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# MODEL CALCULATIONS OF SHORT-TERM FORECASTS OF RUSSIAN ECONOMIC TIME SERIES

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# INTRODUCTION TO ALL THE ISSUES

This Bulletin presents calculations of values of different economic indices of the Russian Federation in *June–November* of 2014 made on the basis on the time-series models developed as a result of research carried out by the IEP in the past few years[1]. The utilized method of forecasting belongs to the group of *formal* or *statistical* methods. In other words, the obtained values are not the expression of the *opinion* or *expert evaluation* of the researcher, but calculations of future values of the specific economic index made on the basis of formal models of ARIMA ($p$, $d$, $q$) time series with taking into account the existing trend and, in some cases, its significant changes. The presented forecasts are of inertial nature because the respective models take into account the dynamics of the data till the date of making of the forecast and, particularly, depend to a great extent on the trends which are typical of the time series in the period which is just before the time interval for which the forecast is made. The evaluations of the future values of the economic indices of the Russian Federation can be used for approval of decisions related to the economic policy provided that the general trends observed till the date on which the forecast is made in respect of each particular index do not change, that is, there will be no serious shocks or changes in the existing long-term trends.

Despite the fact that a large volume of the data related to the period prior to the 1998 crisis is available, the analysis and model building for forecasting were carried out in the period after August 1998. It was justified by outputs of the previous research[2] whose main conclusion was the fact that with the pre-crisis period taken into account the quality of forecasts in most cases declines. On the other hand, now it seems incorrect to use ever shorter series (after the 2008 crisis), as statistical qualities of the models built on the basis of such a short period happen to be rather low.

The evaluation of the models of the economic indices was carried out on the basis of the standard methods of analysis of time series. At the first stage, correlograms of the researched series and their first differences were analyzed in order to determine the maximum number of the delayed values which need to be included into the specifications of the model. Then, on the basis if the outputs of the analysis of the correlograms all the series were tested for weak stationarity (or stationarity around the trend) by means of the Dickey–Fuller test. In some cases, testing of series for stationarity around the segmented trend by means of the Perron and Zivot–Andrews tests for endogenous structural changes[3] was carried out.

Upon division of the series into those with weak stationary, trend stationary, segmented trend stationary or difference stationary, models corresponding to each of the above types were evaluated (as regards the levels and if necessary with inclusion of the trend, segmented trend or the differences). On the basis the Akaike and Schwartz information criteria and the parameters of the rest of the models (lack of autocorrelation, homoscedasticity and normality) and the quality of in-sample-forecasts obtained by means of those models, the best one was selected. Calculations of the forecast values were carried out on the basis of the best model which was built for each economic index.

In addition to the above, on the basis of the models developed by the IEP *the Bulletin* presents the calculations of future values of monthly indices of the CPI, the volume of the import from all

1 See, for example, R.M. Entov, S.M. Drobyshevsky, V.P. Nosko, A.D. Yudin. *The Econometric Analysis of the Time Series of the Main Macroeconomic Indices.* M., IET, 2001; R.M. Entov, V.P. Nosko, A.D. Yudin, P.A. Kadochnikov, S.S. Ponomarenko. *Problems of Forecasting of Some Macroeconomic Indices.* M., IET, 2002; V. Nosko, A. Buzaev, P. Kadochnikov, S. Ponomarenko. *Analysis of the Forecasting Parameters of Structural Models and Models with the Outputs of the Polls of Industries.* M., IET, 2003; M.Yu. Turuntseva and T.R. Kiblitskaya, *Qualitative Properties of Different Approaches to Forecasting of Social and Economic Indices of the Russian Federation.* M.: IET, 2010.

2 Ibid.

3 See.: Perron, P. Further Evidence on Breaking Trend Functions in Macroeconomic Variables, *Journal of Econometrics*, 1997, 80, pp. 355–385; Zivot, E. and D.W.K. Andrews. Further Evidence on the Great Crash, the Oil-Price Shock, and Unit-Root Hypothesis. *Journal of Business and Economic Statistics,* 1992, 10, pp. 251–270.

the countries and the export to all the countries on the basis of structural models (SM). The forecast values obtained on the basis of structural models can in a number of cases produce better results as compared to ARIMA-models because in building of such models the additional information on the dynamics of exogenous variables is used. In addition to the above, inclusion of structural forecasts in building of aggregated forecasts (that is, forecasts obtained as an average value by a few models) may contribute to adjustment of forecast values.

In modeling the dynamics of the consumer price index, theoretical hypotheses resulting from the monetary theory were used. Utilized as explanatory variables were: the money supply, output volume and the dynamics of the nominal RUR/USD exchange rate which defines the dynamics of the alternative cost of money safe-keeping. Also, the model for the consumer price index included the index of prices on power because that index determined to a great extent the dynamics of manufacturers' costs.

It is to be noted that the main index which may have an effect on the value of the export and the import is the real exchange rate which fluctuations result in the change in the relative value of domestic and import goods. However, in the econometric models that effect is insignificant. The most important factors which determine the dynamics of the export are the global prices on the exported resources, particularly, oil prices: price rises result in growth in export of goods. Used as a parameter of relative competitiveness of Russian goods was the level of households' income in the economy (the cost of the work force). In order to take into account seasonal fluctuations of the export, fictitious variables D12 and D01 equal to one in December and January, respectively, and zero in the other periods were introduced. The dynamics of the import is influenced by the income of households and industries; growth in income results in growth in demand in all the goods, including imported ones. The parameter of the households' income is the real disposable cash income, while that of the income of industries is the index of industrial production.

The forecast values of currency exchange rates are also based on structural models of their dependence on international oil prices.

Forecast values of explanatory variables required for making of forecasts on the basis of structural models were calculated on the basis of ARIMA ($p$, $d$, $q$) models.

Also, the paper presents calculations of the values of the indices of industrial production, producer price index and the index of the total number of the unemployed calculated with use of the results of the business surveys (BS) carried out by the IEP. The empirical studies show[1] that utilization of the series of the business polls as explanatory variables[2] in prediction models improves on average the accuracy of the forecast. Calculations of future values of those indices were made on the basis of the ADL-model (with addition of seasonal autoregressive delays).

The consumer price index and producer price index are forecasted using the large dataset (factor models – FM) as well. The factor models are based on the estimate of the main components of a large dataset of social and economic indices (in our case – 112 indices). The lags of those main components and lags of the dependent variable are used as regressors in such models. On the basis of the analysis of the quality of forecasts received for various sets of factor models, as regards the consumer price index a model which included the 9$^{th}$ lag, 12$^{th}$ lag and 13$^{th}$ lag of the four main components, as well as the 1$^{st}$ lag and 12$^{th}$ lag of the variable proper was selected, while as regards the producer price index – the model which included the 8$^{th}$ lag, the 9$^{th}$ lag and the 12$^{th}$ lag of the four principal components, as well as the 1$^{st}$, the 3$^{rd}$ lag and the 12$^{th}$ lag of the variable proper.

All the calculations were carried out with use of the Eviews econometric package.

1 See, for example: V. Nosko, A. Buzaev, P. Kadochnikov, S. Ponomarenko. *The Analysis of Forecasting Parameters of Structural Models and Models with Business Surveys Results*. M., IEP, 2003.

2 Used as explanatory variables were the following series of the business polls: the current/expected change in production, the expected changes in the solvent demand, the current/expected price changes and the expected change in employment.

*Table 1*

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF INDICES OF INDUSTRIAL PRODUCTION [1], (%)

| | Index of industrial production | | | | IIP for mining | | IIP for manufacturing | | IIP for utilities (electricity, water, and gas) | | IIP for food products | | IIP for coke and petroleum | | IIP for primary metals and fabricated metal products | | IIP for machinery | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rosstat | | NRU HSE | | Rosstat | NRU HSE | Rosstat | NRU HSE | Rosstat | NRU HSE | Rosstat | NRU HSE | Rosstat | NRU HSE | Rosstat | NRU HSE | Rosstat | NRU HSE |
| | ARIMA | BS | ARIMA | BS | | | | | | | | | | | | | | |
| Expected growth on the respective month of the previous year | | | | | | | | | | | | | | | | | | |
| June 14 | 0,5 | 1,3 | 0,8 | 0,5 | 0.4 | 0.4 | 2.9 | 0.7 | 0.6 | -1.2 | 2.8 | 7.8 | 5.1 | 3.6 | 0.3 | 0.0 | 16.4 | -6.7 |
| July 14 | 1,0 | 1,2 | 1,3 | 0,6 | 0.0 | 0.9 | 2.5 | 0.5 | 1.3 | -1.0 | 0.9 | 5.3 | 5.8 | 4.8 | 0.5 | 0.1 | 6.0 | 2.6 |
| August 14 | 0,9 | 0,3 | 1,5 | -0,3 | -0.4 | 0.2 | 3.2 | 0.7 | 1.7 | -1.3 | 1.3 | 4.0 | 6.3 | 4.9 | -1.2 | 0.9 | 5.0 | 0.8 |
| September 14 | 1,8 | 2,1 | 1,9 | 1,5 | -1.3 | 0.1 | 2.8 | 0.3 | -0.6 | -3.3 | 0.6 | 1.9 | 9.9 | 7.8 | -3.1 | -0.1 | -1.7 | 0.7 |
| October 14 | -0,7 | 1,1 | 2,4 | 0,6 | -0.9 | 0.7 | 1.3 | 0.6 | -3.2 | -3.5 | 0.6 | 1.6 | 9.8 | 8.2 | -1.5 | 0.4 | -10.6 | -0.9 |
| November 14 | 0,6 | -0,9 | 4,1 | -1,3 | 0.4 | 0.6 | -2.9 | 0.3 | 2.7 | 3.5 | -0.4 | -0.8 | 8.8 | 7.9 | -0.9 | 2.5 | -16.2 | 6.7 |
| For reference: actual growth in 2013 on the respective month of 2012 | | | | | | | | | | | | | | | | | | |
| June 13 | 1.7 | | 0.5 | | 1.7 | 2.4 | 2.0 | -0.5 | -0.7 | 0.2 | -4.1 | -4.8 | 1.6 | 2.7 | 3.9 | 4.0 | -6.8 | -6.0 |
| July 13 | 0.8 | | 0.8 | | 0.1 | 0.7 | 1.5 | 1.3 | -1.8 | -1.4 | 2.4 | 1.4 | 4.0 | 4.9 | 0.3 | 2.1 | -11.8 | -14.0 |
| August 13 | -0.2 | | 0.2 | | 1.0 | 1.6 | -0.7 | -0.3 | -2.0 | -1.9 | -0.6 | -1.0 | 3.0 | 4.3 | -0.8 | 0.5 | -5.4 | -6.8 |
| September 13 | 1.3 | | 0.8 | | 1.9 | 1.0 | 1.1 | 0.5 | 0.0 | 2.0 | 1.4 | 0.8 | 1.5 | 2.1 | 1.8 | 0.1 | -1.5 | -4.0 |
| October 13 | 1.0 | | 0.6 | | 1.7 | 0.9 | 0.6 | 0.3 | 1.1 | 1.6 | 0.9 | 0.8 | 2.6 | 3.8 | -0.2 | -0.5 | 7.9 | 0.4 |
| November 13 | 2.8 | | -0.3 | | 1.8 | 1.1 | 4.8 | 0.8 | -5.9 | -7.0 | 3.4 | 2.4 | 0.4 | 0.4 | -0.9 | 0.1 | 1.8 | -4.4 |

*Note*: in the time spans under review, the series of the Rosstat and NRU HSE chain indices of IIP, as well as the NRU HSE chain IIP for manufacturing are identified as stationary processes around the trend with an endogenous structural change; the series of the Rosstat and NRU HSE chain IIPs for manufacturing, for primary metals and fabricated metal products, as well as the NRU HSE chain IIP for mining and Rosstat chain IIP for machinery are identified as stationary processes around the trend with two endogenous structural changes. The time series of other chain indices are stationary at levels.

1 It is to be noted that for making of forecasts so-called "raw" indices (without seasonal and calendar adjustment) were used and for that reason in most models existence of the season factor is taken into account and, as a consequence, the obtained outputs reflect the seasonal dynamics of the series.

# INDUSTRIAL PRODUCTION AND RETAIL SALES

### Industrial production

*For building of the forecast for June–November 2014, the series of monthly data of the indices of industrial production of the Federal State Statistics Service (Rosstat) from January 2002 till March 2014, as well as the series of the base indices of industrial production of the Center for the Economic Situation under the National Research University Higher School of Economics (NRU HSE[1]) in the period from January 1999 till April 2014 were used (the value of January 1995 was equal to 100%). The forecast values of the series were calculated on the basis of ARIMA-class models. The forecast values of the Rosstat and NRU HSE indices of industrial production are calculated with use of business surveys (BS) as well. The obtained outputs are shown in Table 1.*

As seen from *Table 1*, the average growth[2] in the NRU HSE index of industrial production in June–November 2014 on the corresponding period of the previous year for industry in general amounts to 1.3%. As regards the Rosstat index of industrial production, it amounts to 0.8%.

In June–November 2014, the monthly average values of the Rosstat and NRU HSE indices of industrial production for mining amount to (-0.3%) and 0.5%, respectively. As for production of coke and petroleum, the average growth in the indices of Rosstat and NRU HSE is expected at the level of 7.6% and 6.2%, respectively.

In June–November 2014, the average growth in the NRU HSE index of industrial production for manufacturing amounts to 0.5% on the corresponding period of the previous year, while that in the Rosstat index, to 1.6%. The monthly average values of the Rosstat and NRU HSE indices of industrial production for food products amount to 1.0% and 3.3%, respectively. In June–November 2014, the monthly average values of the Rosstat and NRU HSE indices of industrial production for primary metals and fabricated metal products amount to (-1.0%) and (0.6%), respectively. As for machinery, the average growth in the indices of Rosstat and NRU HSE is expected at the level of (-0.2%) and 0.6%, respectively.

In June–November 2014, the average growth in the Rosstat index of industrial production for utilities (electricity, water and gas) amounts to 0.4% on the corresponding period of the previous year, while that in the NRU HSE index, to (-1.1%).

