CENTRAL BANK OF
MONTENEGRO

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1. INFLATION INDICATORS

In Q3 2012, consumer prices increased 1%. In this period the highest growth was recorded in the categories „transport" (3.9%), "dwelling, water, electricity, gas and other fuels" (3.8%) and "communications" (3.6%). Observed by months, the growth of consumer prices was recorded in July (0.2%), August (0.4%) and September (0.4%). The annual increase in September was 4.4%, while the average rate (period-on-period) was 3.8%. In relation to end-2011, in September 2012 prices were 4.3% higher.

Growth of the prices of utilisation and maintenance of vehicles of 7.1% as well as the growth of the prices of fuels and lubricants of 9.6% has induced the 3.9% growth of prices in the "transport" category. In this period prices in the "dwelling, water, electricity, gas and other fuels" category increased as a result of a 9.7% increase in the prices of electricity, while the increased prices of telephone and telegraph services (4.2%) have induced a 3.6% growth of prices in the "communications" category. Growth of 0.6% was recorded in the "other products and services" category, while the prices in the categories "recreation and culture" and "health", recorded growth of 0.3%, and 0.2%, respectively. In Q3 the most significant decline of 0.8% was recorded in the "furnishing, household equipment and routine household maintenance" as a result of the decline in the prices of furniture and household equipment of 4.8%. Furthermore, a significant decline of 7% in the prices of the "hotels and restaurants" category was a result of a decline in the prices of accommodation. In this period, slight decline was also recorded in the categories: "alcoholic beverages and tobacco", "food and non-alcoholic beverages" and "clothing and footwear" of 0.3%, 0.2% and 0.1%, respectively. Prices in the "education" category recorded no changes.

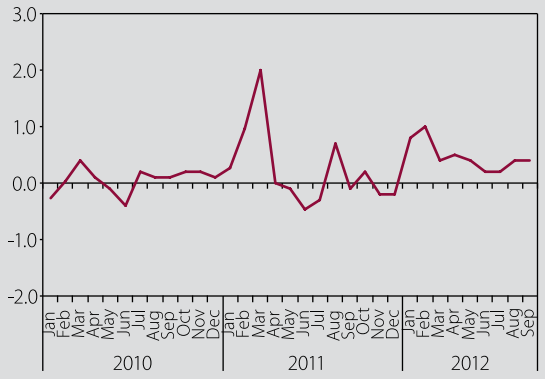
In September 2012, **core inflation** monthly rate amounted to -0.3%, being 0.7 percentage points lower compared to total inflation recorded in this month. Over the first five months, as well as in August and September, monthly core inflation was lower than the official

Table 1 - Inflation, %

	2011				2012		
	III	VI	IX	XII	III	VI	IX
Change in relation to previous year-end	3.3	2.7	3.0	2.8	2.2	3.2	4.3
Annual change	3.7	3.5	3.4	2.8	2.7	3.9	4.4

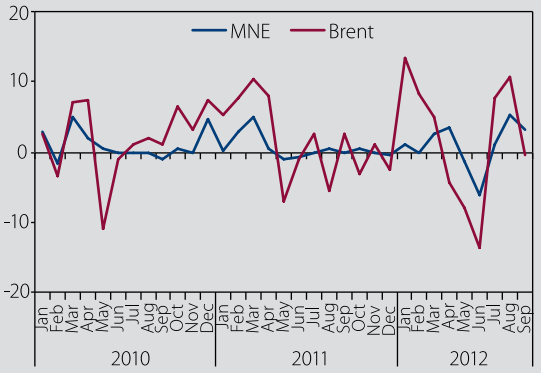
Source: Monstat

Graph 1 – Consumer prices, monthly growth rate



Source: Monstat

Graph 2 – Oil prices, monthly growth rate



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

monthly inflation, while in June and July it was higher 0.1 percentage point and 0.5 percentage points, respectively. In relation to December 2011, in September 2012, core inflation was 2.7 percentage points lower than the total recorded inflation which amounted to 4.3%.

The price of reference OPEC basket in Q3 averaged at 106.6 USD/barrel, which is 0.2% lower in relation to the average price in Q2 2012. The average price of Brent in Q3 amounted to 109.6 USD/barrel, which is a 1.2% increase in relation to the average price in Q2 2012. The growth was mostly induced by the risk on the production side, i.e. geopolitical

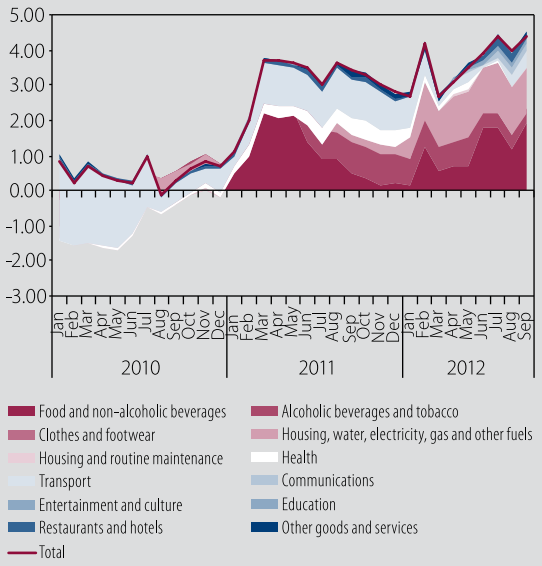
Table 2 - Share of individual categories in total inflation

	Weights	XII 12/VI 12	Growth rate	Contribution	Share in total inflation
TOTAL	1000.0	101.0	1.0	1.0	100.0
Food and non-alcoholic beverages	375.5	99.8	-0.2	-0.1	-8.0
Alcoholic beverages and tobacco	37.2	99.7	-0.3	0.0	-1.2
Clothing and footwear	76.1	99.9	-0.1	0.0	-0.9
Dwelling, water, electricity, gas and other fuels	128.7	103.8	3.8	0.5	47.4
Furnishing, household equipment and routine household maintenance	49.4	99.2	-0.8	0.0	-3.7
Health	28.0	100.2	0.2	0.0	0.5
Transport	121.6	103.9	3.9	0.5	45.4
Communications	55.8	103.6	3.6	0.2	19.4
Entertainment and culture	32.1	100.3	0.3	0.0	0.8
Education	21.8	100.0	0.0	0.0	0.0
Restaurants and hotels	29.6	99.2	-0.8	0.0	-2.2
Other products and services	44.2	100.6	0.6	0.0	2.4

