CENTRAL BANK OF
MONTENEGRO

INFLATION REPORT
QUARTER I, 2011

Year VII, Number 21

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

WEB SITE: http://www.cb-cg.org

CENTRAL BANK COUNCIL: Radoje Žugić, MS, Governor
Milojica Dakić, MS, Vice -Governor
Velibor Milošević, MS, Vice -Governor
Asim Telaćević
Milivoje Radović, PhD
Milorad Jovović, PhD
Srđa Božović, PhD

TRANSLATED BY: Translation Services Division

DESIGNED BY: Andrijana Vujović

Users of this publication are requested to make reference to the source of information whenever they use data from the Report.

CONTENTS

1. INFLATION INDICATORS 5
2. INFLATION FORECASTS 9
3. INFLATION DETERMINANTS 14
3.1. DEMAND 14
3.1.1. Salaries and other available demand determinants 15
3.1.2. Budgetary analysis 16
3.1.3. Economy 16
3.1.4. External demand and the current account 17
3.2. SUPPLY AND PRODUCTION 18
3.3. STOCK EXCHANGE INDICES 19
4. MONETARY POLICY 20
5. INFLATION FORECAST IN 2011 21
6. EXPECTED INFLATION IN 2011 24

1. INFLATION INDICATORS

Measured by consumer prices, inflation in March 2011 amounted to 3.3% in relation to December 2010. In this period, the highest growth was recorded by the prices of food and non-alcoholic beverages (4.9%), alcoholic beverages and tobacco (10.6%), while transportation and health care prices recorded growth of 8.1%, each. Highest monthly growth of consumer prices was reported in March (2%), representing the highest monthly growth ever since inflation has been measured by consumer prices. At the annual level, consumer prices in March 2011 increased by 3.7% or 3 percentage points more in relation to the growth recorded in the same month of the previous year. The average consumer prices' rate (first three months of 2011 in relation to the same period of the previous year) amounted to 2.3%.

With the increase of 4.9%, the prices of food and non-alcoholic beverages recorded the highest share in total inflation in the first quarter (56.4%). Within this category, almost all groups of products recorded increase of prices, except the prices of meat and fish which declined by 1.6% and 1.1%, respectively. The highest growth was recorded by the prices of vegetables (24.5%), bread and grains (9.2%), where the prices of white bread increased by 13.3%. Prices of fruit increased by 9%, oil and grease by 4.2%, milk, cheese and eggs by 1.1%, while the prices of sugar, honey, marmalade and chocolate increased by 2%, other food products by 2.7% and non-alcoholic beverages by 1.7%. Due to changes of excise duties, prices of alcoholic beverages and tobacco increased by 10.6%, whereby tobacco prices increased by 15.4% and alcoholic beverages by 3.7%.

Table 1 – Inflation, %

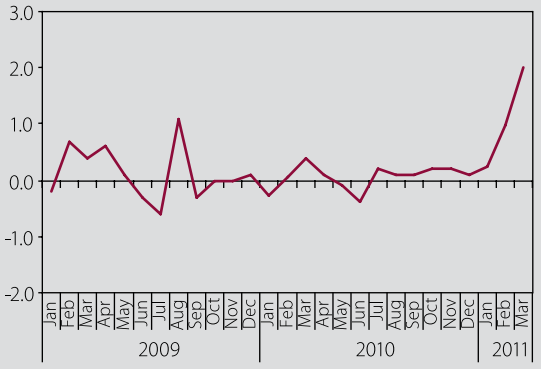
	2010				2011
	III	VI	IX	XII	III
Change in relation to previous year end	0.2	-0.2	0.2	0.7	3.3
Annual change	0.7	0.2	0.3	0.7	3.7

Source: Monstat

Transportation prices increased by 8.1% thus recording share of 30.2%, mostly due to the growth of fuel and lubricants prices of 8.3% and transportation prices of 13.5%. In the category „health care", prices of pharmacy products increased by 10.8% and ambulance services 1.5%, while the prices in the category „restaurants and hotels" increased by 3.6%, mostly due to the growth of catering services by 3.9%. Prices increased by 0.3% in the category "housing", while they increased in the category „other goods and services" by 0.4%. Prices decline was recorded in the categories „culture and entertainment" (-3.5%), „clothes and footwear" (-2.3%), furniture and furnishings" (-1.1%) and „education" (0.3%), while the prices from the category „communications" remained unchanged in the first quarter.

Annual **core inflation** rate increased in March, amounting to 0.9%. Since the beginning of 2011, total annual inflation and annual core inflation have been increasing. Due to higher prices of agricultural products, tobacco, medicines and fuel (excluding listed products) core inflation was lower than the total inflation by 2.8 percentage points in March 2011.

Graph 1 – Consumer prices, monthly growth rate



Source: Monstat

Table 2 - Share of individual categories in total inflation*

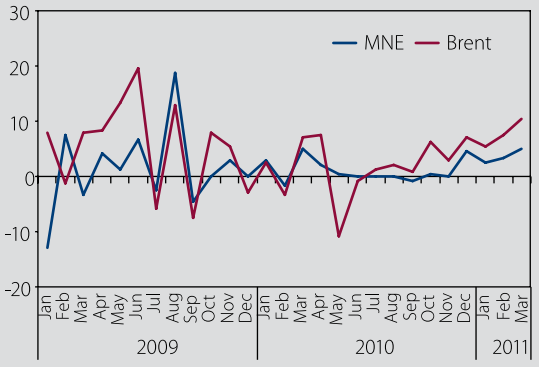
	Weights	III 11/XII 10	Growth rate	contribution	Share in total inflation
total	10000	103.3	3.3	3.3	100.0
Food and non-alcoholic beverages	3755	104.9	4.9	1.8	56.4
Alcoholic beverages and tobacco	372	110.6	10.6	0.4	12.1
Clothes and footwear	761	97.7	-2.3	-0.2	-5.4
housing	1287	100.3	0.3	0.0	1.2
Furniture and furnishings	494	98.9	-1.1	-0.1	-1.7
Health care	280	108.1	8.1	0.2	7.0
Transportation	1216	108.1	8.1	1.0	30.2
Communications	558	100.0	0.0	0.0	0.0
Culture and entertainment	321	96.5	-3.5	-0.1	-3.4
Education	218	99.7	-0.3	-0.0	-0.2
Restaurants and hotels	296	103.6	3.6	0.1	3.3
Other goods and services	442	100.4	0.4	0.0	0.5