### Retail Sales

*This section (Table 2) presents forecasts of monthly retail sales made on the basis of monthly Rosstat data in the January 1999 – March 2014 period.*

As seen from *Table 2*, in June–November 2014 the average expected growth in monthly nominal retail sales volumes amounts to about 12.5% on the corresponding period of 2013.

In June–November 2014, the average expected growth in monthly real sales amounts to 4.0% on the corresponding period of 2013.

*Table 2*

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF THE RETAIL SALES AND THE REAL RETAIL SALES

| Forecast value according to ARIMA-model | | |
|---|---|---|
| | Retail sales, billion Rb (in brackets – growth on the respective month of the previous year, %) | Real retail sales (as % of the respective period of the previous year) |
| Jun 2014 | 2162.2 (11.4) | 104.0 |
| July 2014 | 2225.9 (11.8) | 103.9 |
| Aug 2014 | 2292.5 (12.3) | 103.9 |
| Sep 2014 | 2280.3 (12.9) | 104.0 |
| Oct 2014 | 2362.1 (13.4) | 104.3 |
| Nov 2014 | 2380.3 (13.4) | 104.1 |
| For reference: actual value in the same months of 2013 | | |
| Jun 2013 | 1940.2 | 103.8 |
| Jul 2013 | 1991.2 | 104.5 |
| Aug 2013 | 2041.1 | 104.2 |
| Sep 2013 | 2019.7 | 103.2 |
| Oct 2013 | 2083.1 | 103.3 |
| Nov 2013 | 2099.5 | 104.1 |

*Note:* series of retail sales and real retail sales in the January 1999 – March 2014 period.

1 The indices in question are calculated by E.A. Baranov and V.A. Bessonov.

2 The average growth of industrial production indices is understood here as the average value of the said indices for six forecast months.

## INVESTMENTS IN CAPITAL ASSETS

*Table 3 presents the outputs of calculations of forecast values of investments in capital assets in June–November 2014. The forecasts were made on the basis of time-series models with utilization of the Rosstat data of the January 1999 – March 2014 period.*

The outputs in *Table 3* show that in June–November 2014 the average expected growth in investments amounts to about 2.9% on the corresponding period of 2013.

In June–November 2014, the average expected drop in real investments amounts to 5.2% on the corresponding period of 2013.

*Table 3*

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF INVESTMENTS IN CAPITAL ASSETS AND REAL INVESTMENTS IN CAPITAL ASSETS

| Forecast values according to ARIMA-model | | |
|---|---|---|
| | Investments in capital assets, billion Rb (in brackets – growth on the respective month of the previous year, %) | Real investments in capital assets (as % of the respective period of the previous year) |
| Jun 2014 | 1156.1 (3.1) | 94.7 |
| July 2014 | 1076.7 (2.3) | 94.6 |
| Aug 2014 | 1162.8 (2.5) | 95.0 |
| Sep 2014 | 1230.0 (2.6) | 94.9 |
| Oct 2014 | 1498.1 (3.8) | 95.0 |
| Nov 2014 | 1414.3 (3.5) | 94.7 |
| For reference: actual values in the same months of 2012–2013 | | |
| Jun 2013 | 1121.9 | 97.1 |
| Jul 2013 | 1052.2 | 102.4 |
| Aug 2013 | 1135.0 | 98.2 |
| Sep 2013 | 1199.3 | 98.7 |
| Oct 2013 | 1443.8 | 99.9 |
| Nov 2013 | 1366.7 | 100.4 |

*Note*: series of investments in capital assets in the January 1999 – March 2014 period are series of DS type.

## FOREIGN TRADE INDICES

*Model calculations of forecast values of the export and export to countries outside the CIS and the import and import from countries outside the CIS were made on the basis of the models of time series and structural models evaluated on the basis of the monthly data in the period from September 1998 till March 2014 on the basis of the data of the Central Bank of Russia[1]. The outputs of the calculations are shown in Table 4.*

In June–November 2014, the average expected growth in the export, import, export to countries outside the CIS and import from countries outside the CIS will amount to 6.8%, -3.3%, 4.4% and -7.1%, respectively, on the corresponding period of 2013. In June–November 2014, the average expected volume of the trade balance with all the countries will amount to $110.3bn which figure is equal to a 27.4% increase as compared to the same period of 2013.

*Table 4*

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF VOLUMES OF FOREIGN TRADE TURNOVER WITH COUNTRIES OUTSIDE THE CIS

| Month | Export to all countries | | | | Import from all countries | | | | Export to countries outside the CIS | | | | Import from countries outside the CIS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | |
| | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM |
| Jun 2014 | 48.4 | 47.5 | 116 | 114 | 26.5 | 29.7 | 94 | 105 | 36.2 | 36.3 | 100 | 101 | 23.5 | 24.1 | 98 | 100 |
| July 2014 | 47.3 | 44.0 | 108 | 101 | 28.3 | 27.5 | 93 | 90 | 38.7 | 38.7 | 104 | 104 | 21.8 | 23.7 | 83 | 90 |
| Aug 2014 | 47.0 | 47.6 | 111 | 112 | 29.7 | 28.0 | 103 | 97 | 40.0 | 40.4 | 112 | 113 | 23.0 | 24.9 | 93 | 101 |
| Sep 2014 | 46.5 | 45.3 | 104 | 101 | 28.0 | 27.3 | 97 | 94 | 38.1 | 39.0 | 100 | 103 | 21.4 | 24.4 | 86 | 99 |
| Oct 2014 | 48.0 | 46.2 | 110 | 106 | 28.4 | 28.4 | 93 | 93 | 38.8 | 37.9 | 107 | 105 | 23.3 | 24.0 | 88 | 91 |
| Nov 2014 | 47.1 | 47.4 | 100 | 101 | 29.8 | 30.1 | 100 | 101 | 40.1 | 41.4 | 100 | 103 | 23.8 | 24.5 | 93 | 95 |

1 The data on the foreign trade turnover is calculated by the CBR in accordance with the methods for making of the balance of payment in prices of the exporter-country (FOB) in billion USD.

*Table 4, cont'd*

| Month | Export to all countries | | | | Import from all countries | | | | Export to countries outside the CIS | | | | Import from countries outside the CIS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | | Forecast values (billion USD a month) | | Percentage of actual data in the respective month of the previous year | |
| | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM | ARIMA | SM |
| For reference: actual values in respective months of 2013 (billion USD) | | | | | | | | | | | | | | | | |
| Jun 2014 | 41.8 | | | | 28.2 | | | | 36.1 | | | | 24.1 | | | |
| July 2014 | 43.7 | | | | 30.6 | | | | 37.1 | | | | 26.3 | | | |
| Aug 2014 | 42.5 | | | | 28.7 | | | | 35.6 | | | | 24.7 | | | |
| Sep 2014 | 44.8 | | | | 29.0 | | | | 38.0 | | | | 24.8 | | | |
| Oct 2014 | 43.5 | | | | 30,5 | | | | 36.1 | | | | 26.5 | | | |
| Nov 2014 | 46.9 | | | | 29,7 | | | | 40.0 | | | | 25.7 | | | |

*Note*: in the period from January 1999 till March 2014, the series of the export, import, export to the countries outside the CIS and import from the countries outside the CIS were identified as stationary series in the first-order differences. In all the cases, seasonal components were included in the specification of the models.

# DYNAMICS OF PRICES

## The Consumer Price Index and Producer Price Indices

*This section presents calculations of forecast values of the consumer price index and producer price indices (as regards both the industry in general and some types of its activities under the National Industry Classification Standard (NICS)) made on the basis of the time-series models evaluated on the basis of the Rosstat data in the period from January 1999 to March 2014*[1]*. Table 5 presents the outputs of model calculations of forecast values in June–November 2014 in accordance with ARIMA-models, structural models (SM) and models built with utilization of business surveys (BS).*

*Table 5*

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF PRICE INDICES

| Month | The consumer price index (ARIMA) | The consumer price index (SM) | The consumer price index (FM) | Producer price indices: for industrial goods (ARIMA) | for industrial goods (BS) | for industrial goods (FM) | for mining | for manufacturing | for utilities (electricity. water. and gas) | for food products | for the textile and sewing industry | for wood products | for the pulp and paper industry | for coke and petroleum | for the chemical industry | for primary metals and fabricated metal | for machinery | for transport equipment manufacturing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast values (% of the previous month) | | | | | | | | | | | | | | | | | | |
| Jun 2014 | 100.5 | 100.5 | 100.5 | 100.8 | 100.4 | 100.4 | 100.7 | 99.6 | 99.6 | 100.8 | 100.5 | 100.2 | 100.3 | 102.6 | 100.3 | 100.8 | 100.2 | 100.4 |
| July 2014 | 100.4 | 100.3 | 100.6 | 101.4 | 102.3 | 100.7 | 102.6 | 99.8 | 100.6 | 101.0 | 100.5 | 100.5 | 100.5 | 102.9 | 100.6 | 100.9 | 100.2 | 100.4 |
| Aug 2014 | 100.1 | 100.1 | 100.4 | 100.6 | 101.6 | 102.4 | 105.3 | 100.0 | 101.9 | 100.7 | 100.5 | 100.2 | 100.6 | 103.3 | 100.8 | 100.9 | 100.1 | 100.9 |
| Sep 2014 | 100.3 | 100.2 | 100.4 | 100.3 | 100.5 | 101.2 | 101.1 | 100.6 | 101.0 | 100.6 | 100.5 | 100.5 | 100.7 | 102.6 | 100.8 | 100.5 | 100.1 | 100.1 |
| Oct 2014 | 100.4 | 100.4 | 100.6 | 99.9 | 99.1 | 99.6 | 100.1 | 101.0 | 99.9 | 100.5 | 100.5 | 100.9 | 100.2 | 102.1 | 100.7 | 100.4 | 100.4 | 101.1 |
| Nov 2014 | 100.4 | 100.3 | 100.5 | 99.9 | 98.9 | 100.1 | 102.1 | 100.3 | 100.1 | 100.6 | 100.5 | 100.6 | 100.1 | 102.0 | 100.5 | 100.2 | 100.4 | 100.3 |
| Forecast values (% of December 2013) | | | | | | | | | | | | | | | | | | |
| Jun 2014 | 104.1 | 104.7 | 104.5 | 105.1 | 102.0 | 105.9 | 114.9 | 101.4 | 99.6 | 105.2 | 103.0 | 101.0 | 101.2 | 109.6 | 104.5 | 103.8 | 103.0 | 104.5 |
| July 2014 | 104.6 | 105.0 | 105.1 | 106.6 | 104.3 | 106.7 | 117.9 | 101.2 | 100.2 | 106.2 | 103.6 | 101.5 | 101.8 | 112.7 | 105.2 | 104.7 | 103.2 | 104.9 |
| Aug 2014 | 104.7 | 105.1 | 105.5 | 107.3 | 106.0 | 109.2 | 124.1 | 101.3 | 102.1 | 107.0 | 104.0 | 101.7 | 102.4 | 116.5 | 106.1 | 105.6 | 103.3 | 105.8 |
| Sep 2014 | 105.0 | 105.3 | 105.9 | 107.6 | 106.5 | 110.5 | 125.5 | 101.9 | 103.1 | 107.7 | 104.5 | 102.2 | 103.1 | 119.5 | 106.9 | 106.1 | 103.4 | 106.0 |
| Oct 2014 | 105.5 | 105.7 | 106.6 | 107.5 | 105.5 | 110.1 | 125.6 | 102.9 | 103.0 | 108.3 | 105.1 | 103.2 | 103.4 | 121.9 | 107.6 | 106.6 | 103.8 | 107.2 |
| Nov 2014 | 105.9 | 106.1 | 107.1 | 107.4 | 104.3 | 110.2 | 128.3 | 103.2 | 103.1 | 108.9 | 105.6 | 103.8 | 103.5 | 124.4 | 108.2 | 106.8 | 104.2 | 107.5 |

1 Structural models were evaluated in the period from October 1998.

*Table 5, cont'd*

| Month | The consumer price index (ARIMA) | The consumer price index (SM) | The consumer price index (FM) | Producer price indices: for industrial goods (ARIMA) | for industrial goods (BS) | for industrial goods (FM) | for mining | for manufacturing | for utilities (electricity. water. and gas) | for food products | for the textile and sewing industry | for wood products | for the pulp and paper industry | for coke and petroleum | for the chemical industry | for primary metals and fabricated metal | fo r machinery | for transport equipment manufacturing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| For reference: actual values in the same periods of 2013 (% of December 2012) | | | | | | | | | | | | | | | | | | |
| Jun 2014 | 103.5 | | | 99.1 | | | 98.6 | 99.4 | 99.2 | 101.0 | 102.2 | 103.5 | 101.3 | 96.1 | 101.2 | 97.1 | 100.4 | 99.2 |
| July 2014 | 104.4 | | | 101.1 | | | 103.0 | 100.1 | 103.3 | 101.4 | 102.5 | 103.7 | 101.9 | 98.0 | 102.1 | 96.8 | 102.5 | 100.5 |
| Aug 2014 | 104.5 | | | 103.9 | | | 107.5 | 101.8 | 108.7 | 101.9 | 102.5 | 103.2 | 103.2 | 105.6 | 101.6 | 97.3 | 102.1 | 101.0 |
| Sep 2014 | 104.7 | | | 105.4 | | | 112.2 | 102.5 | 108.9 | 102.3 | 102.9 | 103.9 | 104.9 | 107.7 | 102.3 | 98.4 | 101.9 | 101.2 |
| Oct 2014 | 105.3 | | | 104.1 | | | 107.8 | 102.3 | 108.1 | 102.3 | 102.6 | 103.7 | 103.7 | 106.3 | 101.3 | 99.3 | 102.1 | 100.8 |
| Nov 2014 | 106.0 | | | 102.5 | | | 101.6 | 101.9 | 108.6 | 102.3 | 102.7 | 103.6 | 104.0 | 105.1 | 101.6 | 98.0 | 101.7 | 100.7 |

*Note*: in the period from January 1999 till March 2014, the series of the chain producer price index for machinery are identified as a stationary process around the trend with two endogenous structural changes. The series of other chain price indices are stationary at levels.

In June–November 2014, the expected monthly average growth in the consumer price index will amount on average on the basis of three models to 0.4%. In the above period, the producer price index (PPI) is expected to grow on average at the level of 0.5% a month.