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 CBCG calculations

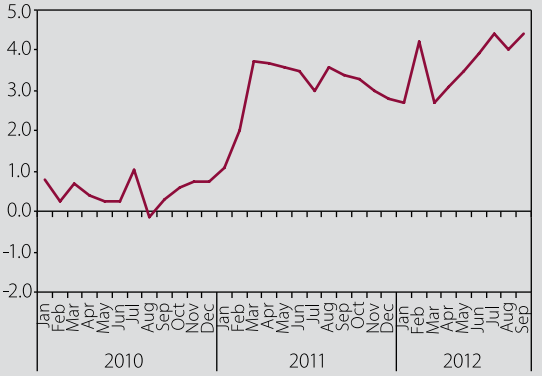
instability and conflict in the Middle East. However, demand for crude oil remains limited and its projection depends on the uncertainty that the still sluggish global economy is facing. In Q3, prices in the category "fuels and lubricants" in Montenegro recorded a 9.6% increase.

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



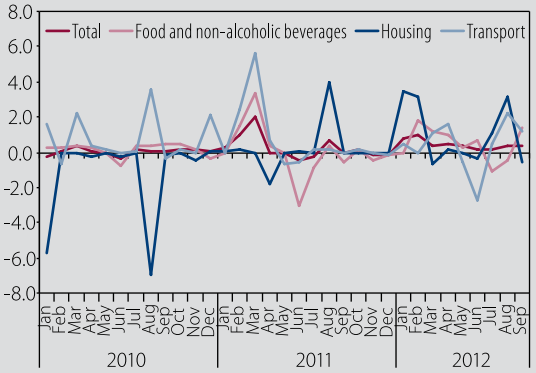
Source: Monstat and CBCG calculations

Graph 4 – Consumer prices, annual rate



Source: Monstat

Graph 5 – Selected categories – consumer prices, monthly rate



Source: Monstat

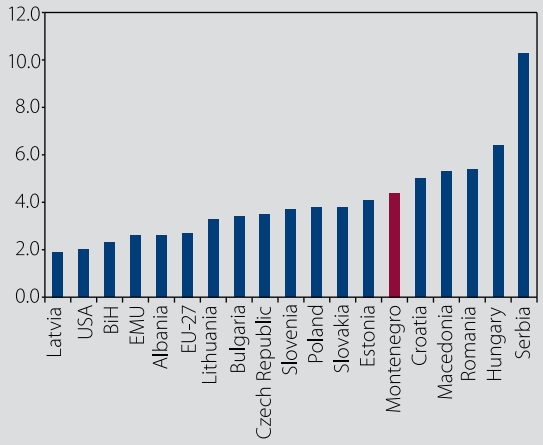
Annual consumer prices rate in September amounted to 4.4% showing an 0.5 percentage points increase in relation to the annual rate recorded in June. The most significant annual prices increase was recorded in the following categories: "alcoholic beverages and tobacco" (10.7%), "dwelling, water, electricity, gas and other fuels" (10.1%), "hotels and restaurants" (6.7%), "food and non-alcoholic beverages" (5.1%) and "other products and services" (-3%).

In Q3 2012, **producers' prices of manufactured products** increased 2.6% in relation to Q2 2012, whereby the prices of electricity, water gas and steam supply increased 18.2%. Prices in the manufacturing industry recorded a 2.5% decline, while the prices in the mining and quarrying sector remained unchanged. Observed in relation to end-2011, producers' prices of manufactured products in September recorded an increase of 5.6%, while observed annually, this growth amounted to 3.5%.

Comparison of Montenegro's annual inflation with that of selected countries shows that the following countries recorded higher annual inflation rate: Croatia (5%), Macedonia (5.3%), Romania (5.4%), Hungary (6.4%) and Serbia which recorded the highest growth (10.3%). The lowest annual growth was recorded in Latvia (1.9%).

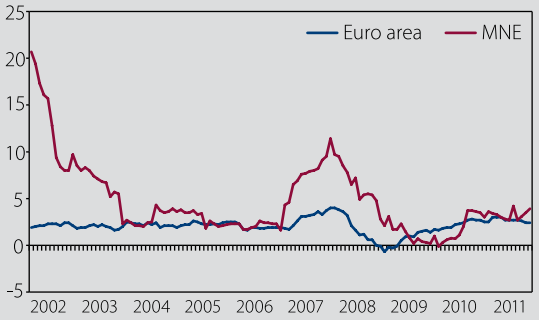
The annual rate recorded in the Euro area, measured by harmonized consumer prices index (HCPI) amounted to 2.6%. The annual inflation rate in Montenegro measured by CPI amounted to 4.4%.

Graph 6 – Annual inflation rate in selected countries, September 2012



Source: National Statistical Offices and EUROSTAT

Graph 7 - Inflation in the Euro area and in Montenegro since the introduction of euro (annual rates)



Source: Monstat and EUROSTAT

2. INFLATION FORECASTS OF BANKS

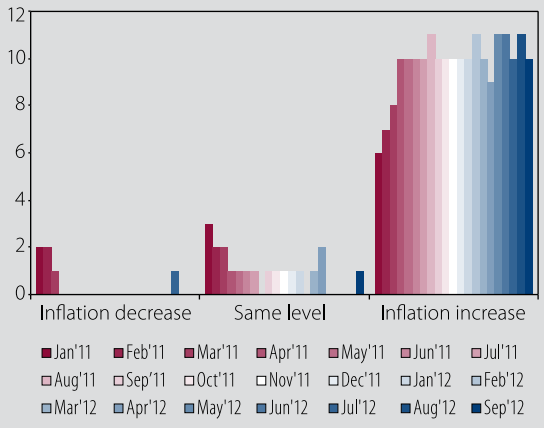
Regarding inflation forecasts of banks, based on the survey conducted in September 2012, ten banks expected higher inflation rate in 2012, while only one bank expected unchanged inflation rate in relation to 2011 (Graph 8).

Banks' forecasts regarding the trend and the level of inflation by the end of 2012 differ. Five banks expect inflation in the range of 4% to 5%. Four banks expect inflation growth to range between 3% and 4% , one bank expects it to range between 1% and 2% and one bank expects inflation growth over 5%.

