to 4% and over 5% (Graph 9).



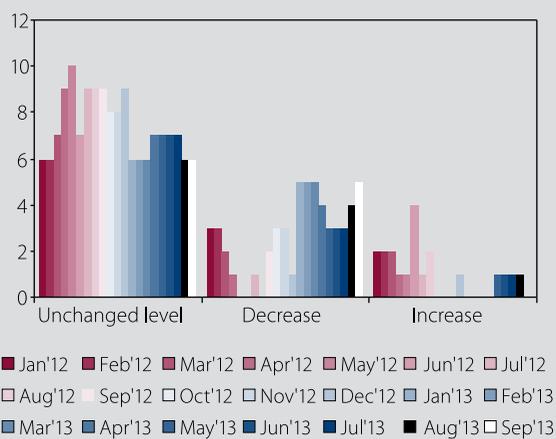
Concerning the forecasts on lending interest rates, seven banks forecasted unchanged levels, while four banks expected a decline of nominal interest rate. On the other hand, six banks expected unchanged amount of effective interest rates, while five banks expected a decline.

Regarding the deposit interest rates, four banks expected unchanged level, while seven banks expected a decline in deposit interest rates.

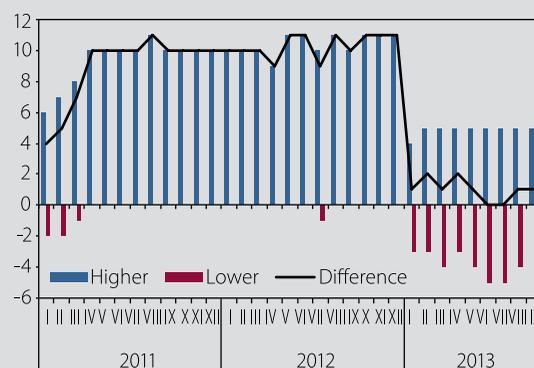
**Graph 10 – Nominal interest rate movement forecasts**



**Graph 11 – Effective lending interest rates forecasts**



**Graph 12 – Market indicator**



For the purpose of calculating inflation forecasts we use market trend indicator (black line in Graph 12). It is calculated as the difference between the number of banks expecting an inflation growth (blue columns) and the number of banks expecting inflation decrease (red columns). 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, while higher positive value means higher inflation level forecasts. Inflation forecasts recorded a sharp decline in January 2013 and since then until September, they maintained lower levels compared to the previous period, especially period of the last quarter 2012 when all banks expected inflation growth.

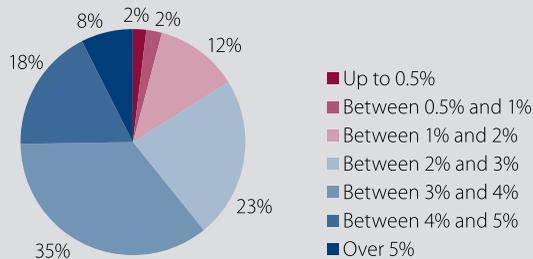
## Expectations of economy (except banks)

### Inflation

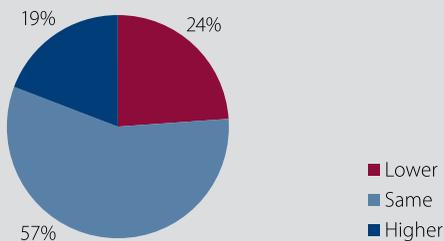
Out of total surveyed companies, 35% expected that inflation in 2013 would range between 3% and 4%. Inflation ranging between 2% and 3% is expected by 23% of companies, 18% expected inflation between 4% and 5%, while 12% expected the inflation between 1% and 2%. Only 2% of surveyed companies expected that inflation would be lower than 0.5%, as well as that it will range between

0.6% and 1%, while 8% of companies expected inflation over 5%. Some 24% of companies expected decrease in salaries; 19% expected increase in salaries while some 57% expected unchanged level. The highest number of surveyed companies (55%) expected the same level of production input prices which they use, while 82% expected the same level of their products (services) in 2013. As for the number of employees, 48% of surveyed companies expected unchanged number by the year-end in relation to 2012, while 26% believed in increase and i.e. decrease.