As regards producer price indices, in June–November 2014 the following monthly average growth rates are expected: for mining (2.0%), for manufacturing (0.2%), for utilities (electricity, water and gas) (0.5%), for food products (0.7%), for the textile and sewing industry (0.5%), for wood products (0.5%), for the pulp and paper industry (0.4%), for coke and petroleum production (2.6%), for the chemical industry (0.6%), for primary metals and fabricated metal products (0.6%), for machinery (0.2%) and for transport equipment manufacturing (0.6).

**The dynamics of the cost of the monthly per capita minimum food basket**

*This section presents the outputs of calculations of forecast values of the cost of the monthly per capita minimum food basket in June–November 2014. The forecasts were made on the basis of time series with use the Rosstat data in the period from January 2000 till March 2014. The outputs of calculations are shown in Table 6.*

As seen from *Table 6*, growth in the cost of the monthly per capita minimum food basket as compared to the respective level of the previous year is expected. It is to be noted that the average expected cost of the monthly per capita minimum food basket amounts to about Rb 3,163.1. The expected growth in the cost of the monthly per capita minimum food basket amounts on average to about 10.6% as compared to the level of the same period of the previous year.

*Table 6*

THE FORECAST OF THE COST OF THE MONTHLY PER CAPITA MINIMUM FOOD BASKET

| Forecast values according to ARIMA-model (Rb) | |
|---|---|
| June 2014 | 3198.8 |
| July 2014 | 3172.2 |
| August 2014 | 3136.6 |
| September 2014 | 3131.6 |
| October 2014 | 3162.1 |
| November 2014 | 3177.4 |
| For reference: actual values in the same months of 2013 (billion Rb) | |
| June 2013 | 2969.8 |
| July 2013 | 2962.0 |
| August 2013 | 2838.6 |
| September 2013 | 2758.2 |
| October 2013 | 2801.8 |
| November 2013 | 2836.3 |
| Expected growth on the respective month of the previous year (%) | |
| June 2014 | 7.7 |
| July 2014 | 7.1 |
| August 2014 | 10.5 |
| September 2014 | 13.5 |
| October 2014 | 12.9 |
| November 2014 | 12.0 |

*Note*: the series of the cost of the monthly per capita minimum food basket in the period from January 2000 till March 2013 are stationary in the first-order differences.

**Indices of Transportation Tariffs**

*This section presents calculations of forecast values of price indices of transportation tariffs on cargo carriage[1], made on the basis of time-series models evaluated on the basis of the Rosstat data in the period from September 1998 till March 2014. Table 7 shows the outputs of model calculations of forecast values in June–November 2014. It is to be noted that some of the indices under review (for instance, the index of tariffs on pipeline transportation) are adjustable ones and for that reason their behavior is hard to describe by means of the time-series models. As a result, the future values may differ greatly from the real ones in case of the centralized increase of the tariffs in the period of forecasting or in case of absence of such an increase in the forecasting period, but with it taking place shortly before the beginning of that period.*

*Table 7*

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF INDICES OF TRANSPORTATION TARIFFS

| Period | The composite index of transportation tariffs | The index of motor freight tariffs | The index of pipeline tariffs |
|---|---|---|---|
| Forecast values according to ARIMA-models (% of the previous month) | | | |
| June 2014 | 100.1 | 100.2 | 100.1 |
| July 2014 | 103.4 | 100.2 | 109.15 |
| August 2014 | 100.1 | 100.1 | 100.15 |
| September 2014 | 100.1 | 100.1 | 99.95 |
| October 2014 | 100.1 | 100.1 | 93.9 |
| November 2014 | 100.1 | 100.1 | 100.7 |
| Forecast values according to ARIMA-models (% of December of the previous year) | | | |
| June 2014 | 100.4 | 104.6 | 103.6 |
| July 2014 | 103.8 | 104.8 | 113.1 |
| August 2014 | 103.9 | 104.9 | 113.2 |
| September 2014 | 104.0 | 105.1 | 113.2 |
| October 2014 | 104.1 | 105.2 | 106.3 |
| November 2014 | 104.1 | 105.3 | 107.0 |
| For reference: actual values in the same period of 2013 (% of the previous month) | | | |
| June 2013 | 100.2 | 100.5 | 100.1 |
| July 2013 | 100.3 | 100.0 | 105.9 |
| August 2013 | 100.2 | 100.3 | 100.0 |
| September 2013 | 99.9 | 99.9 | 99.9 |
| October 2013 | 95.9 | 100.2 | 92.0 |
| November 2013 | 101.8 | 100.7 | 103.5 |

*Note*: in the period from September 1998 till March 2014, the series of the index of tariffs on motor cargo carriage were identified as stationary ones; the other series were identified as stationary ones in the period from September 1998 till March 2014, too; fictitious variables for taking into account particularly dramatic fluctuations were used in respect of all the series.

On the basis of the results of the forecast for summer–autumn 2014, within six months under review the composite index of transportation tariffs will grow at the monthly average rate of 0.6%. In July 2014, seasonal index growth of 3.4 p.p. is expected.

The index of motor freight tariffs will grow within six months at the monthly average rate of 0.1%.

Within the next six months, the index of pipeline tariffs will grow at the monthly average rate of 0.7%. In July 2014, seasonal index growth of 9.1 p.p. is expected.

**The dynamics of world prices on natural resources**

*This section presents calculations of such average monthly values of the Brent oil prices ($ per barrel), the aluminum prices ($ per ton), the gold prices ($ per ounce), the copper prices ($ per ton)*

1 The Bulletin presents a review of the composite index of transportation tariffs on cargo carriage and the index of transportation tariffs on motor cargo carriage, as well as the index of tariffs on pipeline transportation. The composite index of transportation tariffs on cargo carriage is calculated on the basis of the indices of tariffs on cargo carriage by individual types of transport: railway, pipeline, shipping, domestic water-borne, motor and air service (for more detailed information, pls. refer, for instance, to: Prices in Russia. The Official Publication of Goskomstat of RF, 1998).

*and the nickel prices ($ per ton) in June–November 2014 as were received on the basis of nonlinear models of time series evaluated on the basis of the IMF data in the period from January 1980 till April 2014.*

*Table 8*

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF WORLD PRICES ON NATURAL RESOURCES

| Month | Brent oil ($ per barrel) | Aluminum ($ per ton) | Gold ($ per ounce) | Copper ($ per ton) | Nickel ($ per ton) |
|---|---|---|---|---|---|
| Forecast values | | | | | |
| June 2014 | 111.74 | 1857 | 1294 | 6792 | 18177 |
| July 2014 | 113.27 | 1902 | 1296 | 6732 | 18505 |
| August 2014 | 114.52 | 1912 | 1299 | 6677 | 18796 |
| September 2014 | 115.45 | 1909 | 1303 | 6634 | 19090 |
| October 2014 | 116.66 | 1921 | 1308 | 6602 | 19447 |
| November 2014 | 117.84 | 1921 | 1312 | 6551 | 19755 |
| Growth on the respective month of the previous year (%) | | | | | |
| June 2014 | 8.4 | 2.4 | -3.6 | -3.0 | 27.3 |
| July 2014 | 5.2 | 7.5 | 0.7 | -2.5 | 34.6 |
| August 2014 | 3.2 | 5.3 | -3.6 | -7.1 | 31.4 |
| September 2014 | 3.4 | 8.4 | -3.4 | -7.3 | 38.3 |
| October 2014 | 6.6 | 5.9 | -0.6 | -8.3 | 37.8 |
| November 2014 | 9.0 | 9.9 | 2.8 | -7.3 | 44.4 |
| For reference: actual values in the same period of 2013 | | | | | |
| June 2013 | 103.11 | 1815 | 1342 | 7000 | 14280 |
| July 2013 | 107.72 | 1770 | 1287 | 6907 | 13750 |
| August 2013 | 110.96 | 1816 | 1347 | 7186 | 14308 |
| September 2013 | 111.62 | 1761 | 1349 | 7159 | 13801 |
| October 2013 | 109.48 | 1815 | 1316 | 7203 | 14118 |
| November 2013 | 108.08 | 1748 | 1276 | 7071 | 13684 |

*Note*: in the period from January 1980 till April 2014, the series of prices on oil, nickel, gold, copper and aluminum are series of DS type.

The average expected level of oil prices amounts to about $114.9 per barrel which figure is on average 6.0% higher than the respective indices of the previous year. Aluminum prices are expected at the level of about $1,904 per ton, while their average decrease is expected to amount to about 7% against the respective level of the previous year. Gold prices are expected to amount to about $1,302 per ounce. Average copper prices are expected to amount to about $6,665 per ton, while those on nickel, to about $18,962 per ton. The expected average depreciation of gold and copper prices amounts to about 1% and about 6%, respectively, on the respective period of the previous year, while the expected average appreciation of nickel prices, to about 36%.

## MONETARY INDICES

*The future values of the monetary base (in the narrow definition: cash funds and the Fund of Mandatory Reserves (FMR)) and $M_2$ monetary aggregate in June–November 2014were received on the basis of models of time-series of respective indices calculated by the CBR[1] in the period from October 1998 till March 2014. Table 9 presents the outputs of calculations of forecast values and actual values of those indices in the same period of the previous year. It is to be noted that due to the fact that the monetary base is an instrument of the policy of the CBR the forecasts of the monetary base on the basis of time-series models are to a certain extent notional as the future value of that index is determined to a great extent by decisions of the CBR, rather than the inherent specifics of the series.*

1 The data on the specific month is given in accordance with the methods of the CBR as of the beginning of the following month.

*Table 9*

THE FORECAST OF $M_2$ AND THE MONETARY BASE

| Period | The Monetary base | | $M_2$ | |
|---|---|---|---|---|
| | Billion Rb | Growth on the previous month, % | Billion Rb | Growth on the previous month, % |
| June 2014 | 8336 | 2.1 | 30904 | 1.1 |
| July 2014 | 8343 | 0.1 | 31217 | 1.0 |
| August 2014 | 8515 | 2.1 | 31535 | 1.0 |
| September 2014 | 8525 | 0.1 | 31855 | 1.0 |
| October 2014 | 8699 | 2.0 | 32177 | 1.0 |
| November 2014 | 8711 | 0.1 | 32501 | 1.0 |
| For reference: actual value in the respective months of 2013 (growth on the previous month, %) | | | | |
| June 2013 | 1.9 | | 1.5 | |
| July 2013 | 0.9 | | 0.8 | |
| August 2013 | -0.4 | | 0.2 | |
| September 2013 | -0.1 | | -0.5 | |
| October 2013 | 0.3 | | -0.3 | |
| November 2013 | 0.9 | | 2.2 | |

*Note*: in the period from October 1998 to March 2014, all the time series of monetary indices were attributed to the class of series which are stationary in the first-order differences and have an explicit seasonal component.

In June–November 2014, the monetary base and the $M_2$ will grow at the monthly average rate of 1.1% and 1.0%, respectively.

## INTERNATIONAL RESERVES

*This section presents the outputs of the statistical evaluation of such future values of the international reserves of the Russian Federation*[1] *as were received on the basis of evaluation of the model of time series of the gold and foreign exchange reserves on the basis of the data of the CBR in the period from October 1998 till April 2014. That index is forecasted without taking into account a decrease in the amount of the reserves due to payment of the foreign debt and for that reason the values of the volumes of the international reserves in the months where foreign debt payments are made may happen to be overestimated (or, otherwise, underestimated) as compared to the actual ones.*

On the basis of the outputs of the forecast, in June–November 2014 the international reserves will grow at the monthly average rate of 0.5%.

*Table 10*

THE FORECAST OF THE INTERNATIONAL RESERVES OF THE RUSSIAN FEDERATION

| Period | Forecast values according to ARIMA-models | |
|---|---|---|
| | Billion USD | Growth on the previous month, % |
| Jun 2014 | 473.8 | -0.7 |
| July 2014 | 472.2 | -0.3 |
| Aug 2014 | 478.9 | 1.4 |
| Sep 2014 | 486.1 | 1.5 |
| Oct 2014 | 488.7 | 0.5 |
| Nov 2014 | 490.3 | 0.3 |
| For reference: actual values in the same period of 2013 | | |
| Jun 2013 | 513.8 | -0.9 |
| Jul 2013 | 512.8 | -0.2 |
| Aug 2013 | 509.7 | -0.6 |
| Sep 2013 | 522.6 | 2.5 |
| Oct 2013 | 524.3 | 0.3 |
| Nov 2013 | 515.6 | -1.7 |

*Note*: in the period from October 1998 till April 2014, the series of the gold and foreign exchange reserves of the Russian Federation were identified as stationary series in difference.

## FOREIGN EXCHANGE RATES

*The model calculations of prospective values of the foreign exchange rates (RUR per USD and euro) were made on the basis of assessment of the time series models (ARIMA) and structural models*

1 The data on the volume of the gold and foreign exchange reserves is presented as of the first day of the following month.

*(SM) of the relevant indicators quoted by the RF Central Bank as of the last date of each month over the periods between October 1998 and May 2014 and between January 1999 and May 2014[1], respectively.*

In the period under review, the value of the RUR/USD exchange rate is forecasted on the basis of the average of the two models equal to Rb 34.64 per $1. A forecast of the USD/EUR exchange rate will amount on average to $1.38 per one euro.

*Table 11*

FORECASTS OF THE RUR/USD AND USD/EUR EXCHANGE RATES

| Period | The RUR/USD exchange rate (RUR per USD) | | The USD/EUR exchange rate (USD per EUR) | |
|---|---|---|---|---|
| | ARIMA | SM | ARIMA | SM |
| Jun 2014 | 34.53 | 34.77 | 1.38 | 1.38 |
| July 2014 | 34.43 | 34.72 | 1.38 | 1.38 |
| Aug 2014 | 34.37 | 34.91 | 1.38 | 1.38 |
| Sep 2014 | 34.35 | 34.88 | 1.39 | 1.38 |
| Oct 2014 | 34.32 | 35.05 | 1.39 | 1.38 |
| Nov 2014 | 34.30 | 35.04 | 1.39 | 1.38 |
| For reference: actual values in the similar period of 2013 | | | | |
| Jun 2013 | 32.71 | | 1.31 | |
| Jul 2013 | 32.89 | | 1.34 | |
| Aug 2013 | 33.25 | | 1.34 | |
| Sep 2013 | 32.35 | | 1.34 | |
| Oct 2013 | 32.06 | | 1.37 | |
| Nov 2013 | 33.19 | | 1.35 | |

*Note*: in the respective periods, the series under review were identified as integrated series of the first order with a seasonal component.