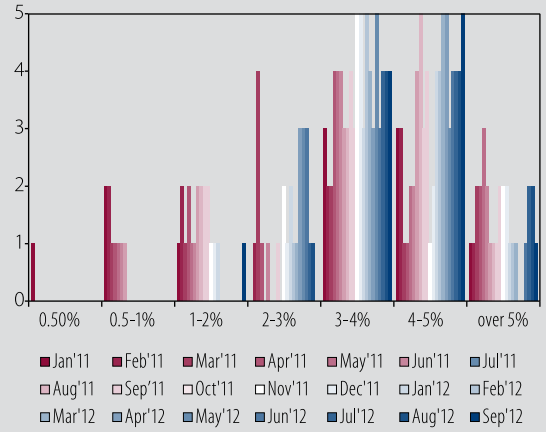
As for the forecasts on lending interest rates trends, eight banks expect the nominal interest rates to remain the same; two banks expect them to decline, while one bank expects the growth of nominal interest rates. As for the effective lending interest rates, nine banks expect them to remain the same as in 2011, while two banks expect their decline in relation to 2011.

With regard to forecasts on deposit interest rates trends, seven banks expect the deposits interest rates to keep their 2011 levels, two banks expect them to decline, and two banks expect them to increase in relation to 2011.

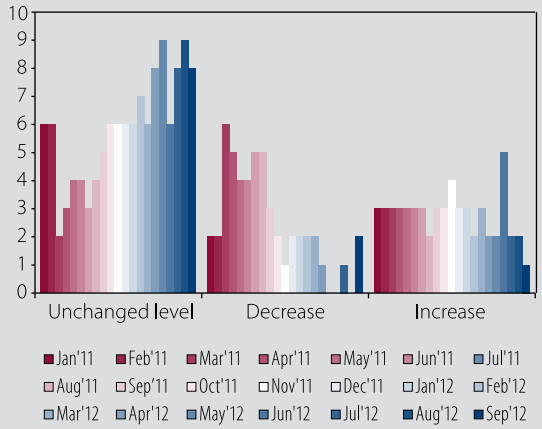
Graph 8 - Inflation forecasts (banks)



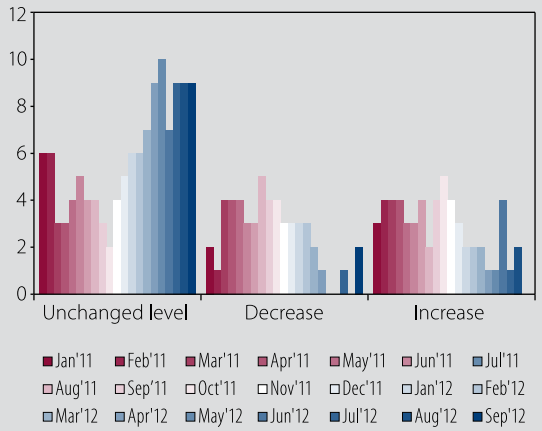
Graph 9 – Forecasted inflation rate level (banks)



Graph 10 – Nominal lending interest rate movement forecasts

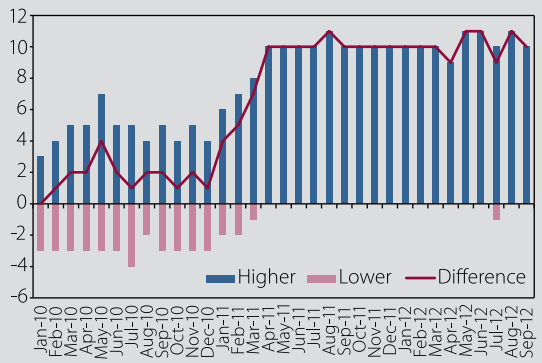


Graph 11 – Effective lending interest rate movement forecasts



For the purpose of calculating inflation forecasts we use the market trend indicator (red 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

Graph 12 – Market trend indicator



expected in the upcoming period. The more negative its value is, the lower the inflation forecast is, while higher positive value means higher inflation level forecasts. Inflation forecasts started growing in 2011 (Graph 12), and as of April 2011 until and including September 2012, they were at a significantly higher level.

Expectations of economy (except banks)

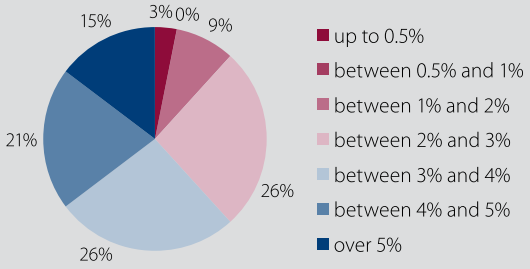
Inflation

Out of total surveyed companies, 26% expected inflation in 2012 to range between 2% and 3%, and 26 % expected inflation between 3% and 4%. Inflation between 4% and 5% is expected by 21% of surveyed companies, and 15% of surveyed companies expect inflation over 5%. Only 3% of surveyed companies expect inflation under 0.5%, while 9% expect inflation to range between 1% and 2%.

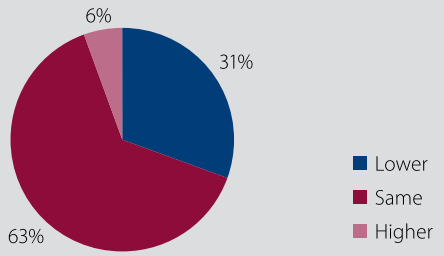
Lower salaries are forecasted by 31% of suveyed companies, the increase in salaries is expected by 6%, while 74% of surveyed companies expect that salaries will not change.

Most of surveyed companies (75%) expects increase of production input prices, while 61% of them expects the prices of their products' (services) to remain unchanged in 2012. As for the number of employees, 45% of surveyed companies does not expect any changes by the end of 2012 in relation to 2011, 33% expect an increase, while 22% expect a decline.