** 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

Oil prices at the world's markets increased. Average price of the OPEC reference basket in the first quarter amounted to USD/barrel 101.0 or 14% more in relation to the price from December 2010. Average Brent price in the first quarter amounted to USD/barrel 104.9 or 14.6% more in relation to the price from December 2010. The highest Brent price was recorded in March amounting to USD/barrel 114.6 representing the highest price since August 2008, when it amounted to USD/barrel 113.03. Analysts assess that the increase of row oil prices was due to intensified war in Libya, turmoil in Near East and North Africa Prices were also affected by tragic events in Japan.

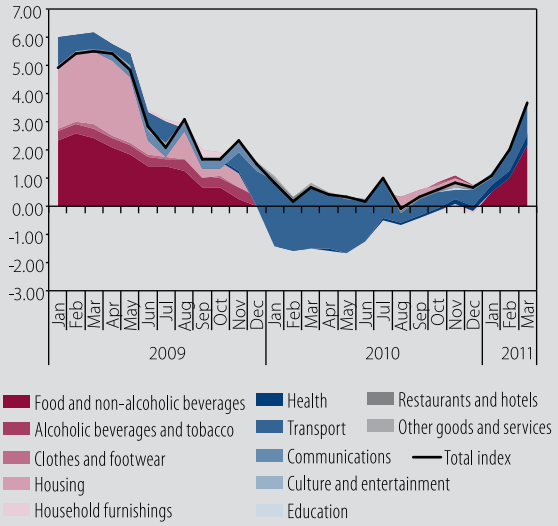
Annual consumer prices' rate amounted to 3.7% in March 2011. Annual inflation grwth was affected by the prices growth in categories „food and non-alcoholic beverages" (5.9%), „transportation" (10.5%), „alcoholic beverages and tobacco" (9.8%), „health care" (11.4%) and „restaurants and hotels" (3.9%).

Graph 2 – Oil prices, monthly growth rate



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

Graph 3 – Consumer prices components: Contribution to the annual rate (index points)

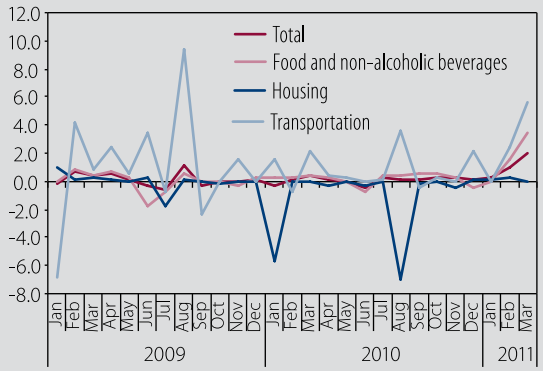


Source: Monstat and CBM calculation

Graph 4 – Consumer prices, annual growth rate

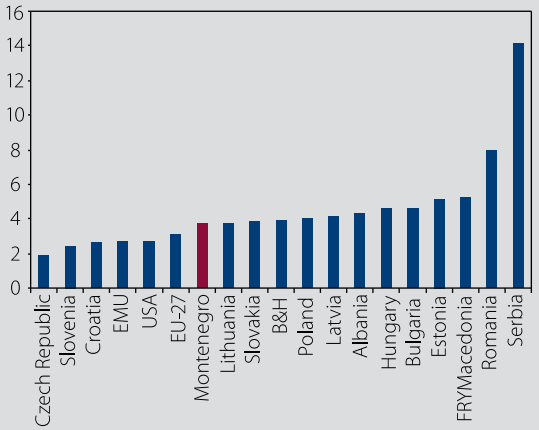
Source: Monstat

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



Source: Monstat

Graph 6 - Annual inflation rate in selected countries, March 2011



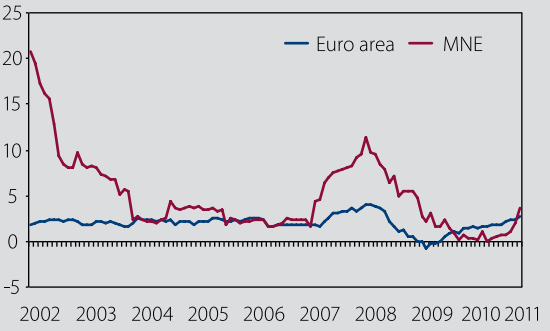
Source: National Statistical Offices and Eurostat

In Q1 2011, **producers' prices of manufactured products** increased by 2.8%, whereby manufacturing industry prices increased by 3.8%, while mining and quarrying prices increased by 3.6%. Electricity, gas and water supply prices remained unchanged in Q1. Annual growth of producers' prices of manufactured products amounted to 5.6%.

Infation in on an upward trend in all selected countries, whereby the highest annual rate was recorded in Serbia (14.1%), Romania (8%), followed by Macedonia with the growth of 5.2% and Estonia 5.1%, while lower annual inflation rate than the one in EMU (2.7%) was recorded by Czech Republic (1.9%), Slovenia (2.4%) and Coratia (2.6%).