## THE STANDARD OF LIVING INDICES

*This section (Table 12) presents such outputs of calculations of forecast values of indices of real wages, real disposable income and real income[2] as were received on the basis of the model of time series of respective indices calculated by Rosstat and taken in the period from January 1999 till April 2014. The above indices depend to a certain extent on the centralized decisions on raising of wages and salaries to public sector workers, as well as those on raising of pensions, scholarships and allowances; such a situation introduces some changes in the dynamics of the indices under review. As a result, the future values of the indices of real wages and real disposable income calculated on the basis of the series which last observations are either considerably higher or lower than the previous ones due to such a raising may differ greatly from those which are implemented in reality.*

The forecast values shown in *Table 12* point to growth in all the indices of the living standard. So, average growth of 2.5% in real disposable cash income as compared to the respective period of the previous year is expected; growth in real cash income will amount to 2.9%. Growth of 5.7% on average in real accrued wages on the respective period of the previous year is expected.

1 The Bulletin applies the IMF's data for the period between January 1999 and March 2014. The data for April and May 2014 was obtained from the foreign exchange rate statistics website: www.oanda.com

2 *Real cash income* is a relative index which is calculated by means of division of the index of the nominal size (which was actually formed in the period under review) of households' cash income by the CPI. *Real disposable cash income* is cash income minus mandatory payments and contributions. (See: Rossiisky Statistichesky Ezhegodnik, Moscow, Rosstat, 2004, p. 212).

*Table 12*

THE FORECAST OF THE INDICES OF THE LIVING STANDARD

| Period | Real disposable cash income | Real cash income | Real accrued wages |
|---|---|---|---|
| Forecast values according to ARIMA-models (% of the respective month of 2013) | | | |
| June 2014 | 101.8 | 101.9 | 105.3 |
| July 2014 | 104.1 | 105.2 | 106.4 |
| August 2014 | 103.6 | 103.5 | 106.8 |
| September 2014 | 99.9 | 100.1 | 106.3 |
| October 2014 | 105.1 | 105.2 | 105.4 |
| November 2014 | 101.0 | 101.3 | 104.1 |
| For reference: actual values in the respective period of 2013 (% of the same period of 2012) | | | |
| June 2013 | 101.2 | 101.8 | 104.2 |
| July 2013 | 103.9 | 103.8 | 105.1 |
| August 2013 | 102.4 | 102.8 | 107.0 |
| September 2013 | 105.5 | 105.7 | 107.3 |
| October 2013 | 104.3 | 104.8 | 105.4 |
| November 2013 | 104.7 | 105.0 | 105.8 |

*Note*: for calculating purposes, the series of the real disposable cash income, real cash income and real accrued wages in the base form were used (March 1999 was adopted as a base period). In the period from January 1999 till April 2014, those series were attributed to the class of processes which are stationary in differences and have an explicit seasonal component.

## EMPLOYMENT AND UNEMPLOYMENT

*For the purpose of calculation of the future values of the employment (of the number the gainfully employed population) and the unemployment (the total number of the unemployed), models of time series evaluated in the period from October 1998 till March 2014 on the basis of the monthly data of Rosstat[1] were used. The unemployment was calculated on the basis of the models with results of the outputs of business polls[2], too.*

*It is to be noted that possible logical differences[3] in forecasts of the employment and the unemployment which totals should be equal to the index of the economically active population may arise due to the fact that each series is forecasted individually and not as the difference between the forecast values of the economically active population and another index.*

According to the forecasts on the basis of ARIMA-models (*Table 13*), in June–November 2014 growth in the employment is expected to amount on average to 0.9% a month on the corresponding period of the previous year.

Average decrease in the index of the unemployment is expected at the level of 7.4% a month as compared to the same period of the previous year. It is to be noted that there is a significant difference between the forecasts of that index received by means of different models. As compared to the respective period of the previous year, a drop in the unemployment will amount on average to 13.9% on the basis of the ARIMA-model. As regards the BS-model, a drop of 1% a month on average is expected.

1 The index is calculated in accordance with the methods of the International Labor Organization (ILO) and is given as of the end of the month.
2 The model is evaluated in the period from January 1999 till March 2014.
3 For example, deemed as such a difference may be a simultaneous decrease both in the employment and the unemployment. However, it is to be noted that in principle such a situation is possible provided that there is a simultaneous decrease in the number of the economically active population.

*Table 13*

THE OUTPUTS OF CALCULATION OF FORECAST VALUES OF THE INDICES THE EMPLOYMENT AND THE UNEMPLOYMENT

| Month | Employment (ARIMA) | | Unemployment (ARIMA) | | | Unemployment (BS) | | |
|---|---|---|---|---|---|---|---|---|
| | Million people | Growth on the respective month of 2012–2013 (%) | Million people | Growth on the respective month of 2012–2013 (%) | % of the index of the number of the gainfully employed population | Million people | Growth on the respective month of 2012–2013 (%) | % of the index of the number of the gainfully employed population |
| June 2014 | 72.4 | 1.4 | 3.4 | -15.9 | 4.8 | 4.0 | -2.9 | 5.5 |
| July 2014 | 72.6 | 1.1 | 3.5 | -13.4 | 4.8 | 4.0 | -0.5 | 5.5 |
| August 2014 | 72.7 | 0.4 | 3.4 | -15.0 | 4.7 | 3.9 | -1.7 | 5.4 |
| September 2014 | 72.3 | 0.8 | 3.4 | -14.0 | 4.8 | 4.0 | 1.0 | 5.5 |
| October 2014 | 72.0 | 0.7 | 3.6 | -13.3 | 4.9 | 4.0 | -1.5 | 5.6 |
| November 2014 | 71.9 | 0.7 | 3.6 | -11.5 | 5.0 | 4.1 | -0.2 | 5.7 |
| For reference: actual values in the same periods of 2013 (million people) | | | | | | | | |
| June 2013 | 71.4 | | 4.1 | | | | | |
| July 2013 | 71.8 | | 4.0 | | | | | |
| August 2013 | 72.4 | | 4.0 | | | | | |
| September 2013 | 71.8 | | 4.0 | | | | | |
| October 2013 | 71.5 | | 4.1 | | | | | |
| November 2013 | 71.4 | | 4.1 | | | | | |

*Note:* in the period from October 1998 till March 2014, the series of the employment is a stochastic process which is stationary around the trend. The series unemployment is a stochastic process with the first order integration. Both the indices include a seasonal component.

# ANNEX

## Diagrams of the Time Series of the Economic Indices of the Russian

*Fig. 1a. The Rosstat industrial production index (ARIMA-model) (% of December 2001)*

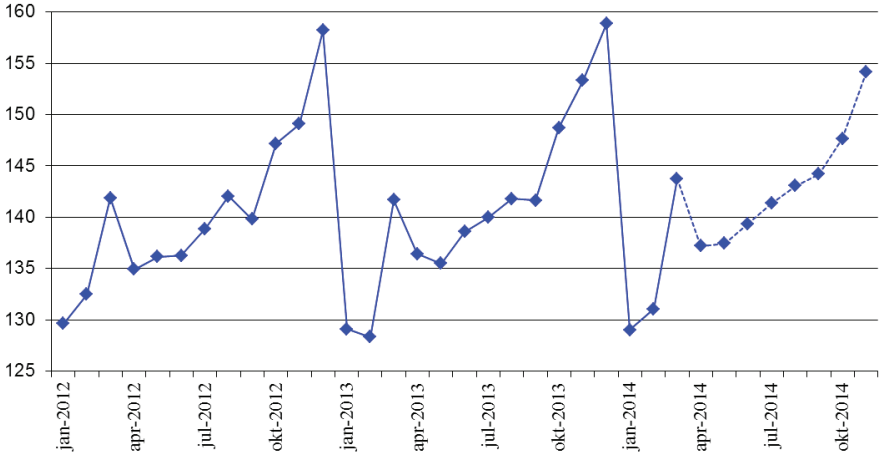


*Fig. 1b. The NRU HSE industrial production index (ARIMA-model) (% of January 1995)*

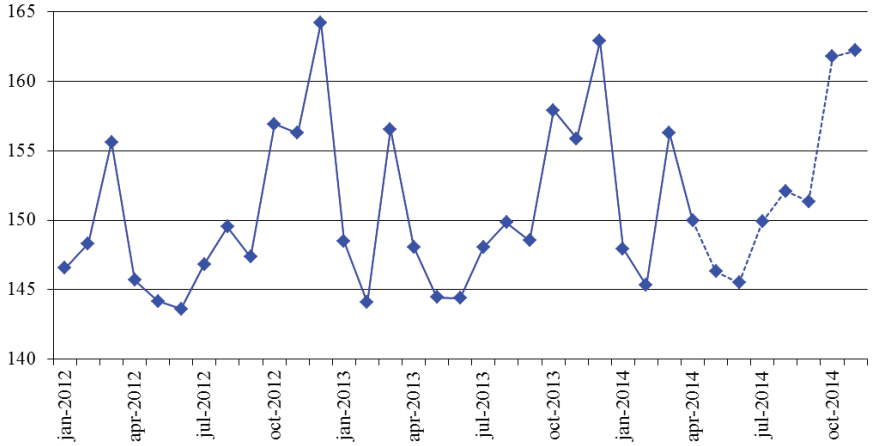


*Fig. 2a. The Rosstat industrial production index for mining (% of December 2001)*

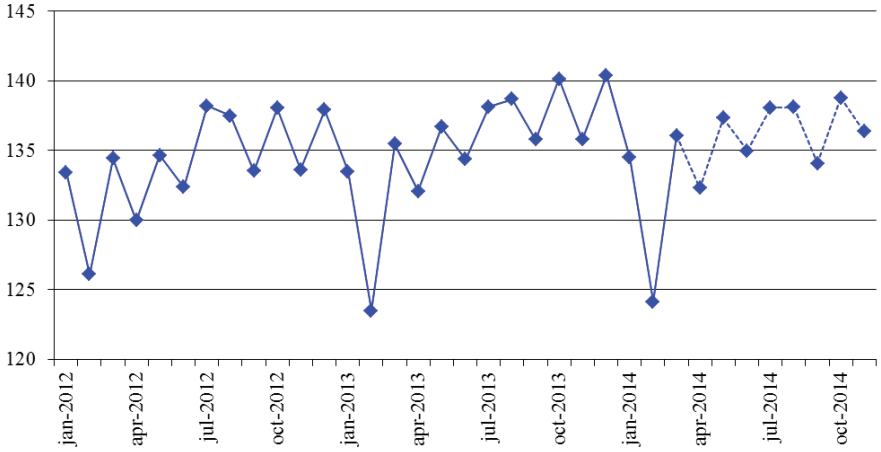

*Fig. 2b. The NRU HSE industrial production index for mining (% of January 1995)*

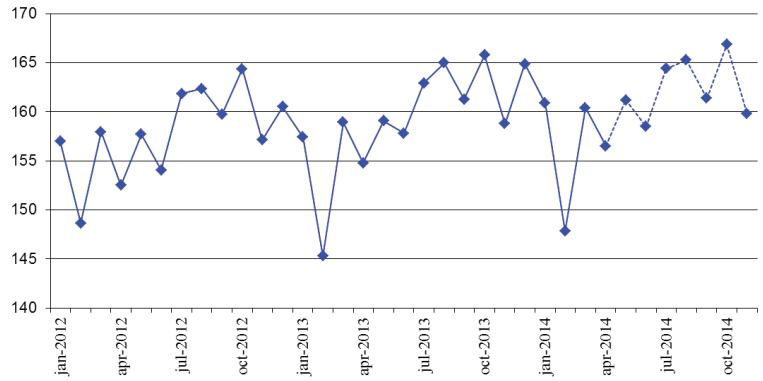


*Fig. 3a. The Rosstat industrial production index for manufacturing (% of December 2001)*

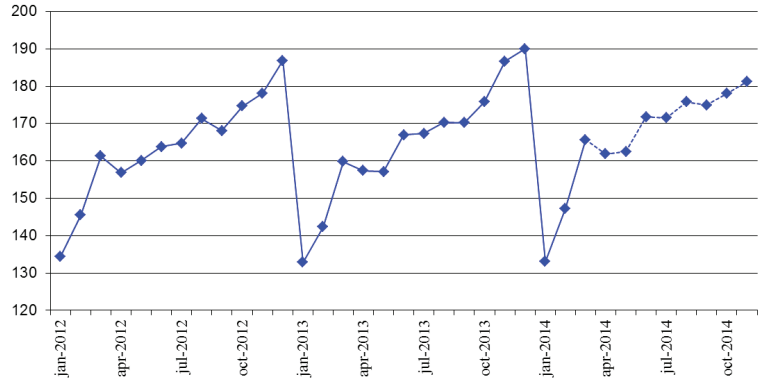


*Fig. 3b. The NRU HSE industrial production index for manufacturing (% of January 1995)*

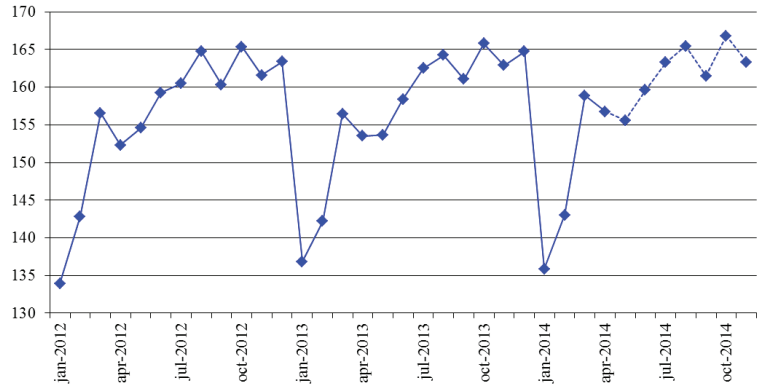


*Fig. 4a. The Rosstat industrial production index for utilities (electricity, water, and gas) (as a percentage of that in December 1998)*