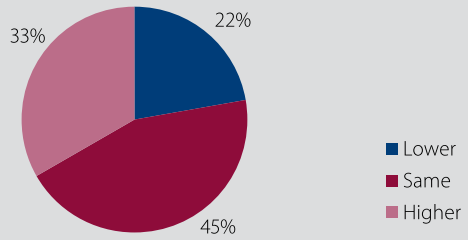
Graph 13 – Forecasted inflation in 2012



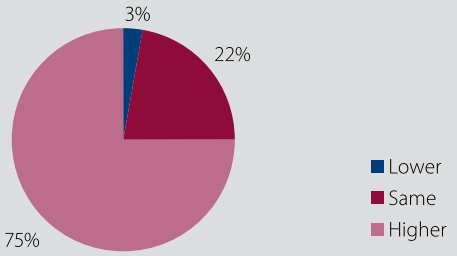
Graph 14 – Expected level of salaries by end-2012



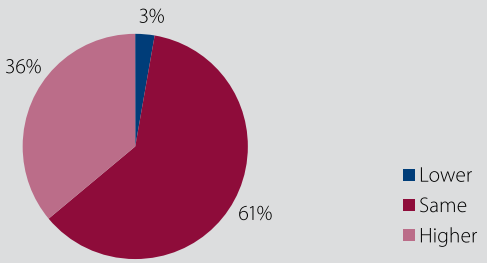
Graph 15 – Expected number of employees by end-2012



Graph 16 - Expected level of prices of production inputs by end-2012



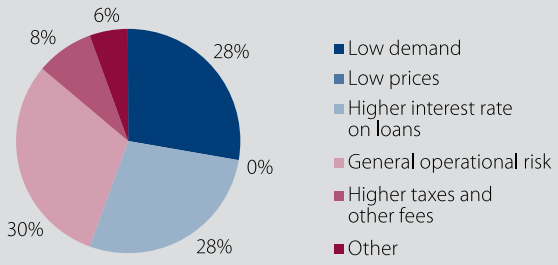
Graph 17 - Expected level of prices of products (services) by end-2012



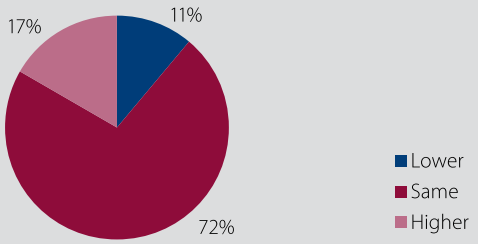
Business Environment

The survey results showed that most of the surveyed companies saw general operational risks (30%), lower demand (28%) and high lending interest rates (28%) as business barriers. In addition, 72% of surveyed companies expected unchanged lending interest rates, 17% expected them to be higher, while 11% of them expected lower lending interest rates in 2012 relative to 2011.

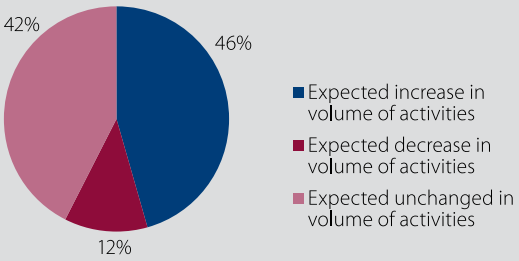
Graph 18 – Business barriers



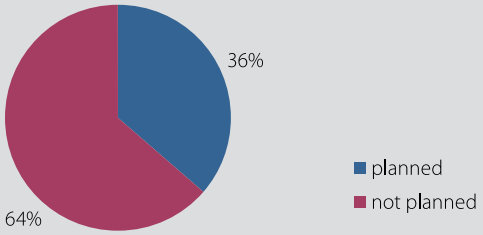
Graph 19 – Expected level of lending interest rates in 2012 relative to 2011



Graph 20 – Expected volume of activities by end-2012



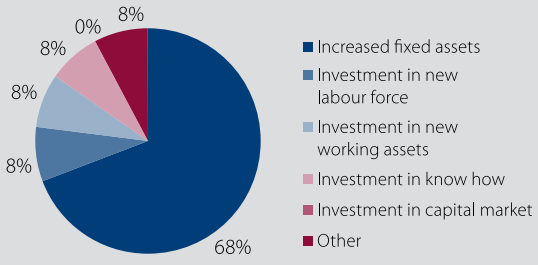
Graph 21 – New investments by end-2012



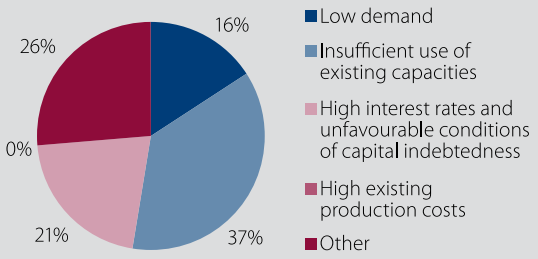
Investments

Out of the total number of surveyed companies, 46% planned the increase in the volume of activities by the end of the year, while 36% planned new investments. As much as 68% of investments referred to the increase in fixed assets, while insufficient exploitation of existing capacities, high interest rates and unfavourable conditions for capital borrowings and other obstacles were described as largest barriers to new investments.

Graph 22 - Types of new investments planned by end-2012



Graph 23– Obstacles to new investments by end-2012



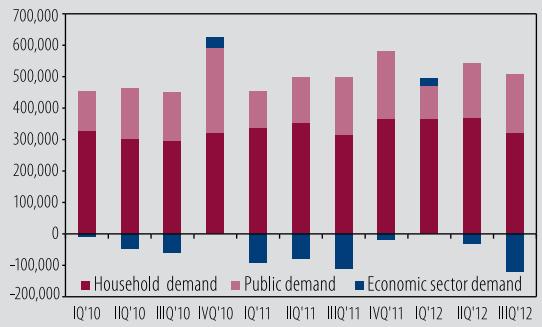
3. INFLATION DETERMINANTS

3.1. DEMAND

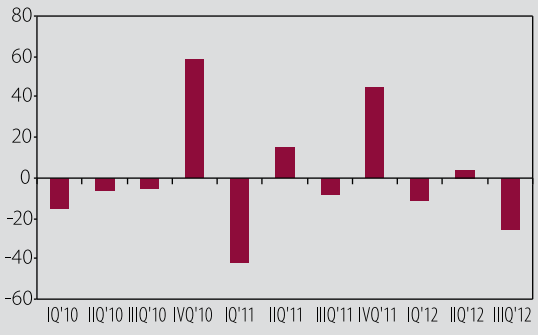
In Q3 2012, the aggregate demand recorded a decline in relation to Q2 2012. Observed by sectors, public consumption was somewhat higher in relation to Q2, while households demand declined. Observing the structure of total demand, in relation to its structure in the previous quarter, the share of households and public consumption increased, while the share of the corporate sector declined.