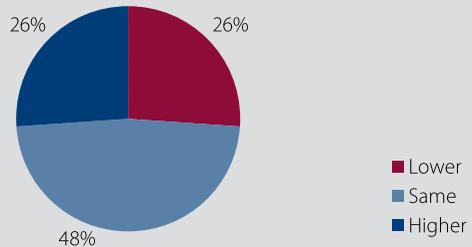
**Graph 13 – Forecasted inflation in 2013**



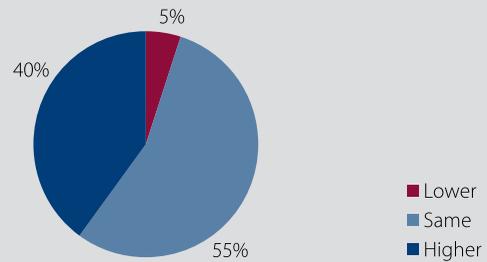
**Graph 14 – Expected level of salaries in 2013**



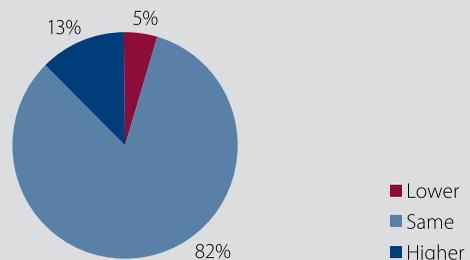
**Graph 15 – Expected level in number of employees in 2013**



**Graph 16 – Expected level of prices of production inputs in 2013**

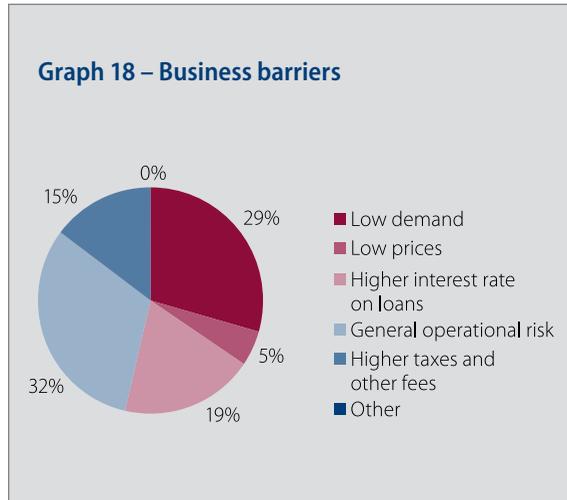


**Graph 17 - Expected level of prices of products (services) in 2013**



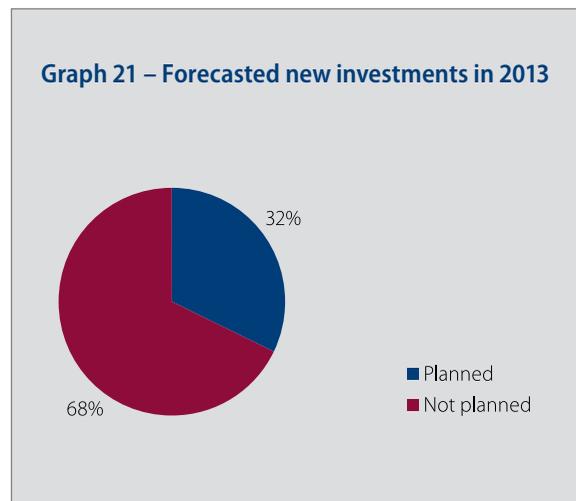
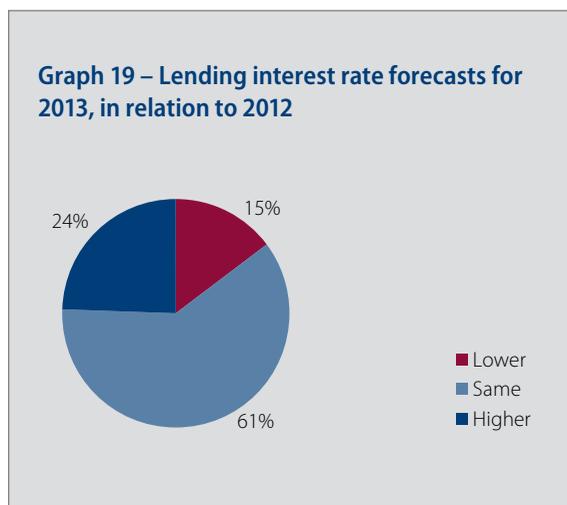
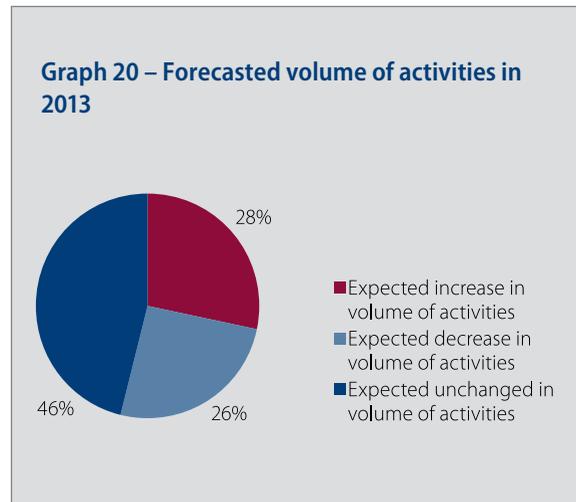
## Business Environment

The survey results showed that most of the surveyed companies saw general operational risks (32%), low demand (29%), high lending interest rates (19%), high taxes, general forms of duties (15%) and low prices (5%) as a red tape. In addition, 61% of surveyed companies expected unchanged levels, 24% higher level, while 15% of them expected lower lending interest rates in 2013 relative to 2012.