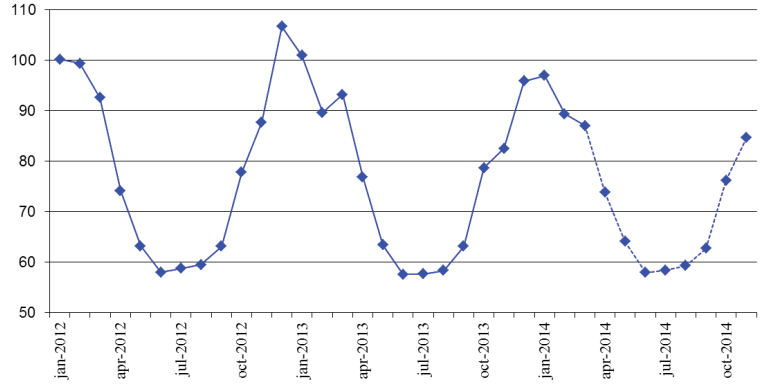

*Fig. 4b. The NRU HSE industrial production index for utilities (electricity, water, and gas) (as a percentage of that in January 1995)*

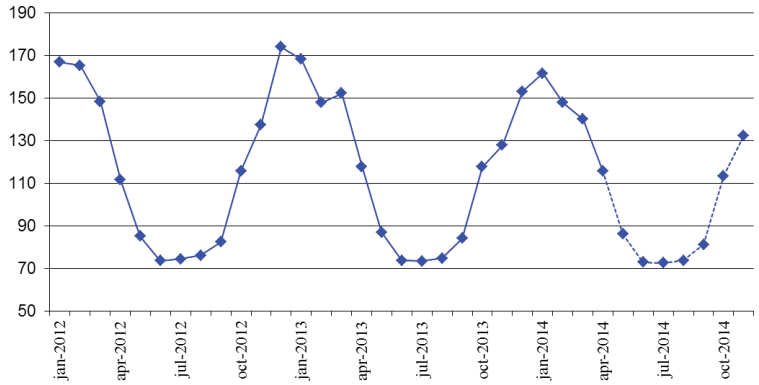


*Fig. 5a. The Rosstat industrial production index for food products (as a percentage of that in December 2001)*

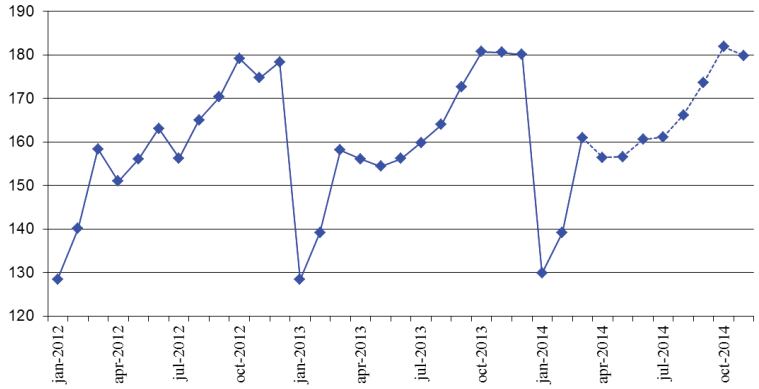


*Fig. 5b. The NRU HSE industrial production index for food products (as a percentage of that in January 1995)*

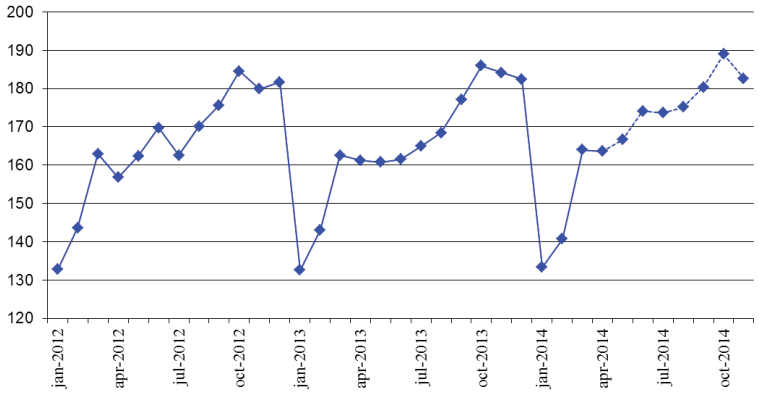


*Fig. 6a. The Rosstat industrial production index for coke and petroleum (as a percentage of that in December 2001)*

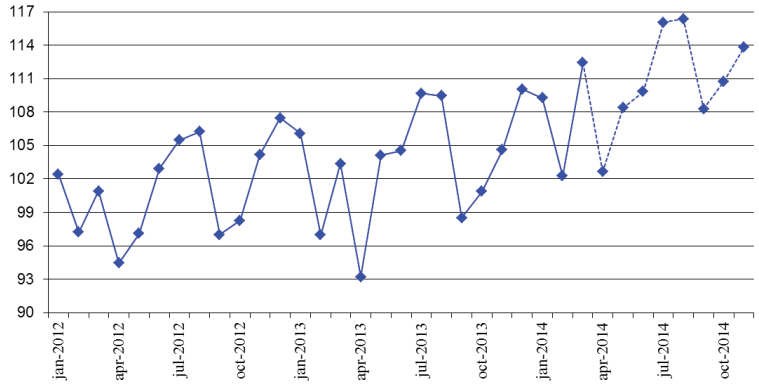

*Fig. 6b. The NRU HSE industrial production index for petroleum and coke (as a percentage of that in January 1995)*

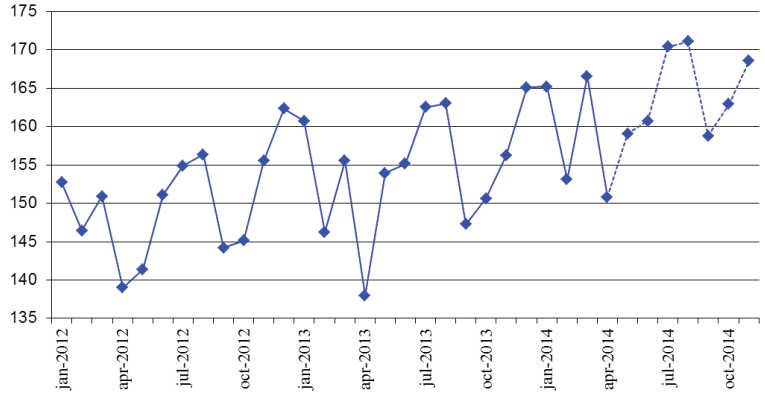


*Fig.7a. The Rosstat industrial production index for primary metals and fabricated metal products (as a percentage of that in December 1998)*

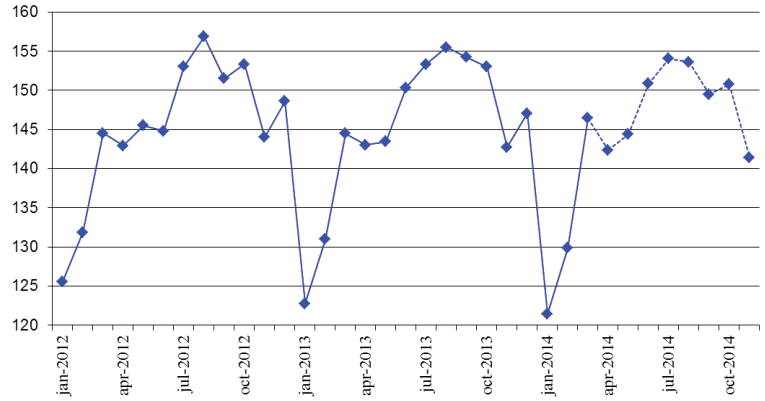


*Fig. 7b. The NRU HSE industrial production index for primary metals and fabricated metal products (as a percentage of that in January 1995)*

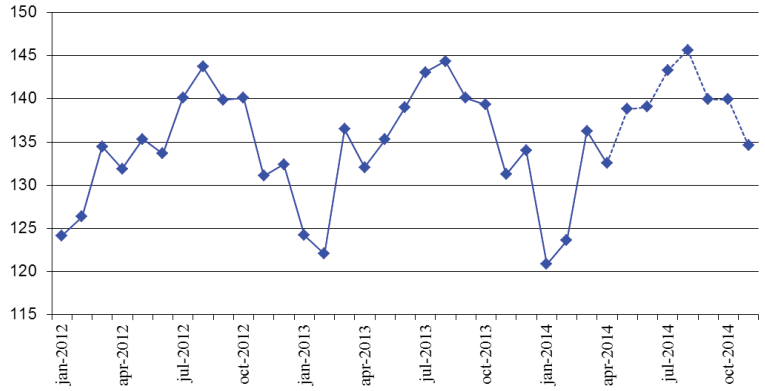


*Fig. 8a. The Rosstat industrial production index for machinery (as a percentage of that in December 1998)*

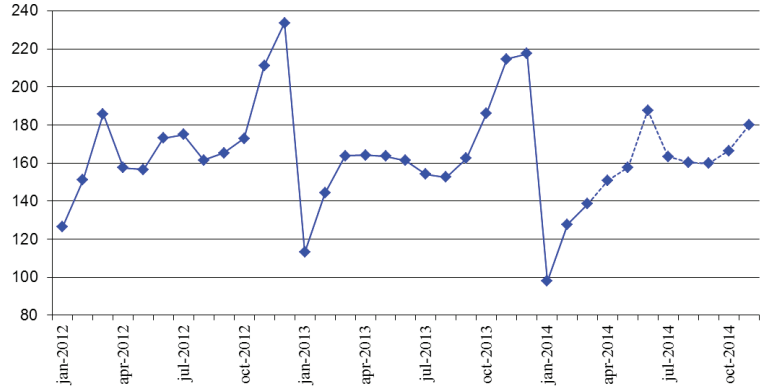

*Fig. 8b. The NRU HSE industrial production index for machinery (as a percentage of that in January 1995)*

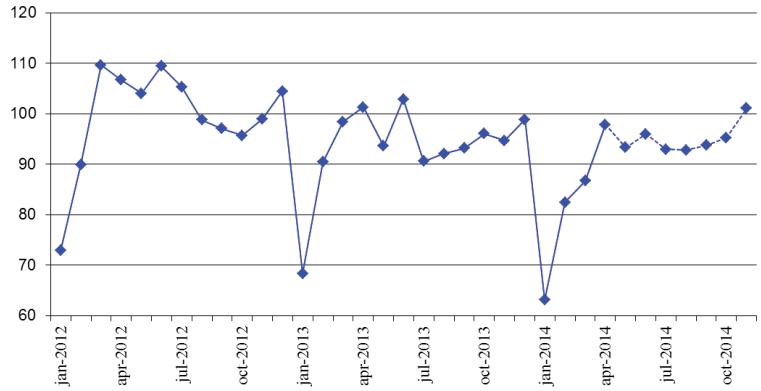


*Fig. 9. The volume of retail sales (billion Rb)*

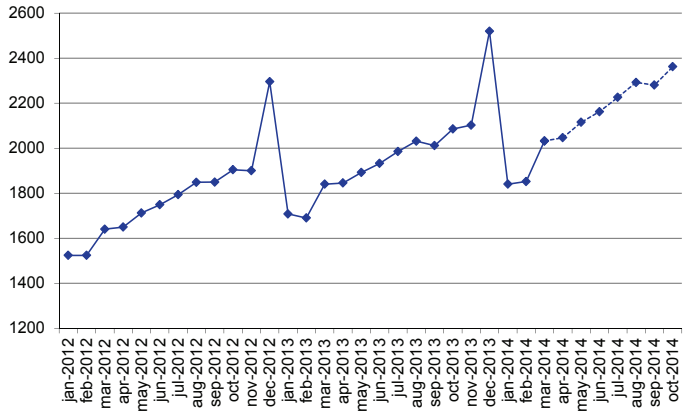


*Fig. 9a. The real volume of retail sales (as a percentage of that in the same period of the previous year)*

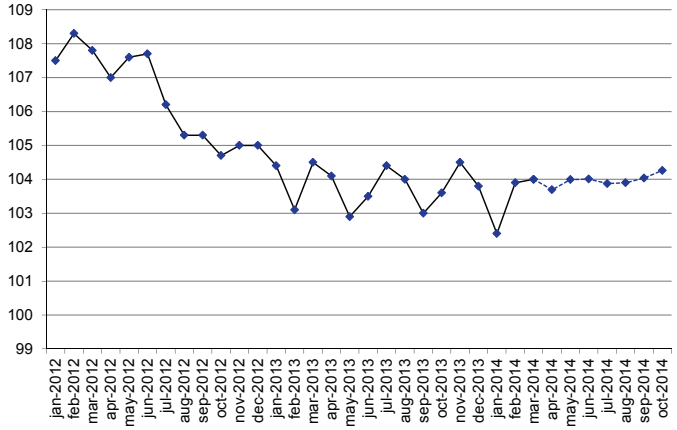


*Fig. 10. Investments in capital assets (billion Rb)*

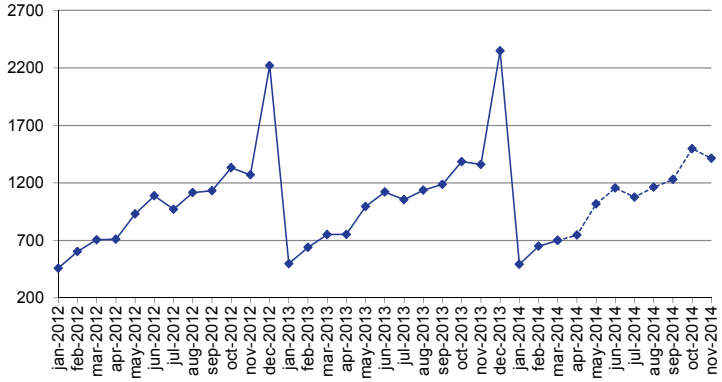

*Fig. 10a. Real investments in capital assets*
*(as a percentage of those in the same period of the previous year)*