The level of aggregate demand in Q3 2012 declined significantly in relation to total demand recorded in Q2 2012, and slightly declined in relation to the level of demand recorded in the final quarter of 2011.

Graph 24 – Aggregate demand (EUR thousand)



Graph 25 – Quarterly aggregate demand growth rates



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 an 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 income, non-observed economy revenues, and the like. Methodology of calculation of the aggregate demand 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 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

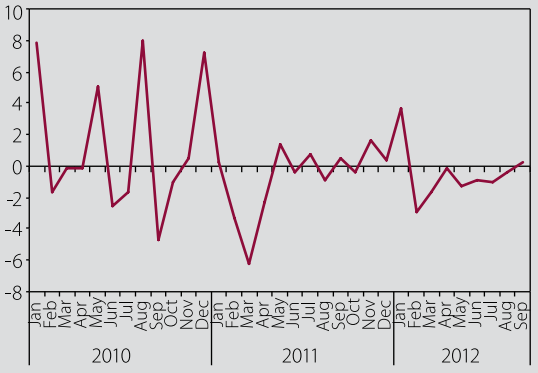
in Q3 2012, the average salary in Montenegro amounted to EUR 718, while the average salary without taxes and contributions amounted to EUR 481. Average salary and average salary without taxes and contributions each recorded q-o-q decline of 1.3%.

Taking into account the consumer prices, i.e. movements of salaries in real amounts, it can be concluded that in Q3 real salaries declined in July and August, and increased in September.

Graph 26 – Average salaries without taxes and contributions in Montenegro

Source: Monstat

Graph 27 – Real salaries (monthly growth rate)



Source: Monstat

Households' loans amounted to EUR 825.2 million at end-September 2012. In relation to end-2011, households' loans were 1.0% lower, while in relation to the same period of 2011 they were 2.2% lower. Over the course of the first nine months of 2012, households' loans declined at an average monthly rate of 0.1%, which is a deceleration of the decline rate in relation to the same period 2011, when loans granted to this sector declined at an average monthly rate of 0.2%.

Per capita debt amounted to EUR 1,331 at end-Q3 2012, recording a 1.0% decline in relation to end-2011, i.e. a decline of EUR 2.2% in relation to the same period of 2011.

Households' loans with MFIs amounted to EUR 28.5 million at end-Q3 2012, which is 12.9% lower than at end-2011, i.e. 15.3% lower than in the same period of 2011.

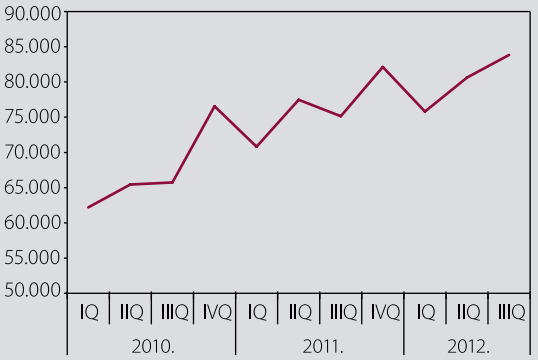
Households' deposits amounted to EUR 1,113.7 million at end-Q3 2012 recording a 7.8% increase in relation to end-2011, i.e. a 7.6% y-o-y increase.

Loans to deposits ratio for the household sector amounted to 0.74 at end-September 2012 improving in relation to end-2011 (0.81), as well as in relation to the same period of 2011 (0.82). Net households' deposits amounted to EUR 288.0 million at the end of the observed period recording an increase in relation to end-2011 when it amounted to EUR 199.7 million, while in the same period of 2011 net deposits amounted to EUR 191.1 million.

Balance of payment statistics showed that the inflow of foreign funds to natural persons in inQ3 2012 recorded an increase in relation to the previous two quarters and in relation to the same quarter of 2011. In Q3, the inflow arising from inheritance, alimony, pensions, disability and other social transfers and remittances in favour of domestic natural persons' accounts.

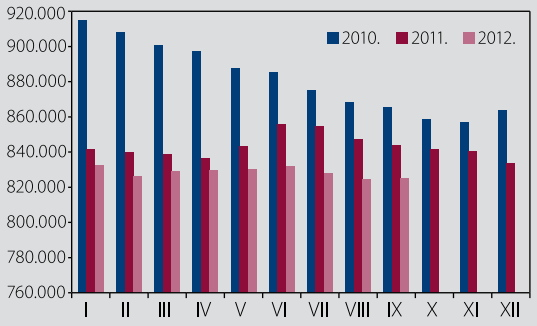
Observation of the total household sector's demand by quarters showed that demand in Q3 2012 declined in relation to demand recorded in the previous two quarters but that it is slightly higher in relation to the same quarter 2011.

Graph 29 – Inflow of foreign funds to household sector, (EUR thousand)

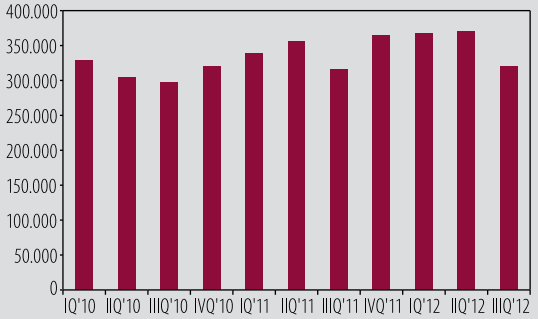


Source: CBCG

Graph 28– Loans granted to households, EUR thousand



Graph 30– Demand of household sector (EUR thousand)



3.1.2. Budgetary analysis

In the first nine months of 2012, Montenegrin Budget, according to Ministry of Finance preliminary data, recorded total revenues[1] in the amount of EUR 1,122.7 million.

Source revenues amounted to EUR 822.3 million or 24.7% of estimated GDP[2], decreasing 1.5% in relation to the plan, and recording a y-o-y decrease of 0.9%. Tax revenues accounted for the highest share in the structure of source revenues (63.7%), followed by contributions (31.2%), fees (1.3%), duties (1.2%), other revenues (2.2%) and repayment of loans granted (0.4%).