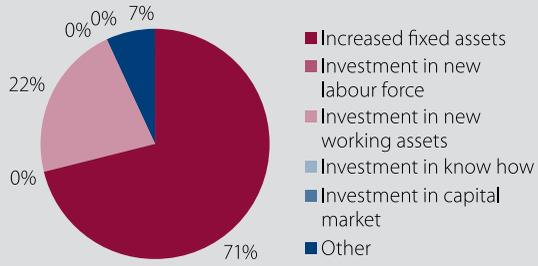


## Investments

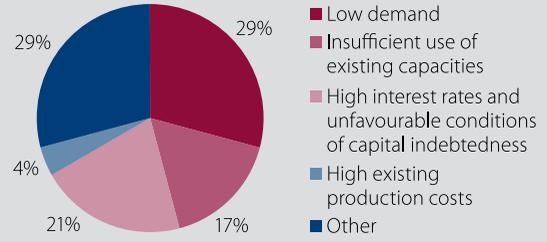
Out of the total number of surveyed companies, 28% planned the increase in volume of activities by the end of this year i.e. 32% of surveyed companies planned new investments. Most investments 71% referred to the increase in fixed assets, while low demand, high interest rates, unfavourable conditions for capital borrowings and insufficient exploitation of existing capacities and other obstacles were described as largest barriers to new investments.



**Graph 22 – Types of forecasted new investments in 2013**



**Graph 23 – Obstacles to forecasted new investments 2013**

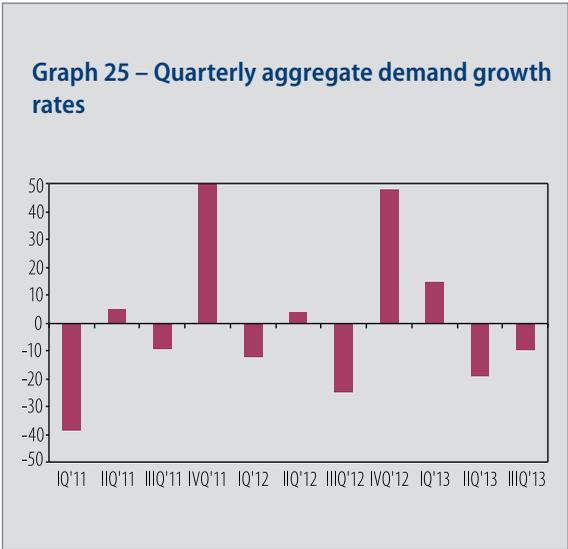
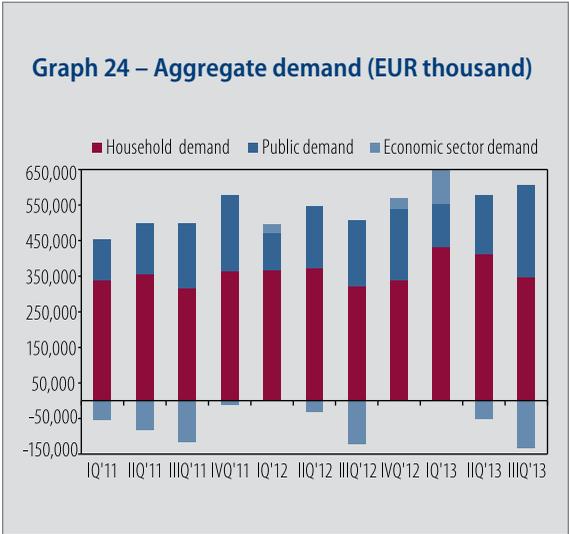


# 3. INFLATION DETERMINANTS

## 3.1. Demand

According to preliminary data, aggregate demand recorded an increase compared to Q2. Observed by sectors, public consumption was somewhat higher in relation to Q2, while households' consumption declined. Compared to the Q2, the structure of total demand shows the decrease in share of households' demand while public consumption increased.

Aggregate demand recorded decrease in Q3 2013 compared to Q2, but it substantially increased compared to the level recorded in the same quarter of 2012.