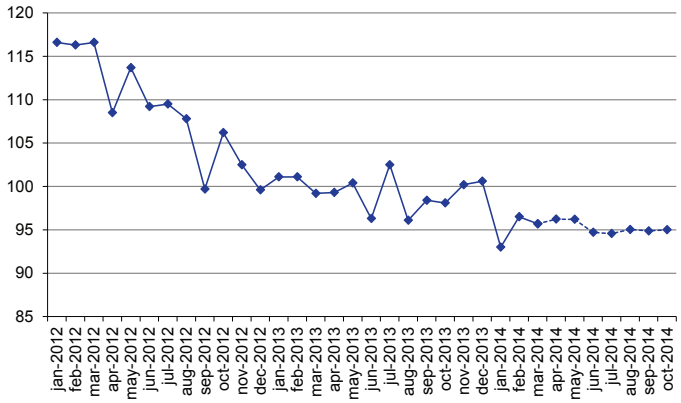


*Fig.11. Export to all countries (billion USD)*

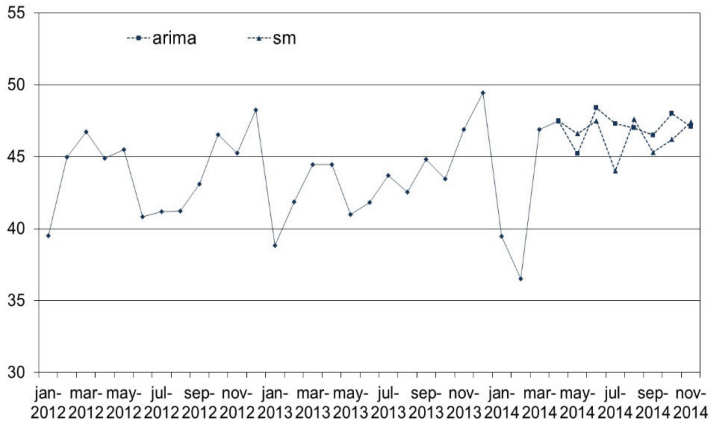


*Fig. 12. Export to countries outside the CIS (billion USD)*

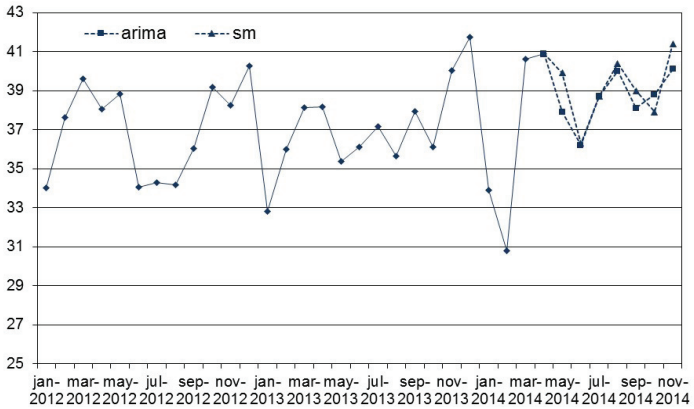


*Fig. 13. Import from all countries (billion USD)*

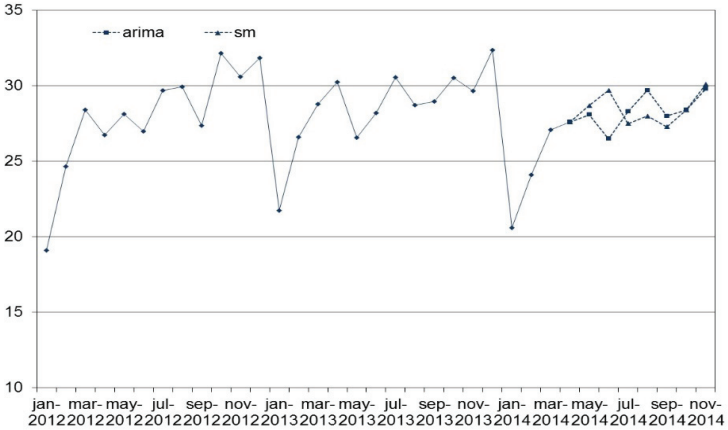

*Fig. 14. Import from countries outside the CIS (billion USD)*

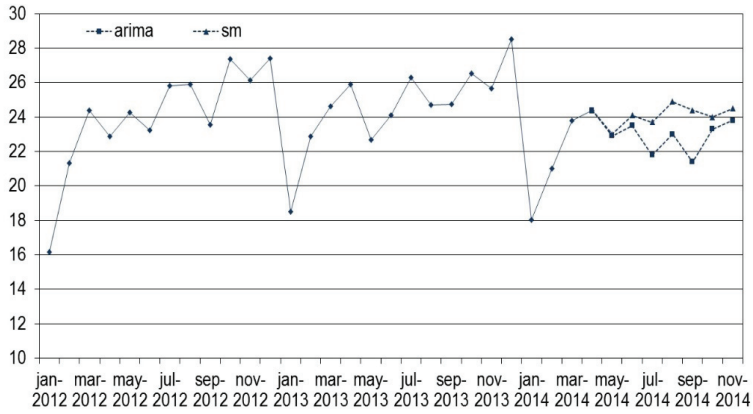


*Fig. 15. The consumer price index (as a percentage of that in December of the previous year)*

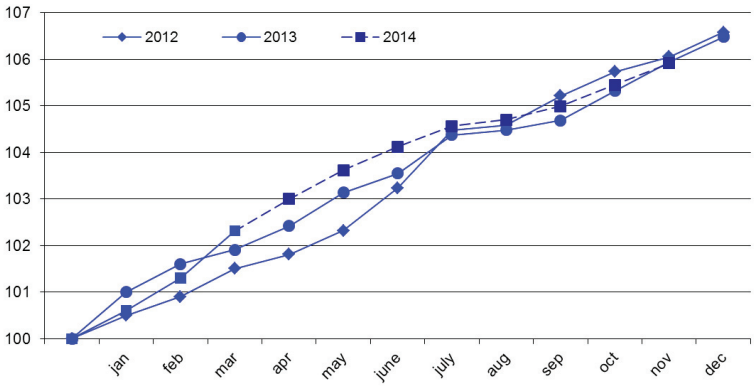


*Fig. 15a. The consumer price index*
*(as a percentage of that in December of the previous year) (SM)*

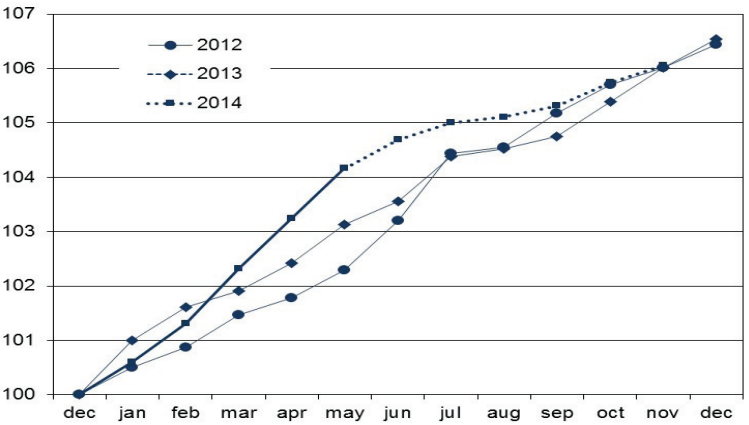


*Fig.16. The producer price index for industrial goods*
*(as a percentage of that in December of the previous year)*

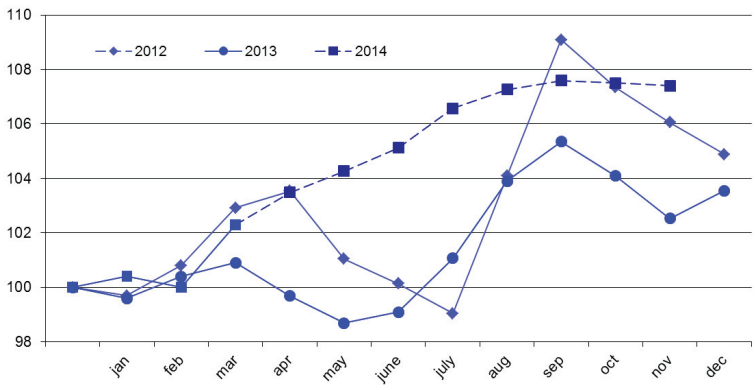

*Fig. 17. The price index for mining (as a percentage of that in December of the previous year)*

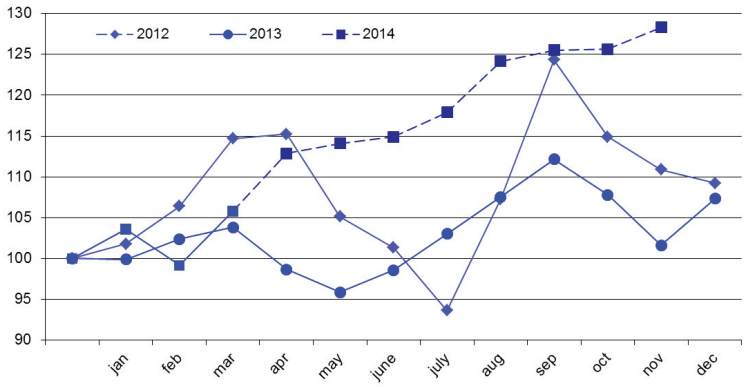


*Fig. 18. The price index for manufacturing (as a percentage of that in December of the previous year)*

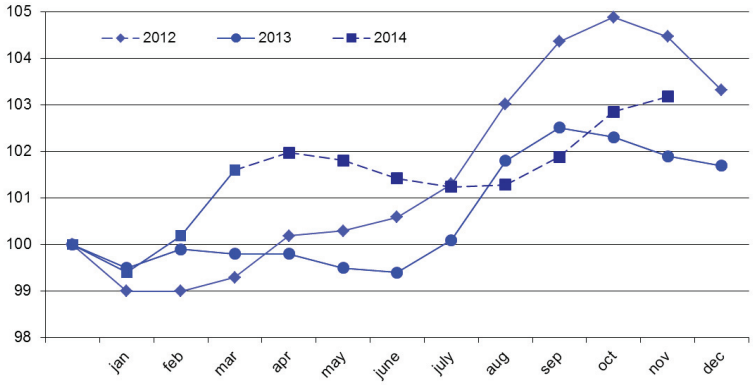


*Fig. 19. The price index for utilities (electricity, water, and gas) (as a percentage of that in December of the previous year)*

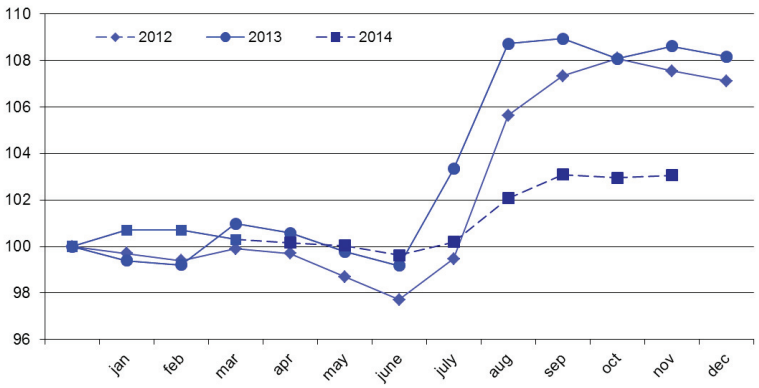


*Fig. 20. The price index for food products (as a percentage of that in December of the previous year)*

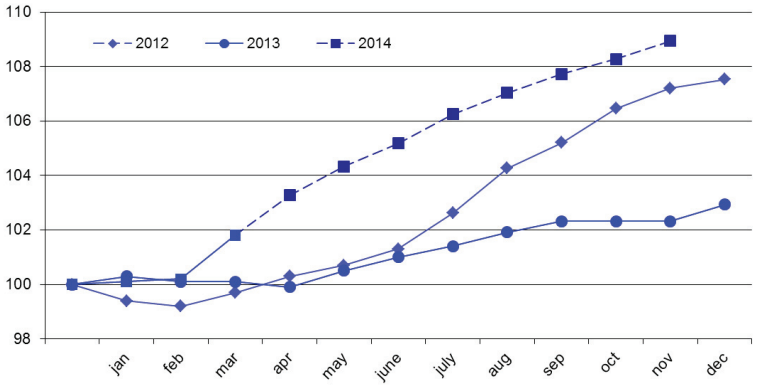

*Fig. 21. The price index for the textile and sewing industry (as a percentage of that in December of the previous year)*

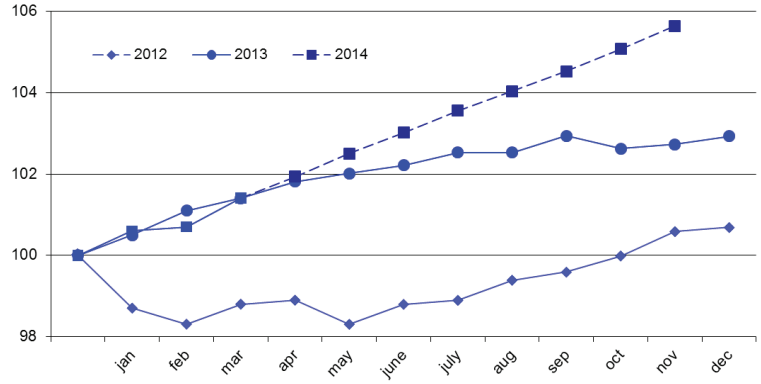


*Fig. 22. The price index for wood products (as a percentage of that in December of the previous year)*

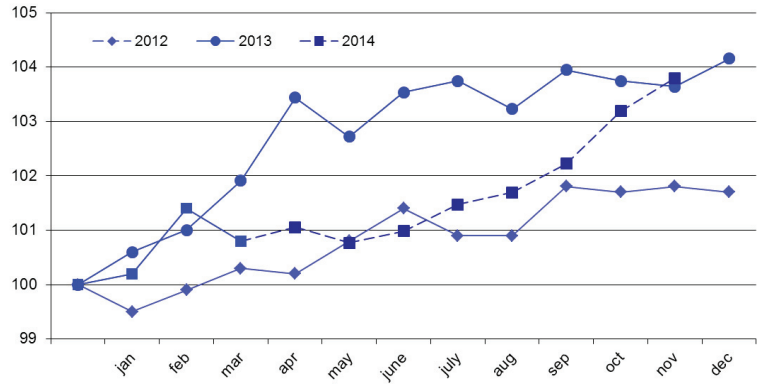


*Fig. 23. The price index for the pulp and paper industry (as a percentage of that in December of the previous year)*