Tax revenues amounted to EUR 523.7 million being 2.6% lower than planned, showing also a y-o-y decline of 1.3%. In nominal terms, the most significant y-o-y decline in revenues of EUR 29.6 million was recorded in VAT revenues. Relative to the plan VAT revenues recorded negative deviation of EUR 17.8 million, amounting to a total of EUR 267.1 million.

In addition, revenues arising from international trade recorded a y-o-y decline of 32.3% as a result of a continuous decline in customs rates caused by market liberalisation which followed after the signing of the SAA agreement with the EU, CEFTA agreement with the countries in the region, EFTA agreement with other European countries and Montenegro's accession to World Trade Organisation.

In the above period collection of corporate profit tax and property turnover tax recorded a y-o-y increase of 94.2% and 22.1%, respectively.

In addition, other fees item increased by almost three times as a result of temporary measures introduced after budget amending in July 2012. Revenues arising from contributions amounted to EUR 256.8 million, recording a 2.5% y-o-y increase.

In the first three quarters of 2012, **total budget expenditures** amounted to EUR 1,060.8 million or 31.9% of GDP showing a y-o-y increase of 1.3%. Current expenditures amounted to EUR 465.4 million or 1.3% lower than planned. Expenditures for gross salaries and interests recorded more significant deviations from the plan, namely a 5.8% decline and a 22.3% increase, respectively. Y-o-y increases were recorded in expenditures arising from the items materials and services, interests and social welfare transfers. Expenditures for social welfare transfers increased EUR 22 million, and they amounted to 10.8% of GDP.

Graph 31 – Budget surplus/deficit in the period 2007 – September 2012, in EUR million

Source: Ministry of Finance

Capital budget amounted to EUR 39.3 million or 1.2% of GDP.

The Montenegrin Budget deficit was estimated at EUR 94.6 million, or 2.8% of GDP.

3.1.3. Economy

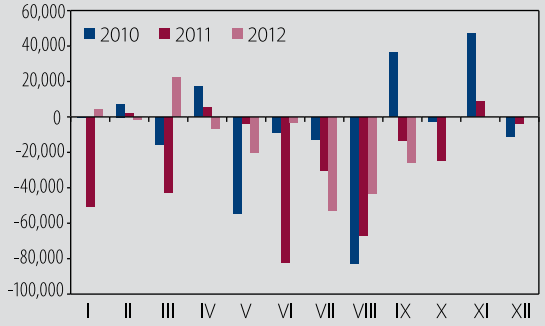
Due to the absence of data on investments by the corporate sector, the net indebtedness of corporate sector can be used for demand approximation.

In the first nine months of 2012, loans granted to corporate sector were significantly higher than this sector's deposits with the banks. Net debt of the corporate sector amounted to EUR 340.8 million at the end of the observed period, being 27.0% lower in relation to end-2011, i.e. 30.0% lower y-o-y.

[1] *Revenues include source revenues (direct and indirect taxes and non-tax revenues), borrowings, donations and revenues from privatization and sale of properties.*

[2] *Estimated GDP for 2012 amounts to EUR 3,324 million.*

Graph 32 – Net debt of the corporate sector, monthly change, at EUR 000



3.1.4. External demand and the current account

In the first nine months of 2012 current account deficit recorded a 6% y-o-y increase and it amounted to EUR 330.9 million. Such trend is a result of the negative movements recorded in the international visible trade, a decline in the visible export and a slight increase in the import all of which has lead to a 7.6% y-o-y increase in the foreign trade deficit. As per preliminary data, in the first nine months of 2012, visible exports recorded a 15.7%[3] y-o-y decline, while, at the same time, visible imports increased 1.5%. The export declined as a result of a decrease in the industrial output and a drop in the prices of metals in the global markets. Current account deficit is financed mainly through FDI (91.4%).

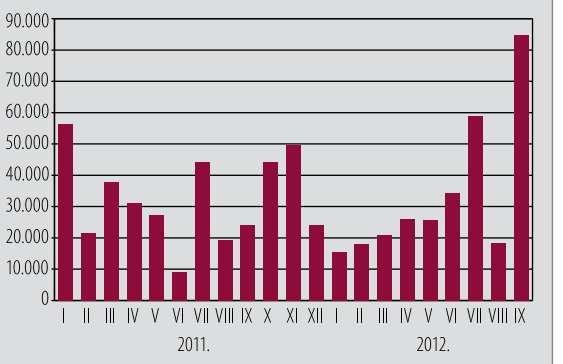
Services sector potential is becoming more and more evident. An increase in the services revenues was recorded in the first nine months of 2012, especially in tourism and transport, indicating the significance of these two sectors for the economic development of Montenegro. Increased tourist demand in 2012 resulted in the increased travel-tourism revenues, which helped record a surplus in the services account and diminish foreign trade deficit. In the observed period surplus in the services account amounted to EUR 610.8 million or 5.3% more than in 2011.

Positive trends in the income and current transfers account have additionally influenced the reduction of the foreign trade deficit. Factor income account recorded a surplus of EUR 22.1 million or about two times more than in 2011 (EUR 11.4 million). Revenues arising from factor income recorded a 4% y-o-y increase, while the expenditures declined 3.8% as a result of the decline in the expenditures arising from paid dividends. Outflow arising from interest repayment recorded no changes in relation to 2011 and it amounted to EUR 95 million. In the observed period, the current transfers account recorded an increase in remittances, which resulted in a surplus of EUR 96.7 million or 18.3 more than in the same period of 2011.

In Q3 2012 FDI inflow increased in relation to previous two quarters, which resulted in a 11.6% y-o-y increase in the net FDI inflow in the first nine months. According to preliminary data, net inflow of FDI amounted to EUR 302.6 million. As of the beginning of 2012, net inflow of FDI was on a monthly uptrend with an exception of August when it was at its lowest level. The highest FDI inflow in 2012 was recorded in September when it amounted to EUR 93.8 million.

In the first nine months of 2012, **portfolio investments** account recorded a net outflow in the amount of EUR 2.8 million. Trends in the other investments account are characterised by the increased borrowing of the state sector in relation to 2011, while the corporate sector reduced its foreign borrowings and the banks reduced their foreign debt. Such trends in the other investments' account in the first nine months of 2012 resulted in the net inflow amounting to EUR 94.4 million.