## Box 1 - Aggregate demand calculation methodology

For the purpose of complete monitoring of aggregate demand as the inflation determinant, the CBCG has developed the aggregate demand calculation methodology. The starting point of this methodology is that the aggregate demand is the total demand of three sectors: personal consumption (households), investment consumption (corporate sector) and public consumption. 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 selling shares, non-market incomes, non-observed economy revenues, and the like. The methodology for calculating the aggregate demand is given in 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 savings by households (savings – loans granted)

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

**G** = public consumption – paid pensions – salaries paid from the budget – net savings by the Government (deposits – loans – Treasury bills)

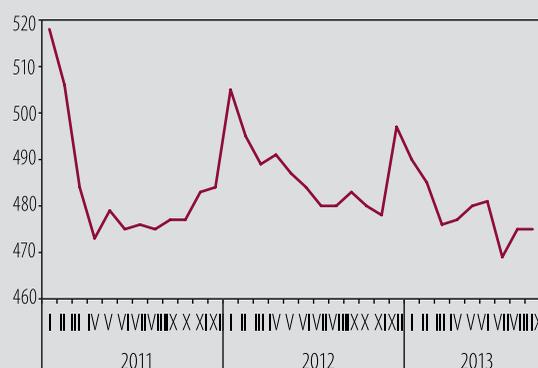
**AD** – aggregate demand, **C** – personal consumption, **I** – investment consumption, **G** – public consumption

### 3.1.1. Salaries and other available demand determinants

In the Q3 2013, the average salary in Montenegro amounted to EUR 718, while average salary without taxes and contributions amounted

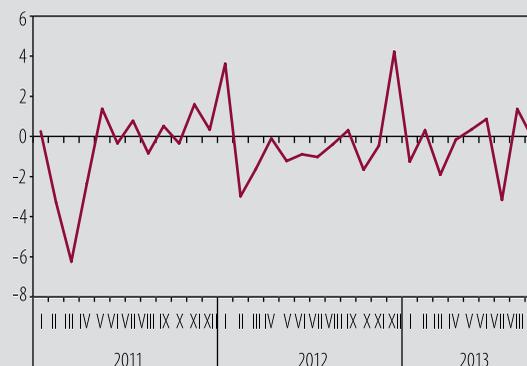
to EUR 473. Average salary and average salary without taxes and contributions recorded q-o-q decrease of 1.3%, respectively.

**Graph 26 – Average salaries without taxes and contributions in Montenegro**



Source: Monstat

**Graph 27 – Real salaries (monthly growth rate)**



Source: Monstat

Taking into account the consumer prices, i.e. salaries in real amounts, it can be concluded that real salaries in Q3 recorded decline in July and September, while growth of real salaries was recorded in August.

Loans and other receivables of households amounted to EUR 886.9 million at end-September 2013. At end-2012, households' loans and other receivables were 9.6% higher, while in relation to the same month of the previous year they increased by 7,5%<sup>1</sup>. During the first nine months of 2013, loans and other receivables of banks and households recorded average monthly growth rate of 1%, while in the same period of the previous year they declined at the average monthly rate of 0.1%.

Per capita debt amounted to EUR 1.430 at end-Q3 2013, and it was EUR 125 higher compared to end-2012 i.e. EUR 99 more compared to Q3 2012.

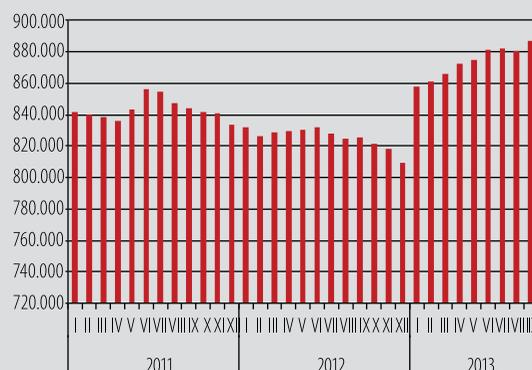
Households' loans in MFIs amounted to EUR 33.4 million at end-Q3 2013, which is 18.3% more compared to end-2012, i.e. 17.1% more compared to Q3 2012.

Deposits of the households in banks amounted to EUR 1,222.9 million at the end-September 2013, which is 6.6% more compared to end-2012, i.e. 9.8% more compared to September 2012.

Loans and other receivables to deposits ratio amounted to 0.73 at the end of September 2013, and compared to end-2012 it deteriorated (0.71), while it slightly improved in comparison to September 2012 (0.74). Since July 2010, the households sector became a net depositor. At end-Q3 2013, net savings of households amounted to EUR 336 million and it decreased by EUR 1.7 million or 0.5% compared to end-2012, while net savings of this sector increased by EUR 47.5 million or 16.5% relative to September 2012.

Balance of payment statistics showed that the inflow of foreign funds to natural persons recorded decline in Q3 2013 in relation to the previous quarter, yet it was somewhat higher than the inflow recorded in Q3 2013. In relation to Q2 2013, there was an increase

**Graph 28 – Loans and other receivables to households, in EUR thousand**



**Graph 29 – Inflow of foreign funds to private citizens (EUR thousand)**

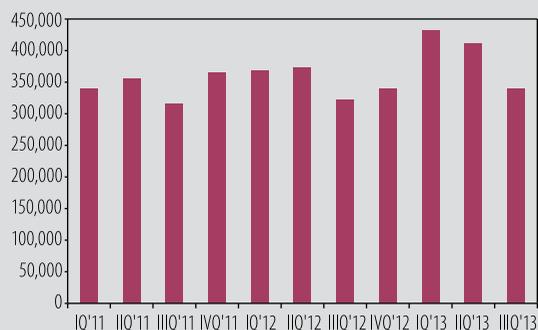


Source: CBM

in inflow of foreign remittances, as assistance to local natural persons in Q3 2013.