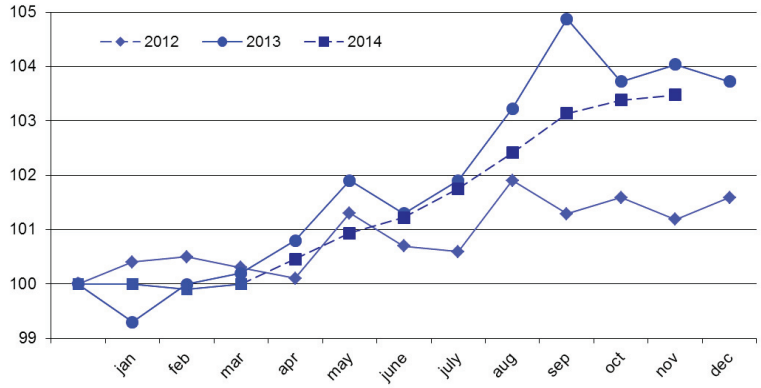


*Fig. 24. The price index for coke and petroleum (as a percentage of that in December of the previous year)*

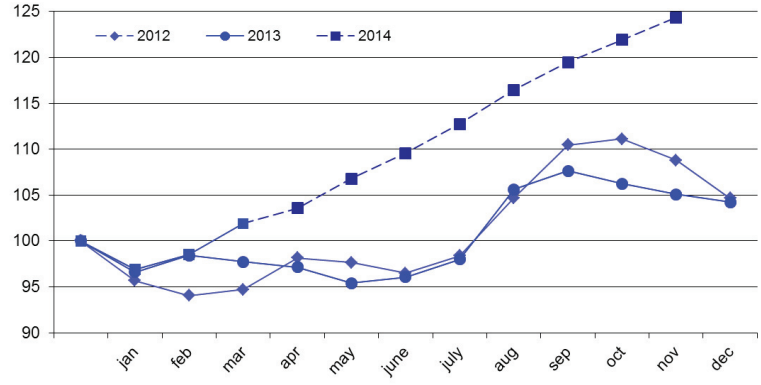

*Fig. 25. The price index for the chemical industry*
*(as a percentage of that in December of the previous year)*

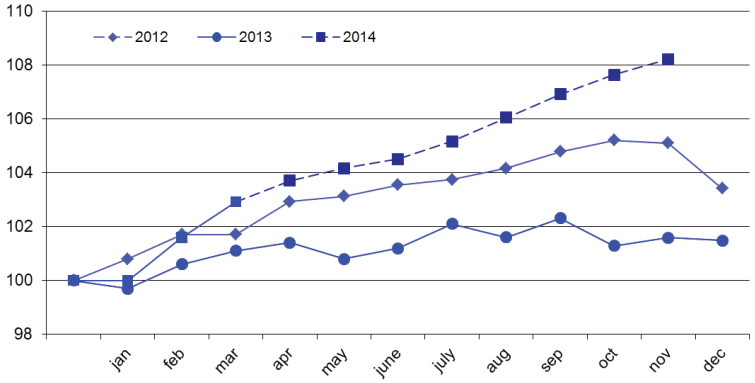


*Fig.26. The price index for primary metals and fabricated metal products*
*(as a percentage of that in December of the previous year)*

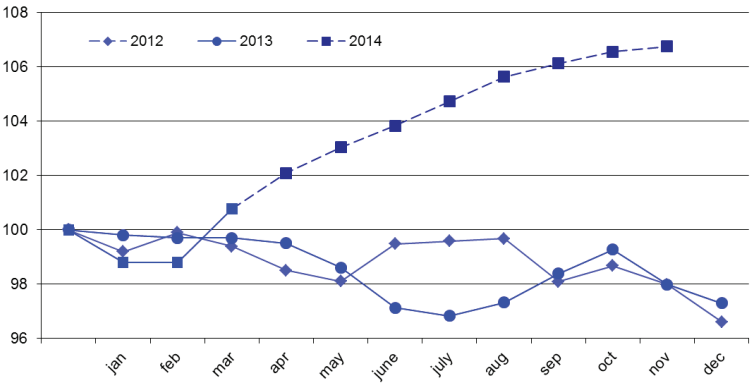


*Fig.27. The price index for machinery*
*(as a percentage of that in December of the previous year)*

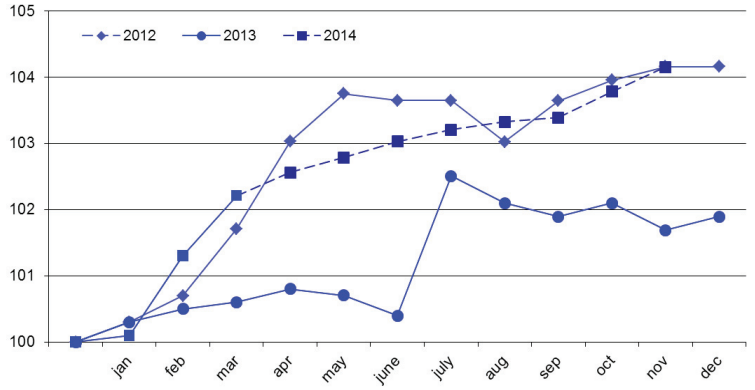


*Fig.28. The price index for transport equipment manufacturing*
*(as a percentage of that in December of the previous year)*

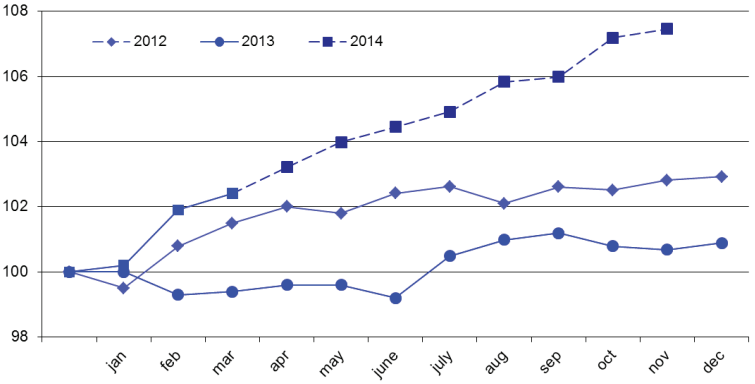

*Fig. 29. The cost of the monthly per capita minimum food basket (Rb)*

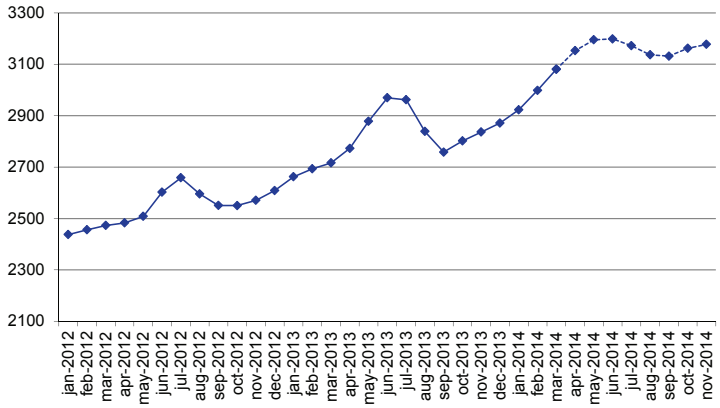


*Fig. 30. The composite index of transportation tariffs*
*(for each year, as a percentage of that in the previous month)*

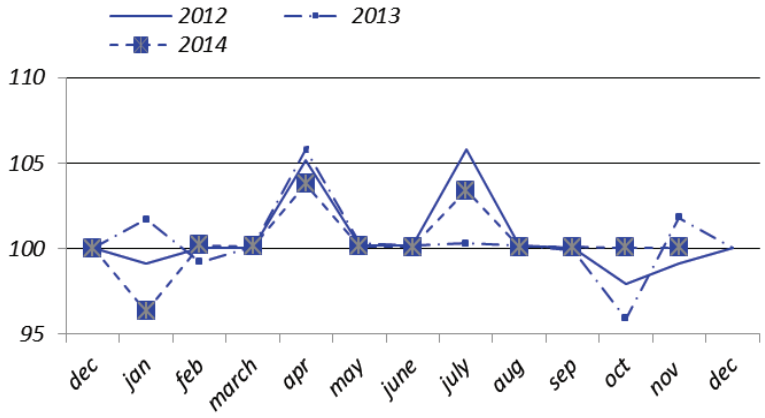


*Fig. 31. The index of motor freight tariffs*
*(for each year, as a percentage of that in the previous month)*

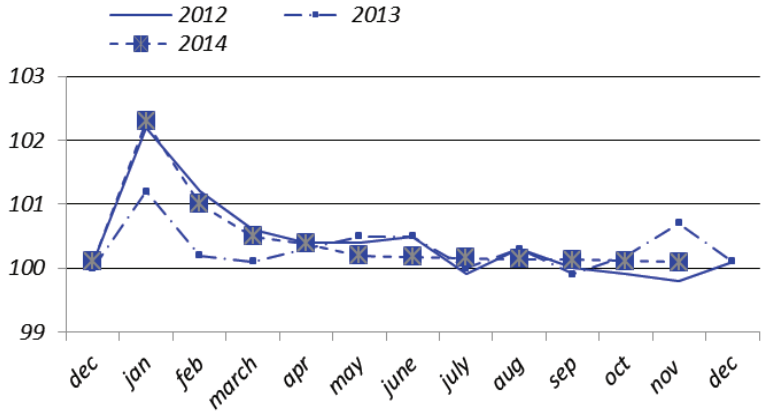


*Fig. 32. The index of pipeline tariffs*
*(for each year, as a percentage of that in the previous month)*