Annual inflation growth recorded in Euro area, measured by harmonized consumer prices index (HCPI) amounted to 2.7%, while the annual inflation in Montenegro, measured by CPI, amounted to 3.7%. Source: Monstat and Eurostat

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



Izvor: Monstat i Eurostat

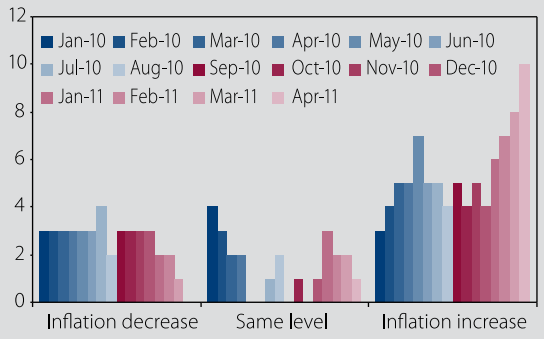
2. INFLATION FORECASTS

BANKS' EXPECTATIONS

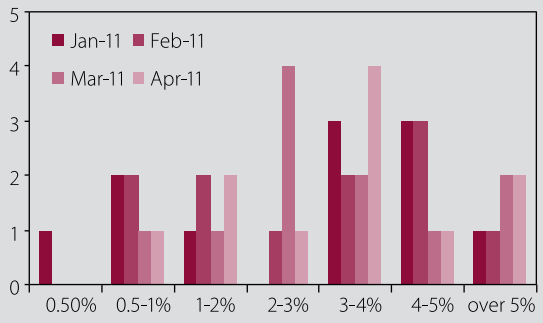
Regarding inflation forecasts of banks, based on the survey conducted in April 2011, ten banks expected higher rate, while only one bank expected the same inflation rate in 2011, in relation to 2010 (Graph 8).

Regarding the inflation level, banks have different expectations. One bank expects the growth rate to range between 0.5% and 1%, one expects it to be between 2% and 3% and third expectation is between 4% and 5%. Two banks expect growth between 1% and 2%, while two of them expet it to be over 5%, while four banks expect the growth to range between 3% and 4%.

Graph 8 - Inflation forecasts (banks)



Graph 9 – Forecasted inflation level (banks)

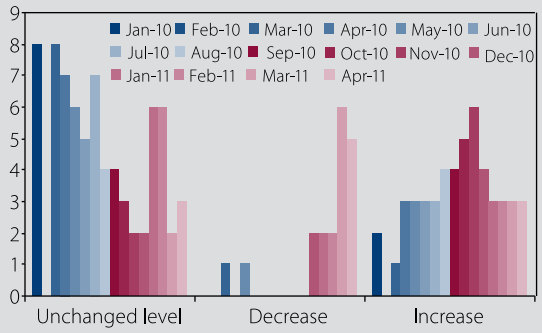


Concerning the forecasts on lending interest rates, three banks forecast unchanged nominal and effective interest rates. Five banks expected the decline in nominal rates, while four banks expected the decline of effective lending interest rates, while three banks expected that nominal lending interest rates will increase and four banks forecasted growth of effective rates in 2011 in relation to 2010.

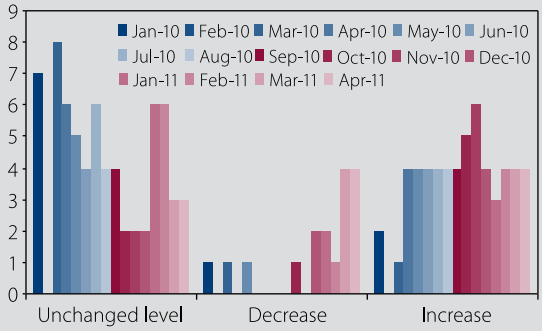
Regarding the deposit interest rates, six banks expected decline of deposit interest rates, one bank forecasted growth, while four banks expected unchanged level in 2011 in relation to 2010.

Market trend indicator (black line in Graph 12) is used for the purpose of calculating inflation forecasts. It is calculated as the difference between the number of banks expecting inflation increase (blue columns) and the number of banks expecting inflation decrease (red columns). If the market trend indicator has a negative value, lower inflation rate is expected in the coming period. If it has a positive value, then an increase in the inflation rate may be expected. If it has a zero value, an unchanged inflation rate may be expected in the coming period. The more negative the value is, the lower the inflation forecast is, and vice versa, while higher positive value means higher inflation level forecasts. Inflation forecast started to grow in 2011 (Graph 12), thus in April 2011 it was substantially higher in relation to trends from the previous year.

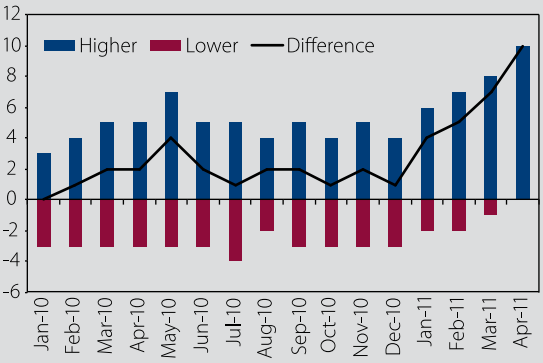
Graph 10 - Nominal lending interest rates forecasts



Graph 11 – Effective lending interest rates forecasts



Graph 12 – Market trend indicator



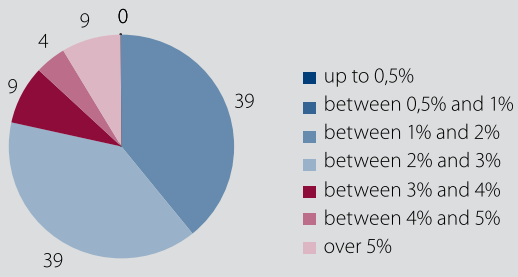
EXPECTATIONS OF ECONOMY (EXCEPT BANKS)

Inflation

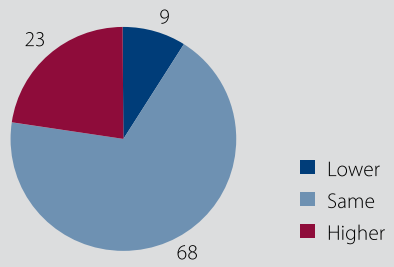
Out of total surveyed companies, 39% expected inflation to range between 1% and 2% in 2011 in relation to 2010. The sam percentage expected inflation to range between 2% and 3%. Inflation ranging from 4% to 5% is expected by 4% of surveyed companies, while 9% of them expected the range between 3% and 4%, that is over 5%. Lower salaries are expected by 9% of suveyed companies, 68%

expects that salaries will not change in 2011 in relation to 2010, while the increase is expected by 23% of surveyed companies. As for the number of employees, 39% of surveyed companies expected the unchanged number, 35% of them believed in decrease and 26% expected increase. Most of surveyed companies (87%) expected increase of production input prices, while only 4% of them believed in decrease of their products' (services) prices in 2011 in relation to 2010.