<sup>1</sup> Growth of loans and other receivables is largely a result of written-off loans (E category) from the off-balance record in on-balance of banks in January 2013, pursuant to the IAS

**Graph 30 – Demand of households  
(EUR thousand)**



Total demand of household sector by quarters showed decrease in Q3 2013 relative to previous two quarters, but it was somewhat higher than the demand recorded in Q3 2012.

### 3.1.2. Budgetary analysis

According to Ministry of Finance preliminary data, in the first nine months of 2013, Montenegrin budget recorded total revenues<sup>2</sup> amounting to EUR 1,113.7 million.

**Source revenues** amounted to EUR 879.5 million or 25% of estimated GDP<sup>3</sup>, and in relation to the plan, they increased by 4.9% showing a y-o-y increase of 8.6%. Tax revenues recorded the highest share in the structure of source revenues (63.7%), followed by contributions (30%), other revenues (2.4%), taxes (2.1%), fees (1.1%) and repayment of loans granted (0.7%).

Tax revenues amounted to EUR 560.1 million and were by 7% higher than planned, showing y-o-y growth of 7.9%. The highest revenues income was recorded in VAT (EUR 51.9 million or 19.5%) in relation to

the same period of the previous year, resulting from the implementation of measures for the shadow economy suppression and higher VAT rate implemented as of 01 July 2013.

Excise duties also grew reaching the amount of 11 million or 10.1%, resulting from their gradual increase.

Revenues from other taxes increased by EUR 8.4 million as a result of interim measures from July 2012, when new duties were introduced.

Revenues from personal income tax increased by 10.7% (EUR 6 million) in relation to the same period of the previous year, as a result of the implementation of amended Law on Personal Income Tax (on net salaries, exceeding EUR 480, tax rate is 15%, while for the lower salaries tax rate was 9%).

Negative deviation is recorded in international trade tax in amount of EUR 6.1 million or 26.3%, resulting from entering into force of the agreement with WTO in the second half of 2012.

Revenues from contributions amounted to EUR 264.3 million or 1.1% less in relation to plan for the nine months of 2013, and they showed 6% y-o-y increase.

In Q3 2013, **budget expenditure** amounted to EUR 1,017.7 million or 28.9% of GDP, while public debt repayment amounted to EUR 176.6 million. In relation to the plan for the nine months 2013 and in relation to the same period of 2012, recorded expenditure was 8.1% higher.

Current budget expenditure amounted to EUR 985.3 million or 28% of GDP, while capital budget amounted to EUR 32.4 million or 0.9% of GDP.

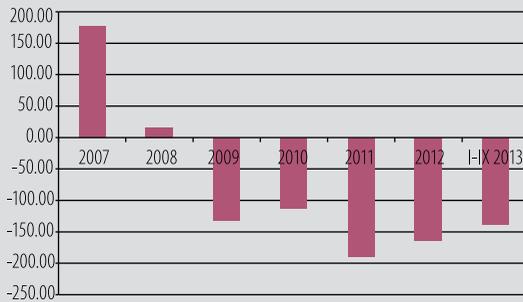
Current expenditures amounted to EUR 446.2 million or 0.8% higher than planned.

The Montenegrin Budget deficit was estimated at EUR 138.2 million, or 3.9% of GDP.

<sup>2</sup> Revenues include source revenues (direct and indirect taxes and non-tax revenues), borrowings, donations and revenues from privatization and sale of property.

<sup>3</sup> Source: Ministry of Finance; Estimated GDP for 2013 amounts to EUR 3.517 million.

**Graph 31 – Budget surplus/deficit in the period 2007 – September 2013, in EUR million**



Source: Ministry of Finance

### 3.1.3. Economy

Due to the absence of data on investments by the corporate sector, net corporate sector leverage can be used for demand approximation.

In the first nine months of 2013, loans and other receivables from the corporate sector were substantially above the level of deposits placed in banks. Thus, net debt of the corporate sector amounted to EUR 318.6 million at the end of the observed period and was 21.1% lower than at the end-2012 and by 14.5% lower than in the same period of the previous year.

**Graph 32 - Net corporate debt, in EUR 000**



The structure of loans granted to the corporate sector showed that the share of long-term loans in total loans granted to this sector amounted to 73.4% of total granted loans and other receivables at the end of the reporting period, whereby loans with maturity over 3 years made up over 53.2% of total loans granted to the corporate sector. This structure of loans points to their dominant use for increasing the economic activity.