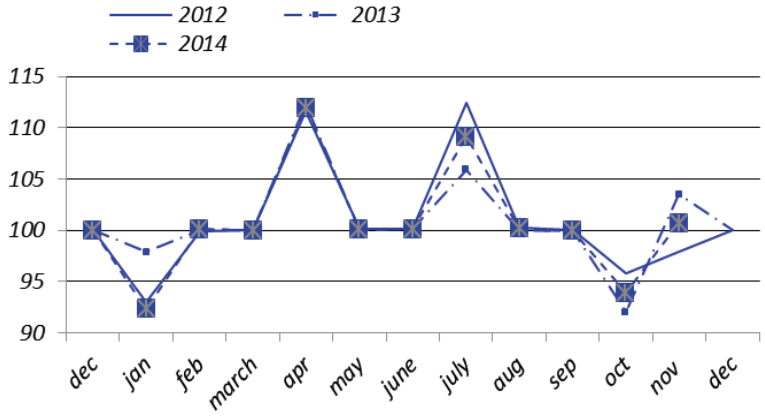

*Fig. 33. The Brent oil price ($ per barrel)*

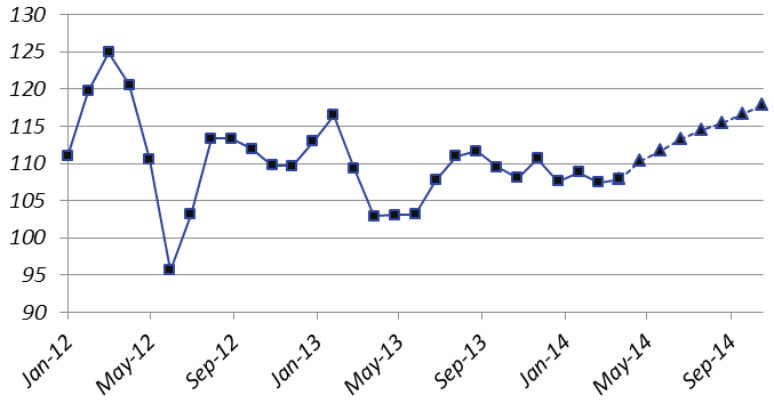


*Fig. 34. The aluminum price ($ per ton)*

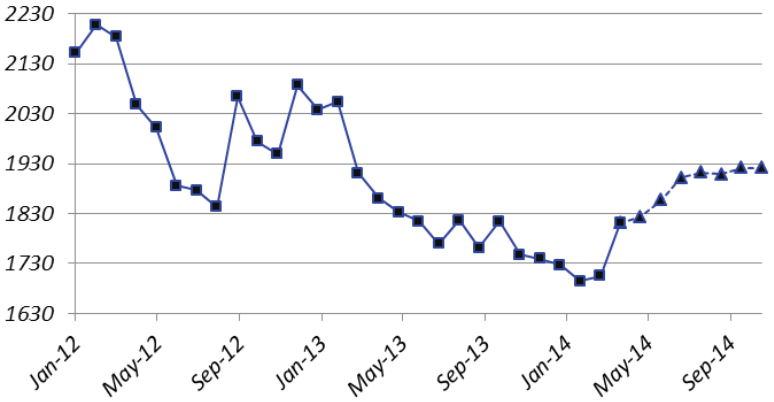


*Fig. 35. The gold price ($ per ounce)*

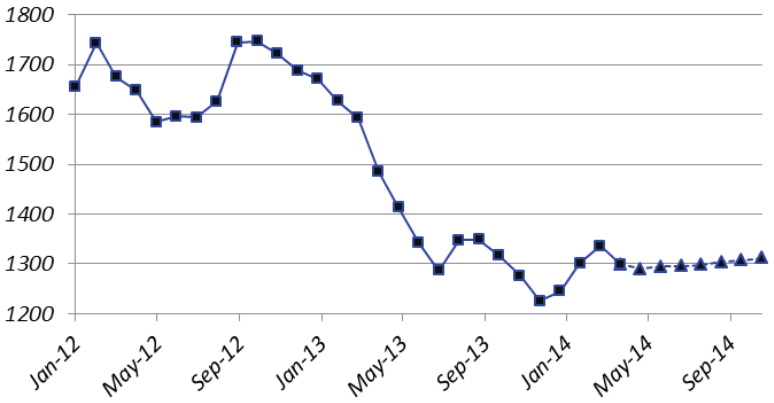


*Fig. 36. The nickel price ($ per ton)*

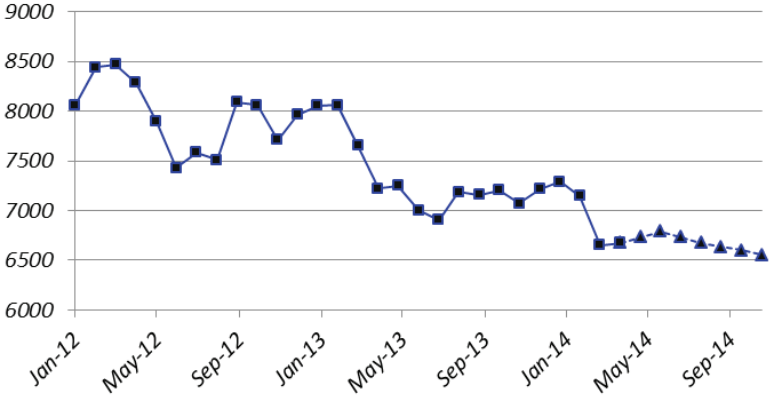

*Fig. 37. The copper price ($ per ton)*

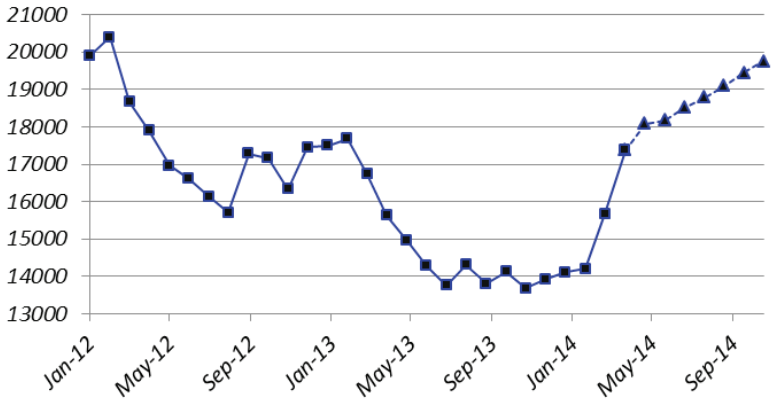


*Fig. 38. The monetary base, million Rb*

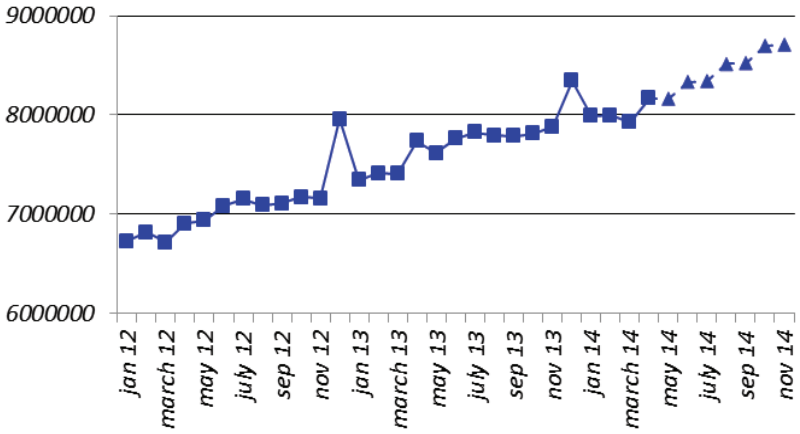


*Fig. 39. $M_2$, billion Rb*

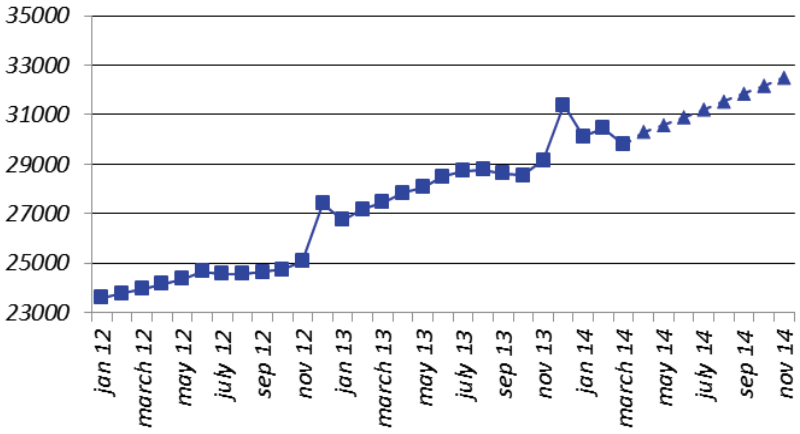


*Fig. 40. The international reserves of the Russian Federation, million USD*

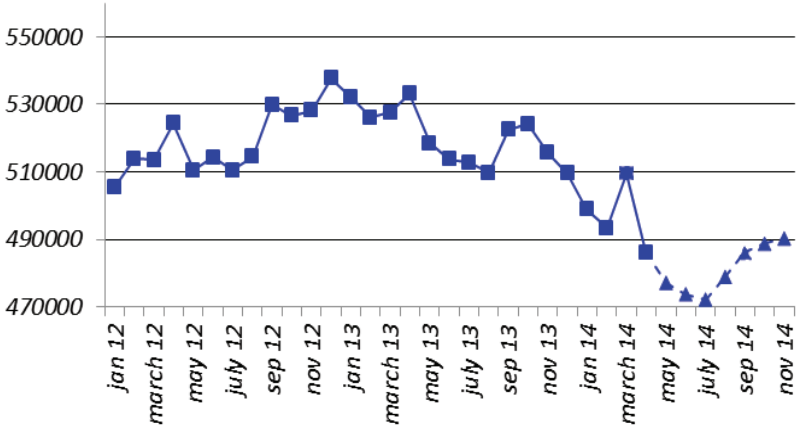

*Fig. 41. The RUR/USD exchange rate*

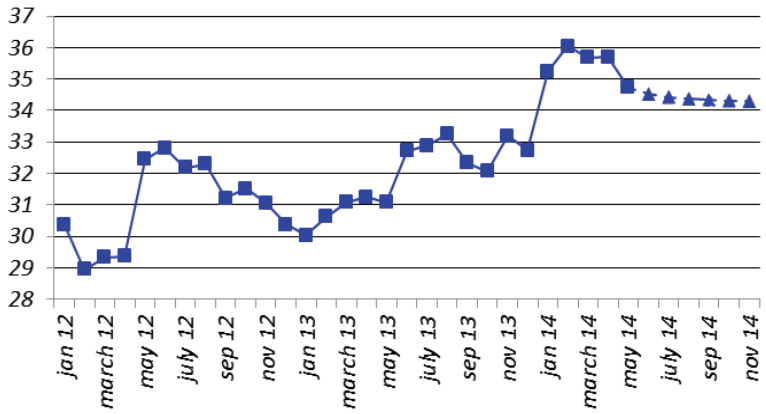


*Fig. 41a. The RUR/USD exchange rate (SM)*

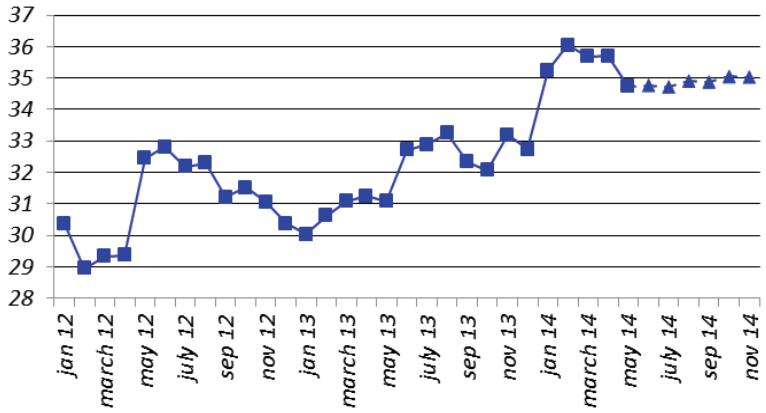


*Fig. 42. The USD/EUR exchange rate*

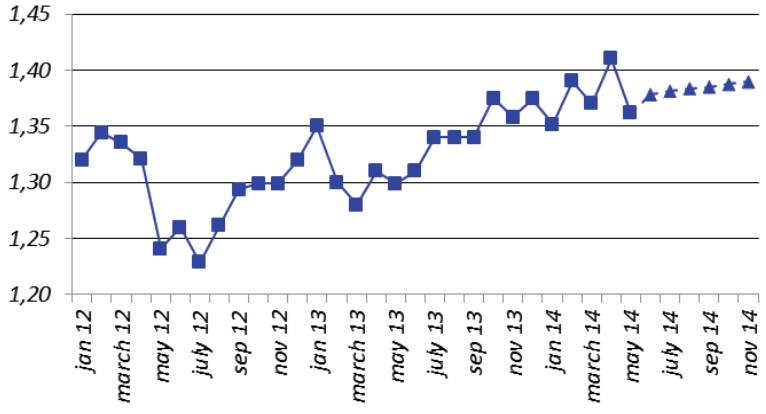


*Fig. 42a. The USD/EUR exchange rate (SM)*

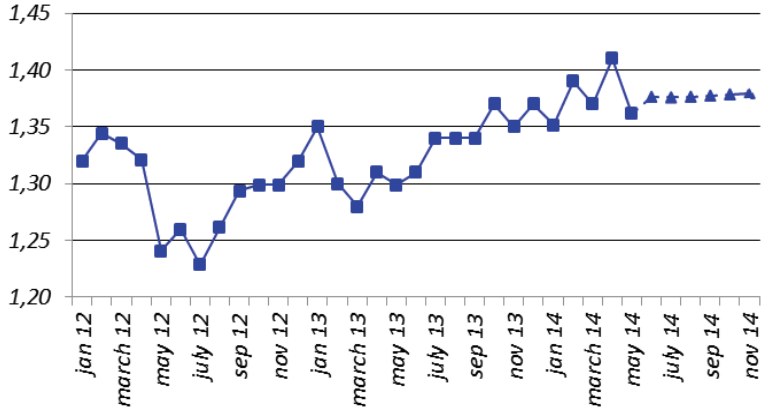

*Fig. 43. Real disposable cash income (as a percentage of that in the same period of the previous year)*

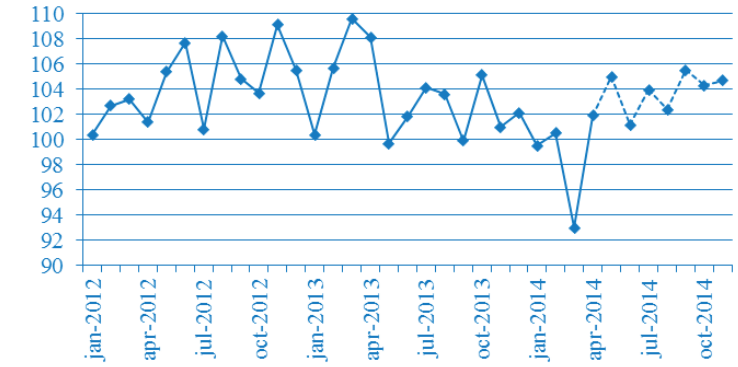


*Fig. 44. Real cash income (as a percentage of that in the same period of the previous year)*

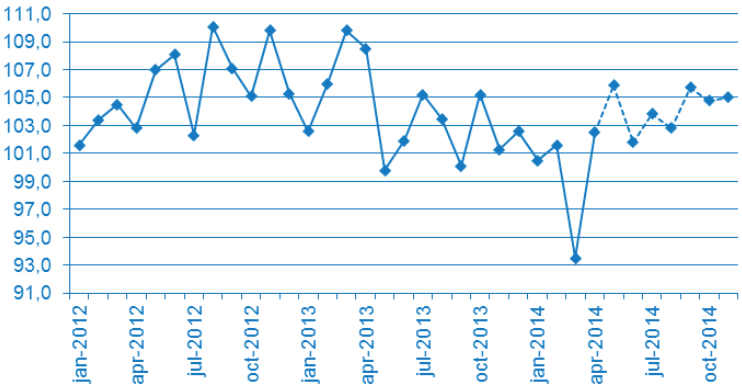


*Fig. 45. Real accrued wages (as a percentage of those in the same period of the previous year)*

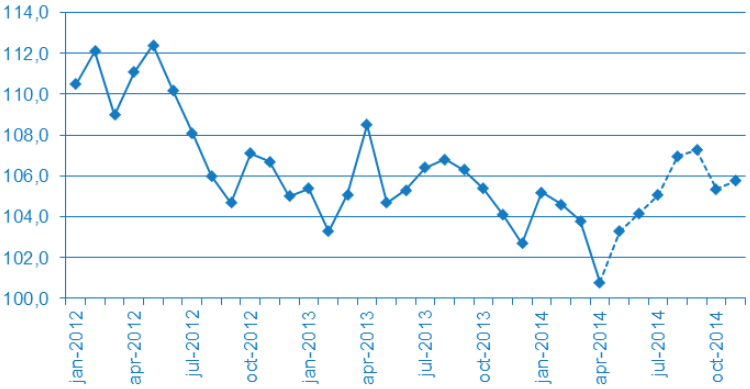


*Fig. 46. Employment (million people)*

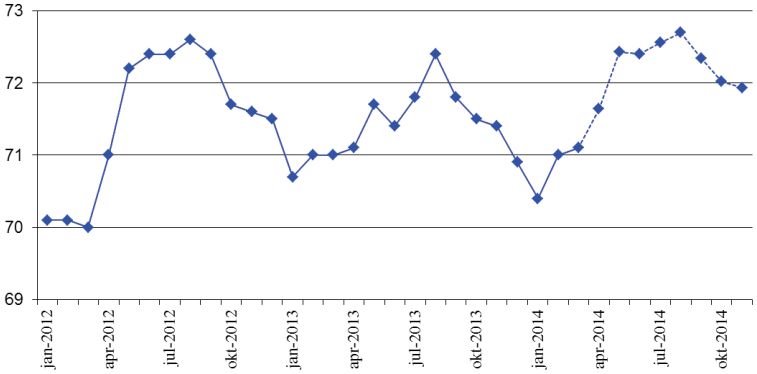

*Fig. 47. Unemployment (million people)*