Graph 33 – Net FDI inflow, in EUR thousand



Source: CBCG

[3] *Monstat data with adjustments performed for the purposes of compiling the balance of payment in line to IMF methodology (BPM5)*

3.2. SUPPLY AND PRODUCTION

In the first nine months of 2012, industrial output recorded a 7.7% y-o-y decline. The decline in output was recorded in all three sectors: the electricity, gas and steam supply sector declined 13.3%, mining and quarrying declined 21.7%, while the manufacturing sector declined 3.1%. Analysis of monthly data on industrial output trends showed that growth was recorded in July (29.1%), while in August and September output recorded decline of -2.8% and -5.4%, respectively.

In the first nine months, Montenegro was visited by 1,368.8 thousand tourists, which is a 4.9% y-o-y increase. The number of domestic tourist arrivals increased 3.3%, while the number of foreign tourist arrivals increased 5.1%. In the same period, Montenegro recorded 8,888.4 overnights, which is a 4.3% y-o-y increase.

In the first nine months of this year, total **wood production** amounted to 165.4 m^3 recording a y-o-y decline of 19.1%.

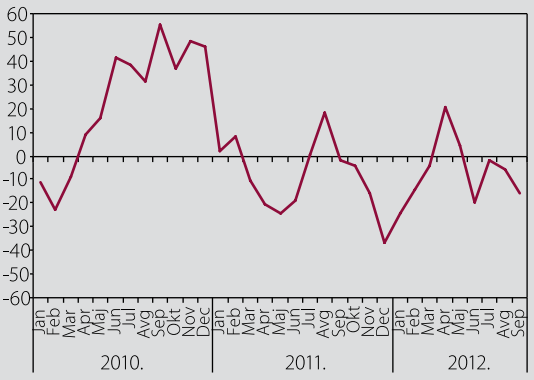
As per preliminary Monstat data, the value of executed **construction works** in the first nine months of 2012 declined 5.5% in relation to comparative period. Construction activity measured by effective working hours declined 8.9%.

In the first nine months, road transport recorded 45.1% more passengers than in the same period of 2011. In the same period, railway transport recorded 6.1% less passengers, while air transport recorded 9% more passengers.

In the first nine months, road cargo transport declined 29.2% (measured in tonne kilometres), air cargo transport 33.4%, railway cargo transport declined 43.4% (mjereno tonskim kilometrima).

Total turnover in ports amounted to 983.4 thousand tonnes showing a y-o-y decrease of 25.3%, whereby the export declined 47.8% and the import declined 0.2%.

Graph 34 – Industrial output, annual growth rate



Source: Monstat

3.3. STOCK EXCHANGE INDICES

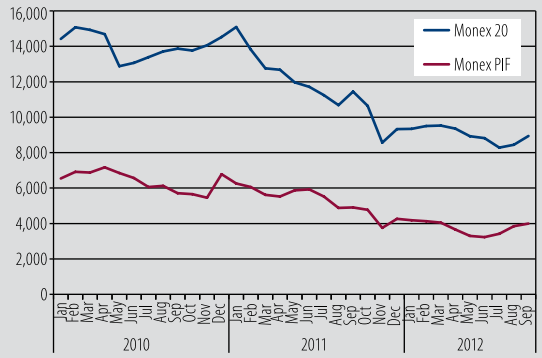
After the negative trend recorded in Q2, in the final two months of Q3 the Monex20 index recorded growth. On the other hand, the investment funds index, Monex PIF, which trended negatively in the first six months, has been recording monthly increase over the entire Q3 2012.

In relation to end-2011, at end-September 2012, the Monex20 recorded an absolute decline of 384.76 index points or 4.1%, while the Monex PIF index declined 268.44 index points or 6.3%.

In relation to end-September 2011, the Monex20 index as well as the Monex PIF index recorded respective declines of 21.9% and 18.5%.

In relation to their historical maximum values (reached in 2007), at end-September 2012, both indices declined: the Monex20 index – 5.4 times and the Monex PIF index – 12.7 times.

Graph 35 - Montenegro Stock Exchange indices



Source: Montenegro Stock Exchange

Table 3 – General data on indices

	MONEX 20		MONEX PIF	
Value on 30 September 2012	8,940.14		3,996.85	
Absolute change of index in 2012	-384.76		-268.44	
Initial index value	1000.00	March 2003	1000.00	March 2003
Maximum value in 2012	9,807.33	23 March 2012	4,272.97	12 February 2012
Maximum historical value	48,617.88	7 March 2007	50,780.54	7 August 2007
Minimum historical value	918.57	14 April 2003	959.53	02 April 2003
Growth (decline) in 2012	-4.1%		-6.3%	

Source: Montenegro Stock Exchange

4. MONETARY POLICY

In the Q3 2012, there were neither change in existing, nor new decisions were passed referring to the CBCG monetary policy instruments.

5. INFLATION FORECAST FOR 2012

5.1. Model assessment

Montenegro's inflation fan chart represents a graph of probability distribution of inflation rate expressed through the consumer price index. In that direction, instead of determining concrete points, using the distribution of probability the "Fan Chart" includes potential risks and uncertainties which could influence the movement of inflation in the future period . The purpose of the fan chart is to point out and take into consideration any existing uncertainty in real economy, consequently reflecting on the inflation rate trends (e.g. higher prices of energy-generating products, increase or decrease in foreign trade deficit, etc.).

Montenegro's fan chart for 2012 and the three quarters of 2013 was based on the following three estimated components:

1. **Central projection values** – The values of the Fan Chart central projection are derived from the ARIMA model, and also by applying the Tramo/Seats simulation in order to obtain the most efficient model.
2. **Degree of uncertainty** – determines the fan chart width. The degree of uncertainty ratios are obtained through analytical assessment and calculation of a relative impact of potential internal and external shocks which are possible in the Montenegrin economy during 2012.
3. **Fan chart curve** – based on the level of the curve in the distribution of inflation projection, the fan chart is adjusted to the forecast to show whether the values of the central projections have "overestimated" or "underestimated" the inflation rates. This will also influence the position of the mean value of inflation distribution.

Fan Chart central projection - ARIMA model for 2012 and three quarters of 2013

For the purpose of Fan Chart preparation, the ARIMA (Auto-Regressive Integrated Model with Variable Averages)[4] model of temporal series of inflation in Montenegro expressed through the Consumer Price Index was developed.