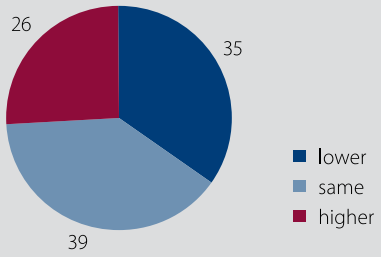
Graph 13 - Forecasted inflation in 2011, in relation to 2010



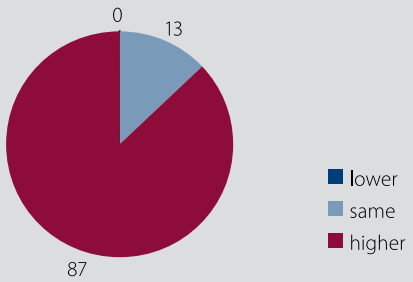
Graph 14 - Expected level of salaries in 2011 in relation to 2010



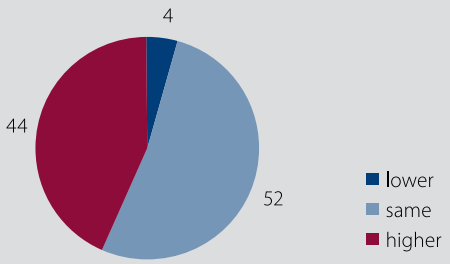
Graph 15 – Expected level in number of employees in 2011 in relation to 2010



Graph 16 – Expected level of prices of production inputs in 2011 in relation to 2010



Graph 17 – Expected level of products' (services) in 2011 in relation to 2010



Business Environment

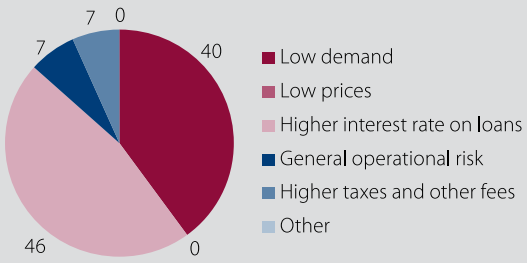
The survey results showed that most of the surveyed companies find high interest rates on loans (46%), poor demand (40%), high taxes (7%) and general operational risks (7%) as obstacles to business.

Besides, 41% of surveyed companies expected lower, 45% expected the unchanged while 14% of them expected higher lending interest rates in 2011 in relation to 2010.

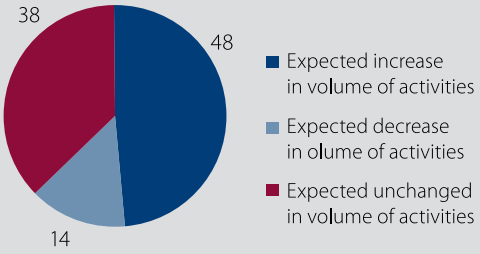
Investments

Out of the total number of surveyed companies, 48% planned the increase in volume of activities in 2011, while 63% planned new investments. The largest number of investments (53%) refers to the increase of fixed assets, and insufficient exploitation of the existing capacities (36%), low demand (32%), high interest rates and unfavourable conditions for capital borrowing (18%) are presented as the major obstacles to new investments.

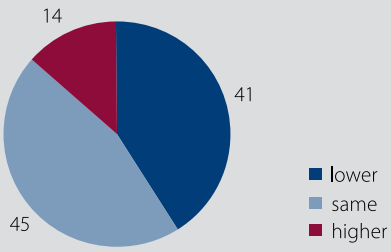
Graph 18 – Business barriers



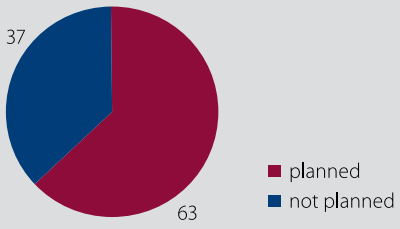
Graph 20 – Expected volume of activities in 2011



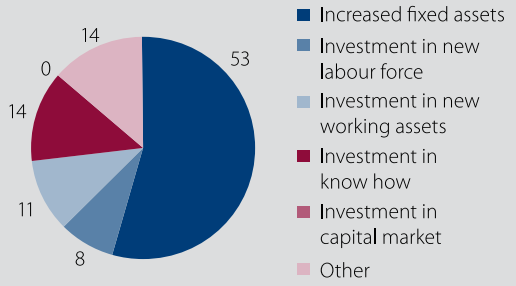
Graph 19 - Expected level of lending interest rates in 2011 in relation to 2010



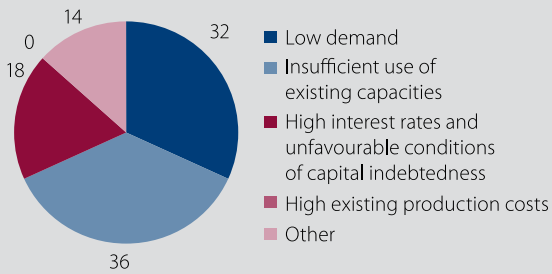
Graph 2 - New investments in 2011



Graph 22 - Types of planned new investments in 2011



Graph 23 - Obstacles to new investments in 2011



3. INFLATION DETERMINANTS

3.1. DEMAND

Data on payments of the Fund for Pension and Disability Insurance for the period January-March 2011 are not available, thus there was no possibility of calculation of households' demand and, consequently, a total demand.