### 3.1.4. External demand and the current account

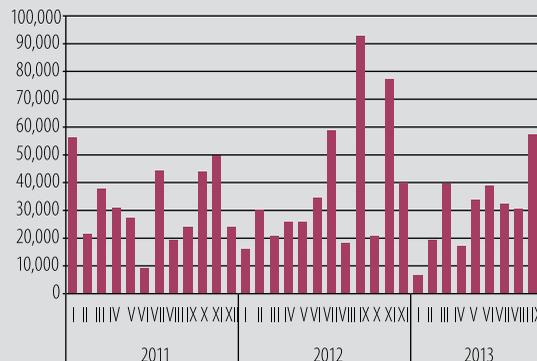
In Q3 2013, current account deficit declined, resulting from external demand growth (export of revenues from services). According to preliminary data, current account deficit amounted to EUR 231.7 million or 18.8% less than in the same period of the previous year. Movements in the goods account is characterized by the decline in foreign trade deficit by 6.3%, resulting from the increase in goods export. This was due to the increased export of electricity by 6.3%, goods by 3.8%, and at the same time, decline of import by 4.1%. These movements were mostly affected by increased export and reduced import, as well as decline in import of oil and oil derivatives compared to Q3 2012.

When it comes to foreign invisible trade in Q3 2013, Montenegro recorded a surplus amounting to EUR 625.5 million, due to higher revenues from tourism. Positive movements in Q3, recorded in travel-tourism sector contributed to the services surplus growth in comparison with the same period of the previous year.

Due to the inflow from compensations to employees and decline of the outflow from interest repayment and paid dividends, factor income account recorded surplus growth of 56.7% amounting to EUR 42.3 million. Current transfers' account recorded surplus in amount of EUR 94.8 million or 1.9% less than in the same period of the previous year.

According to preliminary data, net FDI inflow in the period January – September 2013 amounted to EUR 275.6 million or 14.8% less than in the same period of 2012. Total FDI inflow amounted to EUR 351 million, while, at the same time, the outflow amounted to EUR 75.4 million. Out of the total inflow, equity investments amounted to EUR 186.1 million (53%), while the outflow in the form of the intercompany debt amounted to EUR 155.3 million (44.3%). If we

**Graph 33 – Net FDI Inflow, in EUR 000**



Source: CBM

observe monthly FDI inflow, the highest net inflow was recorded in September when it amounted to EUR 57.3 million.

During the reporting period, portfolio account recorded higher investments in foreign debt securities, while other investments account recorded increase of liabilities of the banking and corporate sectors based on taken foreign loans.

### 3.2. Supply and production

In Q3 2013, industrial output recorded y-o-y increase of 8.8%, primarily due to increase in electricity, gas and steam sector by 58.8% and mining and quarrying sector by 1.1%, while manufacturing industry sector recorded production decline by 14.9%. Monthly data on industrial output in the Q3 2013 show increase in July (14%) and August by 0.8%, while monthly decrease was recorded in September (10.2%).

Some 1,410.0 thousand tourists visited Montenegro in the first nine months of 2013, which represented y-o-y growth of 3%. The number of domestic tourists arrivals decreased by 5.2%, while foreign tourists' arrivals increased by 4.1%. The number of overnights in the observed period amounted to 9,094.6 thousand showing y-o-y decline of 2.3%.

**Graph 34 – Industrial output, annual growth rate**



Source: Monstat

In the first nine months of this year, total **wood products**<sup>4</sup> amounted to 144.1m<sup>3</sup> showing a y-o-y increase of 21.6%<sup>5</sup>. This was a result of extremely low basis in January 2012, i.e. absence of production in February 2012.

The value of executed **construction works** in Q3 2013 showed a y-o-y increase of 2.6%, while construction activity measured by effective working hours recorded an increase of 29.9%.

In the first nine months of 2013, road passenger transportation recorded y-o-y growth of 3.5%. Railway passenger transportation recorded 10% increase while air passenger transportation increased by 15.6%. Road cargo transportation increased by 55.2%, railway cargo transportation by 26.6%, while air cargo transportation declined by 3.3%.

### 3.3. Stock exchange indices

After a significant growth in June 2013, Monex 20 recorded a decline during three months of Q3 2013 with slight oscillations, while at end-September it reached minimum value in 2013. On the other hand,

<sup>4</sup> While drafting this report, nine-month data were not available

<sup>5</sup> Expressed by weighted index, while according to non-weighted index, production in the same period was 15.4% higher

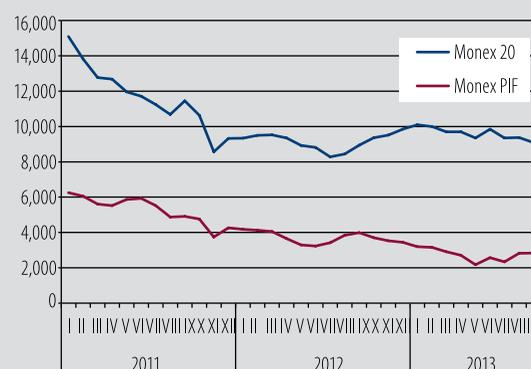
investment funds index, Monex PIF negative trend was stopped in the last two months of Q3 2013. Due to substantial turnover of investments funds' shares in Q3 2013, Monex PIF recorded growth of 9.9% in September, in relation to the half-year end.