ARIMA model was used for short term forecasts (12 months), whereby iteration of 1129 ARIMA models was made, which were ranked based on their efficiency and quality of diagnostics. The selected ARIMA model, ARIMA (4,2,5)[5] has sufficient confidence level for forecasts.

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[4] 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".

[5] 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.

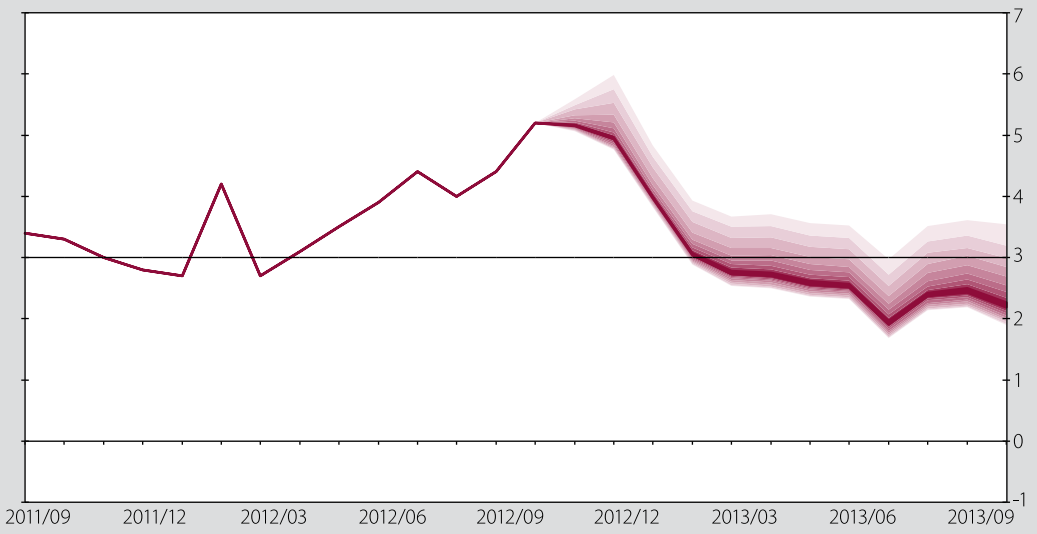
Based on Tramo/Seats[6] procedure, 4 breakpoints (Chow Test was used for identification) have been identified so far, which correspond to a significant change in inflation structure from 2001 to end-2012 and which are included in the ARIMA model through dummy variables.

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 2012 and three quarters of 2013. The obtained values represent the distribution mode, i.e. the values with the highest frequency in the distribution of this time series.

Mean value of the obtained model was 3.15, while the curve varied from –1.05 to 1.95, and standard deviation values were σ2=0.34 and/or σ1=0.12. This pointed out that the central band, as in the last two years, was placed in the lower part of distribution, i.e. that the corresponding degree of uncertainty was concentrated towards higher inflation levels, which are reflected in the graph through "thicker" band concentrated above central "the deepest shade of red" band. 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[7]. The fan chart has an equal number of bands (eight) on either side of the central band whereby every band of the same colour, both above and below the central band, cumulatively explains the following 10% of inflation projection. As the degree of uncertainty grows over time, so the fan chart spreads.

Graph 36 – Projected Consumer Price Index of Montenegro for 2012 and three quarters of 2013



Source: CBCG, 2012

[6] *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 programme is used to extract time series elements that cannot be directly separated, separating the elements such as trend, season, cycle, existence of Easter and Christmas effect, which enables better analysis and projection of ARIMA model. (For more details, see Handbook Tramo and Seats (Gómez and Maravall, 1996)*

[7] *Usually the values of mode (central projection)are placed in the deepest shade of the band. However, if there is a significant risk level, it could happen that central projection does not cover neither 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.)*

Montenegro's inflation Fan Chart, based on the ARIMA model and Tramo/Seats simulation for 2012 and the three quarters of 2013 shows with a 90% probability that inflation, measured by the consumer price index, will vary from 1,7% to 6% depending on the month. It is projected that the inflation will range from 4.7% to 6% at end-2012. It is projected that the inflation will range from 1.9% to 3.5% at end-Q3 2013. To wit, as the time span for forecasting grows, uncertainty increases as well and the forecast span for the central projections of the "Fan Chart" referring to the thickest part spreads, shows the probability range of 10%.

The following assumptions have been taken into account when forecasting the inflation in 2012 and the three quarters of 2013 (the annual growth):

1. Oil and oil derivative prices will not exceed 4% of the prices in June 2012;
2. Aluminium prices will not exceed more than 3% of the prices recorded in June 2012;
3. Real estate prices are stagnant relative to end-2011;
4. Price of electricity growth will not exceed 5%;
5. Real wages in 2012 and 2013 will remain at the 2011 level;
6. There will be no significant increase in the prices of food products in relation to September 2012;
7. There will be no significant increase in VAT or other taxes.

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

6. EXPECTED INFLATION IN 2012

Inflation rate as well as inflation forecasts are trending up. Increase of inflation was expected by 10 of the surveyed banks as well as by most of the surveyed companies. Most of surveyed banks expected inflation rate between 4% and 5%, while most of surveyed companies expected inflation rate between 2%% and 4%.

Most sectors, except for tourism and certain segments of transport, recorded declines in the volume of activity, which has an unfavourable effect on the inflation trends (supply decline). On the other hand, the aggregate demand is trending down in relation to Q2 as well as in relation to Q3, as a counterbalance.

This year's inflation was mainly influenced by the factors expected to have a one-off or diminished effects in 2013, such as: increase in controllerd prices, growth of excise duties, introduction of duties, increase in food prices at the global leval, etc. Therefore, in the following year inflation rate is expected to decline in relation to this year's. Econometric forecasts indicate that at end-3Q 2013, we may expect inflation to range between 1.9% and 3.5%.

Model-based assessment shows 90% probability that inflation in 2012 will range between 4.7% and 6%. Our experts' assessment is similar to model-based assumption and it shows that at end-2012 inflation will range between 5% and 6.5%.

Table br.4 – Inflation rate forecast

Optimistic assessment	Realistic assessment	Pessimistic assessment
5%	5.75%	6.5%

Experts' assessment is based on the same assumptions as the model assessment. The change in any parameter used for this forecast would require the revision of the forecast.