Box 1 - Aggregate demand calculation methodology

Aimed at the more complete monitoring of aggregate demand as the inflation determinant, the CBM 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 a number of data needed for calculating the aggregate demand, the existing data should not be treated as the indicator of the precise 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. Methodology of calculation of the aggregate demand is expressed by the following equation:

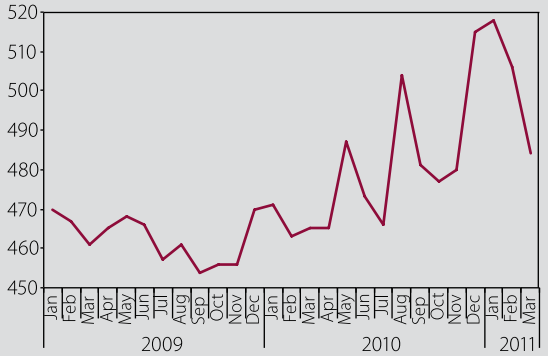
$$AD = C + I + G$$

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 the Q1 2011, the average salary in Montenegro amounted to EUR 749, while average salary without taxes and contributions amounted to EUR 503. In relation to the previous quarter, average salary and average salary without taxes and contributions increased by 2.4%.

Graph 24 - Average salaries without taxes and contributions in Montenegro



Source: Monstat

Graph 25 – Real wages (monthly rate)

Source: Monstat

Taking into account the consumer prices, i.e. salaries in real amounts, it can be concluded that real salaries grew only in January, while they declined in February and March.

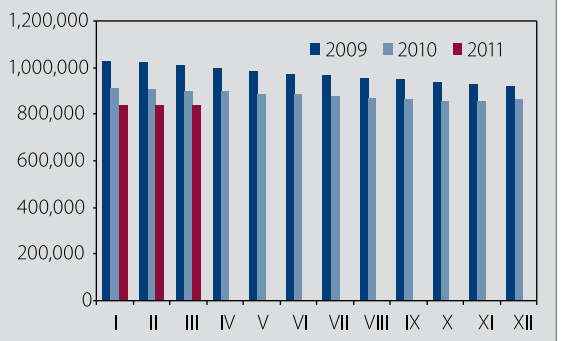
In Q1 2011, households' loans continued the declining trend. Loans to this sector declined at a rate of 1.0% on average at the monthly level (in 2010 they declined at a rate of 0.5%), and they amounted to EUR 838.5 million at end-March. Loans granted to the household sector were by EUR 62.1 million or 6.9% lower in relation to end-March 2010, while in relation to end-2010 they were by EUR 25.1 million or 2.9% lower.

Household loans in MFIs amounted to EUR 39.2 million at end-Q1 2011. At the end of the first quarter of 2011, households' loans in micro-credit financial institutions (MFI) declined by EUR 20.3 million or 34.2% in relation to end-Q1 2010. In relation to end-2010, households' debt declined by EUR 4.0 million or 9.2%.

Deposits of household sector amounted to EUR 953.9 million at the end of the first quarter of 2011, which is EUR 104.2 million or 12.3% more in relation to the same period of the previous year and EUR 2.1 million or 0.2% more in relation to end-2010.

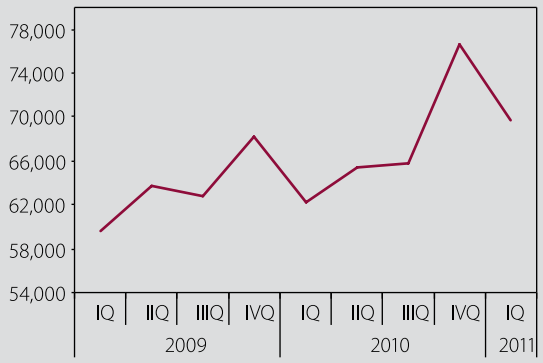
Balance of payment statistics showed that the remittances to households was higher in Q1 2011 in relation to the same period of 2010, as well as in relation to other quarters in 2010, except in comparison with the Q4 when this inflow was somewhat higher.

Graph 26 – Household loans, in EUR thousand



This inflow includes compensations to employees, pensions, remittances and other transfers.

Graph 27 – Remittances to households, EUR thousand



Source: CBM

3.1.2. Budgetary analysis

Consolidated public consumption

The assessment of the Ministry of Finance showed that **the consolidated public consumption** in the first quarter of 2011 amounted to EUR 282.8 million or 8.9% of estimated GDP for 2011[1]. It was by 3% lower in relation to the same period of 2010 and by 8.1% in relation to the plan. The estimated level of public consumption was financed from direct taxes[2] in amount to EUR 81.4 million, indirect taxes in amount of EUR 126.6 million and non-tax revenues in amount of EUR 19.8 million. In addition to core revenues, public expenditure in the first quarter of 2011 was financed from borrowings and loans in amount EUR 9.3 million, privatization (EUR 2 million) and donations (EUR 1.1 million). Deposits were used in amount of EUR 68.9 million or 2.2% of GDP.

Current public revenues[3] amounted to EUR 227.7 million or 7.1% of estimated GDP for 2011. Current public revenues were 6.6% lower than planned amount for the observed period, as a result of evident decline of tax revenues (except VAT revenues which increased by 2.9% in relation to the plan) and substantial decrease of other current revenues (taxes, different fees, other revenues and incomes from the loan repayment). In the observed period, revenues from compensations increased by 4% in relation to the plan for Q1 2011.

Current public consumption amounted to EUR 270.3 million or 8.5% of GDP in the Q1, which is by 6.5% less than in relation to the plan for the same period and 1.3% more in relation to the same period of the previous year. Social protection transfers represented the most significant expenditure item with EUR 110.4 million or 3.5% of GDP (dominantly due to expenditures for pensions), gross salaries EUR 90.2 million or 2.8% of GDP and transfers to institutions, individuals, NGO and public sectors (transfers to health care institutions, Montenegrin university) EUR 22.6 million or 0.7% of GDP.

Capital budget amounted to EUR 12.5 million or 0.4% of GDP.