At end-2013, Monex 20 recorded decline of 7.8% (765.08 index points) in relation to end-2012, while Monex PIF decreased by 608.9 index points or 17.7%.

Compared to the end-September 2012, Monex 20 increased by 1.6%, while Monex PIF declined by 29.1%.

With regard to their historical maximum values (reached in 2007), Monex 20 and Monex PIF declined by 5.4 times and 17.9 times, respectively, at end-September 2013.

**Graph 35 - Montenegro stock exchange indices**



Source: Montenegro stock exchange

**Table 3 – General data on indices**

	MONEX 20		MONEX PIF	
	Value	Date	Value	Date
Value on 30 September 2013	9.084,84		2.832,94	
Absolute change of index in 2013	-765,08		-608,90	
Initial index value	1000,00	March 2003	1000,00	March 2003
Maximum value in 2013	10.247,75	16.01.2013.	3.432,40	28.01.2013.
Maximum historical value	48.617,88	07.05.2007.	50.780,54	17.08.2007
Minimum historical value	918,57	14.04.2003	959,53	02.04.2003
Growth (decline) in 2013	-7,8		-17,7	

## 4. MONETARY POLICY

In the first nine months of 2013, there were neither change in existing, nor new decisions were passed referring to the CBCG monetary policy instruments.

# 5. INFLATION FORECAST FOR 2013 AND Q3 2014

## 5.1. Model assessment

Montenegro's inflation fan chart represents a graph of probability distribution of inflation rate presented by the consumer price index (CPI). Focusing on this, instead of determining concrete points, using the distribution of probability the „Fan Chart“ includes potential risks and uncertainties which would in the future period influence the inflation movement. 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 and the like).

Montenegro's fan chart for 2013 and Q3 2014 was based on the following three estimated components:

1. **Central projection values** – were derived from ARIMA model and use Tramo/Seats simulation for the purpose of obtaining more efficient model.
2. **Degree of uncertainty** – determines the fan chart width. The degree of uncertainty ratio is obtained through analytical assessment and calculation of a relative impact of potential internal and external shocks which are possible in Montenegrin economy during 2014, and which are read through “thickness” of the band around 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 “overestimated” or “underestimated” the inflation rates. This will also influence the position of the mean value of inflation distribution.

### Fan Chart central projection - ARIMA model for 2013 and Q3 2014

With a view to developing a fan chart, an ARIMA model of time series of inflation in Montenegro (Autoregressive Integrated Moving Average) was developed and showed through the Consumer Price Index<sup>6</sup>.

ARIMA model was used for short term forecasts (12 months), whereby iteration of 612 ARIMA models was made, which were ranked based on their efficiency and quality of diagnostics. The selected ARIMA model, ARIMA (3,2,5)<sup>7</sup> has sufficient confidence level for forecasts.

<sup>6</sup> A detailed explanation of the ARIMA model of Montenegro is given in the working study of the Central Bank of Montenegro No. 11 „Inflation Forecast: Empirical Research of Retail Price Index Movements in Montenegro in 2007 –Application of ARIMA Model“.

<sup>7</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.

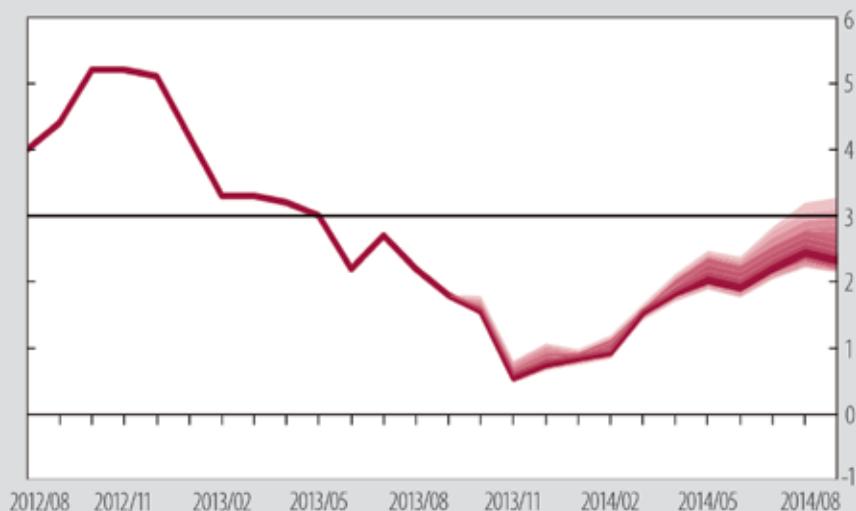
Based on Tramo/Seats<sup>8</sup> procedure, 4 bands (Chow Test was used for identification) have been identified so far, which correspond to a substantial change in inflation structure from 2001 to end-2013 and which are included in the ARIMA model through dummy variable.