In Q1 2011, cash deficit of the public sector was estimated to EUR 55 million or 1.7% of estimated GDP for 2011.

3.1.3. Economy

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

Loans granted to the corporate sector were substantially higher than their deposits in Q1 2011. Net debt of the economy sector was 11.8% lower at end-March 2011 in relation to December and 19.3% lower in relation to March 2010. The structure of loans granted to the corporate sector shows that the share of long-term loans in total loans granted to this sector amounted to 73.3% at the end of the reporting period, whereby loans with maturity over 3 years made up 50.1% of total

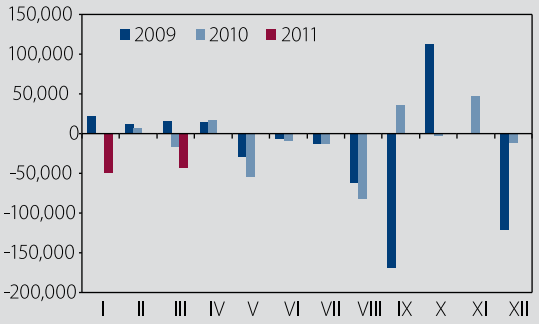
[1] *Source: Ministry of Finance, estimated GDP for 2011 amounts to EUR 3.192.0 million*

[2] *Direct taxes are consisted of income tax, revenues and contribution taxes. Indirect taxes are consisted of VAT, custom, excise duties and other taxes. Non-tax revenues are consisted of fees, compensations and other revenues.*

[3] *Total current public revenues include revenues of the budget, state funds and local administration.*

loans granted to the corporate sector. This structure of loans points to their dominant use for increasing the economic activity.

Graph 28 - Net indebtedness of the corporate sector, monthly change, EUR thousand



3.1.4. External demand and the current account

According to preliminary data, current account deficit amounted to EUR 188.5 million in Q1 2011or 22.5% less in relation to the previous year. Foreign commodity exchange is characterised by positive trends. In this period, substantial growth of commodity export was reported, as well as the growth of total commodity exchange, while external trade deficit declined. Total foreign commodity exchange amounted to EUR 468.4 million or 25% more in relation to the same period 2010. Export increased by 91.7%, mostly due to positive trends in metal industry, while at the same time the import increased by 12%. Commodity account deficit amounted to EUR 237.1 million or 6.8% less in relation to the previous year.

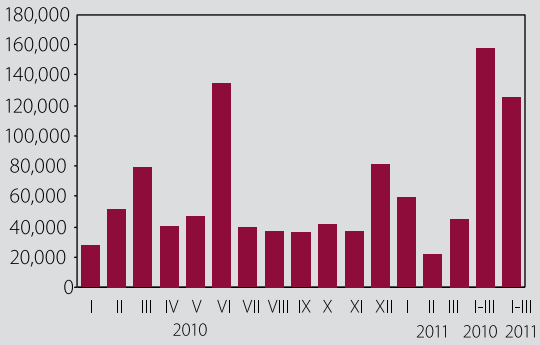
In international services exchange, Montenegro recorded surplus amounting to EUR 2.6 million, while in the same period of 2010, deficit in amount of EUR 17.2 million was recorded. Revenues from services amounted to EUR 60.9 million and were 20.7% higher in relation to Q1 2010. The highest revenues were in transportation (EUR 25.2 million), other business services (EUR 13 million), travel – tourism (EUR 9.2 million) and communication services (EUR 5.1 million). Expenditures from services amounted to EUR 58.3 million or 13.9% less in relation to 2010.

Factor incomes recorded surplus in amount EUR 20.4 million. In Q1, factor income revenues amounted to EUR 45 million or 17% more in the same period of 2010. Compensations of employees represented the largest part of revenues (EUR 41.7 million). Expenditures amounted to EUR 24.5 million or 26.8% less than in 2010. The highest revenues were recorded from interest repayment (EUR 20.9 million) or 2.8% more in relation to 2010.

Growing inflow of monetary assets was continued at the current transfers account. In Q1 2011, current transfers' saldo amounted to EUR 25.6 million or 9.3% more in relation to Q1 2010. Total revenues from current transfers amounted to EUR 33.9 million or 11.5% in relation to the previous year, of which EUR 3.2 million referred to the state sector, while EUR 30.7 million referred to other sectors. In the same period, current transfers' expenditures amounted to EUR 8.3 million.

According to preliminary data, net FDI inflow amounted to EUR 114.2 million or 17.4% less than in 2010. Total FDI inflow amounted to EUR 125.4 million. Out of the total FDI inflow, equity investments amounted to EUR 83.2 million, while the intercompany debt inflow amounted to EUR 34 million.

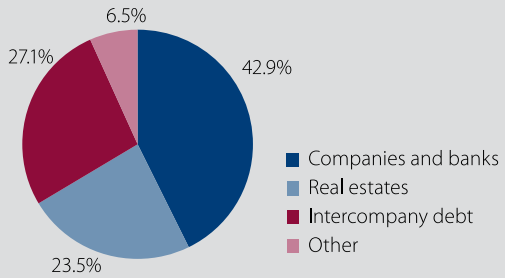
Graph 29 - FDI inflow in the period 2009 – March 2011, in EUR thousand



Source: CBM

In the equity investment structure, investments in companies and banks amounted to EUR 53.8 million or 28.3% less than in the same period of 2010, while investments in real estates amounted to EUR 29.5 million or 5.4% less in relation to the previous year. Monetary assets inflow from withdrawal of residents' funds invested abroad amounted to EUR 8.2 million.

Graph 30 - Structure of total FDI inflow during the period January-March 2011



Source: CBM

Total FDI outflow in the period January-March 2011 amounted to EUR 11.2 million or 42.7% less. In the outflow structure, EUR 5.8 million referred to residents' investments abroad, while the outflow from withdrawal of non-residents' investments amounted to EUR 5.4 million.

During the observed period, the **account of portfolio investments** recorded substantial net inflow of EUR 14 million. Total inflow of funds from portfolio investments amounted to EUR 33.5 million, while at the same time the outflow amounted to EUR 19.5 million. The highest inflow was achieved from investments in debt securities amounting to EUR 30 million.

At the **other investments'** account net outflow in Q1 2011 amounted to EUR 78.2 million, while in Q1 2010, net inflow in amount of EUR 4.8 million was recorded. Net outflow was a result of the increase of foreign assets, as well as the decline of foreign liabilities. Foreign deposits of banks increased by EUR 51 million, while banks recorded decline of their liabilities from loans taken by EUR 45 million.

The inflow from withdrawal of funds from loan taken from the private sector amounted to EUR 142.3 million, which is significantly more than in 2010 (EUR 50.2 million), while the outflow from repayment of principal amounted to EUR 116.3 million, significantly more than in 2010 (EUR 36.6 million).

3.2. SUPPLY AND PRODUCTION

In Q1 2011, industrial production recorded growth of 0.9%, based on monthly indices in relation to the previous year average. Observing monthly data on industrial production in relation to the average from the previous year, growth was recorded in January (5.5%), while the decline was recorded in February (-0.1%) and March (-2.8%). If we observe first three months of this year with the same period of the previous year, industrial production amounted to 0.4%.

Graph 31 - Industrial production, annual growth rate

Source: Monstat

In the first quarter of 2011, Montenegro was visited by 49.7 thousand tourists or 2.6% more than in the same period of 2010. The number of arrivals of domestic tourists increased by 11.8%, while the number of foreign ones decreased by 1.1%. The number of overnights in the observed period amounted to EUR 182.1 thousand or 5.6% less than in the same period of previous year.

In the first three months of this year, total wood production amounted to 25,219 m^3 or 102.1% more than in the same period of the previous year.

The value of performed construction works in Q1 2011 amounted to EUR 41.8 million or 18.1% more in relation to the same period of the previous year, while, measured by effective working hours, construction activity increased by 24.6%.

Some 12.9% more passengers was transported in road transportation in Q1 2011 in relation to the same period of the previous year, while cargo transport declined by 30.5%. Railway passenger transportation declined by 46.4%, while cargo railway transportation increased by 18%. Air transportation recorded increase of 1.8% while cargo transportation increased by 174.2% in relation to the same period of the previous year.

Total turnover in harbours amounted to 296 thousand tonnes in the first three months or 12.7% lower in relation to the same period of the previous year, where the export decreased by 17.7% and the import increased by 0.5%.

3.3. STOCK EXCHANGE INDICES

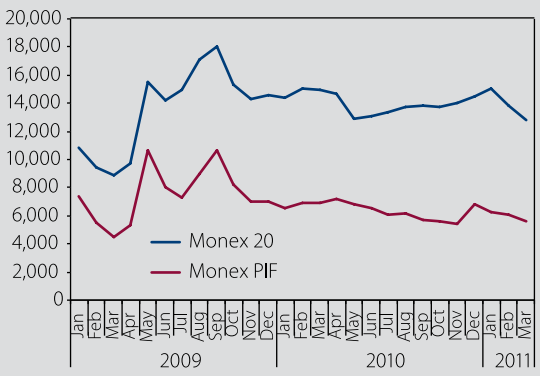
As of 10 January 2011, one single stock exchange is operating in Montenegro, since Nex Montenegro stock exchange merged with Montenegro stock exchange and ceased to operate as of 31 December 2010, pursuant to enacted decisions. The stock exchange uses two indices, MONEX20 and MONEXPIF, being the legal successors of all indices at Montenegrin stock exchanges.

In Q1 2011, stock exchanges recorded monthly increase only in January. In relation to the end-2010, MONEX20 recorded absolute decline of 1,760.87 index points or 12.1%, while MONEXPIF declined by 1,165.55 index points or 17.2%.

In relation to the end of the first quarter of 2010, both indices recorded decline: Monex20 by 14.5% and MONEXPIF by 18.4%.

Compared to their maximum historical values (reached in 2007), at end-March 2011 indices decreased: Monex20 4 times, MONEXPIF 9 times.

Graph 32 – Montenegro stock exchange indices



Source: Montenegro stock exchange

Table 3 – General data on indices

	MONEX 20		MONEX PIF	
Value as on 31 March 2011	12,761.66		5,612.21	
Absolute change of indices in 2011	-1,760.87		-1,165.55	
Starting index value	1000.00	March 2003	1000.00	March 2003
Maximum value in 2011	15,723.86	24.01.2011.	6,673.19	15.02.2011.
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 2011	-12.1		-17.2	

Source: Montenegro stock exchange

4. MONETARY POLICY

In the first quarter of 2011, there were no changes in existing decisions referring to the CBM monetary policy. New decisions were not enacted.

5. INFLATION FORECAST IN 2011

The "Fan Chart" for the forecast of inflation in Montenegro is the graphic presentation of the distribution of projected inflation forecasts expressed by the Consumer Price Index (CPI)[4]. Therefore, instead of identifying some specific points, the Fan Chart, through the distribution of forecasts, takes into account any potential risks and uncertainties that could affect the inflation in the coming 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 growth (higher prices of fuels, increase/decrease in foreign trade deficit).

The Fan Chart of Montenegro for 2011 is based on the following three assessment components:

1. **Values of the central projection**: 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. **Level of uncertainly** - determines the Fan Chart width. The level of uncertainly ratio is a result of analytic analysis and calculation of relative effects of potential internal (expected increase in electricity prices) and external impacts (oil and food prices) that may occur in the Montenegrin economy in 2011

3. **The Fan Chart curve**: following the curve showing the level of distribution of the projected inflation, the Fan Chart adjusts to the forecast in the sense whether the values of the central projection forecast "overestimated" or "underestimated" the inflation rate movements. The position of an inflation distribution average value will depend on this direction.