The result of ARIMA model projection was compared to forecasted values using Tramo/Seats procedure which have shown high level of compatibility.

The monthly forecasts value was used as the value of central projection of the Fan Chart of CPI for 2013 and Q3 2014. The obtained values represent the distribution mode, i.e. values with the highest frequency in the distribution of this time series.

Mean value of the obtained model was 1.9, while skewedness varied from  $-0.5$  to  $+0.45$ , and standard deviation values were  $s_2=0.05$  and/or  $s_1=0.04$ . This pointed out that central band, as in the last two years, was placed in lower part of distribution, i.e. the corresponding degree of uncertainty was concentrated towards higher inflation levels, which is reflected in the graph through “thicker” band concentrated above central “the deepest shade of red” band although being substantially moderate in comparison to the previous period. 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.<sup>9</sup> The fan chart has an equal number of bands (eight) on either side of the central band whereby every band is of the same colour, both above and below the central band, cumulatively takes the inflation projection to the next 10% of probability. As the degree of uncertainty grows over time, so the fan chart spreads.

**Graph 36 – Projection of consumer price index of Montenegro for 2013 and Q3 2014**



Source: CBCG, 2013

<sup>8</sup> Tramo program represents a program for model assessment and design (mostly ARIMA) having problems with a lack of data, data errors and the presence of a large number of extreme data in time series. SEATS program is used to extract the elements of time series than cannot be directly extracted; those elements are extracted as a trend, season, cycle, and occurrence of Easter or Christmas effect, which allows a superior analysis and projection of ARIMA model. For more details see manual Tramo and Seats (Gómez and Maravall, 1996)

<sup>9</sup> The mode value (central projection) is, by construction, always in the deepest band shade, but in the case of a heavily unbalanced risk, the central projection may 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 showing the inflation in Montenegro based on an ARIMA model assessment and Tramo/Seats simulation for 2013 and Q3 2014 shows with 90% probability that the inflation, measured by CPI depending on month, will range between 0.4% and 3.3%. It is forecasted that the inflation will range from 0.7% to 1.2% at end-2013. Namely, the increase of time horizon for projection increases the uncertainty, which consequently spreads their range of forecast. Central projections of the "Fan Chart" referring to the thickest part spreads, shows the probability range of 10%

The following external assumptions have been taken into account when forecasting the inflation in 2013 and Q3 2014 (nominal annual growth):

1. Oil and oil derivative prices will not exceed 5% of the prices in September 2013;
2. Aluminium prices will remain stagnant relative to September 2013;
3. Real estate prices are stagnant relative to end-2012;
4. Electricity prices are stagnant;
5. Real wages in 2013 will remain at the level from 2012;
6. There will be no significant increase in prices of food products at international markets in relation to December 2012;

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

## 6. EXPECTED INFLATION IN 2013

In Q3 2013, inflation recorded substantial downward trend, contrary to expectations of surveyed companies and banks. Most of surveyed banks expected inflation rate to range between 4% and 5%, while most of surveyed companies expected inflation rate from 3% to 4% in 2013. Such expectations were based on facts, since during 2013 VAT has increased, as well as excise duties and electricity prices, while oil prices at world's stock exchanges have recorded substantial increase in Q3 2013.

There are several conditions for substantial inflation rate decline in 2013. The first and probably the most important reason is high growth of certain prices in 2013, when the inflation rate amounted to 5%. This is followed by the production growth in most of sectors, which had an anti-inflationary effect, but also the decline of the aggregate demand in relation to Q2 2013. In addition, some traders decided not to increase prices of their products in current condition, but to decline the margin. Therefore, inflation rate in this year is expected not to exceed the Euro area inflation rate, which basically represents long-term inflation rate, which could be characterized as "natural inflation rate" in Montenegro.

Model-based assumption of inflation for 2013 (with 90% certainty) shows that the inflation will range between 0.7% and 1.2%. In addition, model-based assumption for the following 12 months (by the end-Q3 2014) shows that inflation rate will range between 0.4% and 3.3%.

Our inflation forecast is similar to model-based assumption which estimates that inflation will range between 1% and 3%.

**Table 4 - Estimated inflation rate in 2014**

Optimistic assessment	Realistic assessment	Pessimistic assessment
1%	2%	3%

Assessment based on these assumptions is the same as assumptions for the model-based assessment. Deviation from any of these parameters used for this forecast would require the revision of the assessment.