Fan Chart Central Projection - ARIMA Model for 2011

For the purpose of Fan Chart preparation, the ARIMA (Auto-Regressive Integrated Model with Variable Averages) model of temporal series of inflation in Montenegro was developed and expressed by the Consumer Price Index[5].

ARIMA model was used for the purpose of short-term forecasts (12 months), whereby an iteration of 334 ARIMA models was prepared, ranked according to their respective efficiency and quality diagnostics. Selected Arima model, ARIMA (5,1,5)[6] has sufficient reliability level for the needs of this prognosis.

---

[4] *Consumer Price Index*

[5] *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"*

[6] *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 adequate model.*

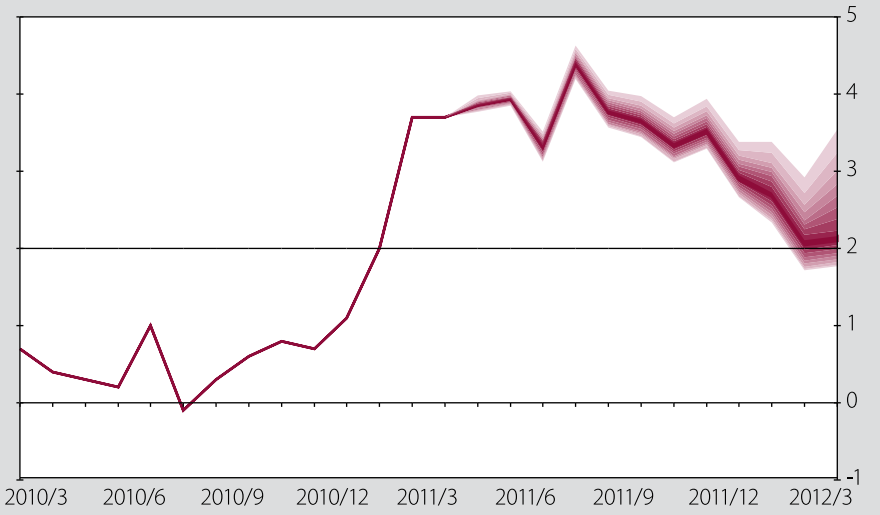
Following the Tramo/Seats[7] procedure, breaking points were identified (Chow Test for the identification was used) in the previous series; those substantially corresponded to the changes of the inflation structure from 2001 to the end of 2011, which was included in the ARIMA model through „dummy" variables.

Results of ARIMA projection were compared to the values of forecasted values by Tramo/Seats procedures expressing substantial level of compatibility.

The monthly forecasts value was used as the value of central projection of the Fan Chart of CPI for 2011 and Q1 2012. The resulting values represented a mode of distribution, i.e. the values with the highest frequency in this time series distribution.

The mean value of the produced model was 2.8, while the curve ratio varied from 0.65 to 2.65, and the values of standard deviations amounted to σ2=0.08 or σ1=0.16 showing, as in the previous two years, that the central span was located in the lower part of the distribution, and that the corresponding range of uncertainty was concentrated to higher levels of inflation, shown in the graph as a "thicker" range concentrated above the central "dominantly red" range. Fan Chart presents the inflation distribution with 90% probability. The central projection is usually in the deepest shade of the Fan Chart, i.e. in the central 10% of probability[8]. The Fan Chart has an equal number of bands (eight) on either side of the central band, whereby each 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 33 – Projected Consumer Price Index of Montenegro for 2011 and Q1 2012 .



Source: CBM, 2011

[7] *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).*

[8] *The mode value (central projection) can always be found in the deepest band shade, but in 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 2011 and Q1 2012 shows 90% probability that the inflation, measured by CPI, will range between 1.77% and 4.63%. Namely, the uncertainty increases as the time horizon for making a projection increases, consequently widening the range of the forecast. The 90% probability shows that the inflation will range from 3.29% to 3.83% at end-2011. The central „Fan Chart" projection referring to the darkest area on the chart represents a probability range of 10%, is forecasting that the inflation in 2011 and Q1 2012 will range from 2.1% and 4.4%.

The assumptions referring to the inflation forecast were the following:

1. The price of oil and oil derivatives will not exceed 25% of the price from December 2010;
2. The price of aluminium will not increase more than 15% in relation to the price in December 2010;
3. Real estates prices will not increase more than 1% in relation to the last quarter of 2010;
4. Real wages increase is up to 4%;
5. The increase in food products will not exceed 10% in relation to December 2010;
6. There will be no significant increase in taxes or excise duties.

Deviation from some or all of these parameters would require also forecast correction.

6. EXPECTED INFLATION IN 2011

Inflation rate is on an upward trend. Growth of food and energy prices affected he growth of total inflation. According to FAO data, prices of almost all fundamental food products increased in February, which largely affected inflation growth, along with the growth of oil prices. Bearing in mind that Montenegro is a small country and highly open economy, it inevitably absorbs all external prices' shocks.

Region again suffered the inflation growth, especially in the last quarter of 2010, and this affected Montenegro with a few months delay. Low inflation from December 2010 reached annual level of 3.7% in March 2011.

The first quarter of 2011 is characterized by the continuation of positive economic activities started in the previous year. The fact that many surveyed companies have planned the increase in the volume of activity in relation to those expecting reduced activities in the coming period, as well as that 63% of surveyed companies have planned new investments, indicates that the economic activity growth may be expected.

Model-based assumption shows 90% probability that the inflation rate in 2011 will range between 3.29% and 3.83%. However, all notes on econometric imperfections regarding the inflation rate forecast should be taken in consideration.

Our experts' assessment is unchanged in relation to the previous quarter and it is expected that the inflation rate in 2011 will range between 3.50% and 5.75%. Due to high uncertainly level, asymmetric projection was created, and it has higher fluctuation level ranging from realistic to pessimistic assessment. Due to high uncertainty level and transmission of negative shocks from international market, this assessment should not be taken for granted.

Table 4 – Estimated inflation rate

Optimistic assessment	Realistic assessment	Pessimistic assessment
3.50%	4.50%	5.75%

Assumptions for this assessment are the same as those for the model assessment.