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MODEL CALCULATIONS OF SHORT-TERM FORECASTS OF SOCIAL AND ECONOMIC INDICES OF THE RUSSIAN FEDERATION

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INTRODUCTION TO ALL THE ISSUES

This Bulletin presents calculations of values of different economic indices of the Russian Federation in *September* of 2013 – *February* 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.

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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. Ponamorenko. *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.

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 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).

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

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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 as regards mineral resources extraction | | IIP as regards manufacturing industry | | IIP as regards production and distribution of power, gas and water | | IIP as regards production of food products | | IIP as regards production of charred coal and oil products | | IIP as regards iron and steel industry and production of finished metallurgic products | | IIP as regards production of machines and equipment | |
| | 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																		
September 2013	2.5	1.6	2.6	1.9	0.2	1.2	0.3	-0.7	4.7	1.1	4.5	-0.7	5.3	6.0	1.2	-0.2	3.1	2.2
October 2013	-0.4	0.4	0.3	0.7	0.2	0.5	-0.5	-0.5	2.3	1.1	2.7	1.0	5.9	7.8	3.8	1.9	-4.0	-15.4
November 2013	2.5	-0.8	1.5	-0.2	0.8	1.0	-1.1	-0.1	0.3	0.8	3.0	1.6	3.7	3.9	7.0	2.5	-11.5	-9.0
December 2013	1.3	1.6	2.7	1.8	1.3	1.8	1.5	0.6	-1.7	-2.8	2.8	2.9	4.4	3.6	4.5	3.0	-4.5	-13.9
January 2014	1.4	0.4	0.5	0.6	2.6	0.8	0.7	-0.8	-0.1	-1.3	4.8	1.3	2.3	2.5	-0.1	3.9	-2.3	-10.1
February 2014	3.5	0.4	2.2	0.6	3.1	1.7	1.6	-0.8	0.9	3.5	3.7	2.1	4.8	4.3	-0.6	4.9	2.5	-7.0
For reference: actual growth in 2012-2013 on the respective month of 2011-2012																		
September 2012	2.0			2.3	1.8	1.8	5.5	2.8	-0.9	-1.2	3.6	4.1	2.6	2.6	5.7	1.9	-10.5	-4.8
October 2012	1.8			3.6	2.1	2.4	4.7	4.9	-0.6	-1.3	5.0	4.0	-0.7	2.4	2.2	-0.7	1.8	11.7
November 2012	1.9			0.9	0.3	0.5	5.4	2.1	-2.6	-5.1	4.2	2.3	4.1	6.6	7.1	2.1	0.2	1.0
December 2012	1.4			0.6	0.2	0.4	5.3	-0.7	4.7	8.4	1.8	-0.1	4.0	6.3	5.4	-1.6	-0.8	-10.0
January 2013	-0.8			2.7	-1.2	0.9	5.8	3.8	1.8	2.4	2.8	2.9	2.6	6.0	9.2	-1.3	-16.6	-8.7
February 2013	-2.1			-1.6	-2.2	-1.8	4.9	0.4	-10.0	-10.0	0.7	1.2	-1.9	0.3	9.7	-3.5	-4.3	-2.6

Note: in the time spans under review, the series of the Rosstat and NRU HSE chain indices of industrial production as regards industry in general, as well as the NRU HSE chain indices of industrial production as regards manufacturing of machines and equipment are identified as stationary processes around the trend with an endogenous structural change; the series of the Rosstat and NRU HSE chain indices of industrial production as regards manufacturing industry, iron and steel industry and production of finished metal goods, as well as the NRU HSE chain indices of industrial production as regards mineral resources extraction and Rosstat chain index as regards production of machines and equipment 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 September 2013 – February 2014, the series of monthly data of the indices of industrial production of the Federal State Statistics Service (Rosstat) from January 2002 till June 2013, 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 July 2013 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] of CES – NRU HSE industrial production index in industry as a whole in the autumn and winter of 2013–2014 will rise on the same period of 2012-2013 by 1.2%. For Rosstat industrial production index, this value amounts to 1.3%. It is predicted that by the end of 2013, the predicted annual growth of OKVED industrial production index will amount to 1.5%, and that of CES – NRU HSE industrial production index in industry – to 2.3%.

The average monthly values of Rosstat and CEC – NRU HSE industrial production indices in the extraction of mineral resources in September 2013 – February 2014 will amount to 1.4% and 1.2% respectively. The average growth values for Rosstat and CEC – NRU HSE indices in the production of coke and petroleum products will be at the level of 3.6% and 1.4% respectively.

The average growth of CEC – NRU HSE industrial production index for manufacturing industries in September 2013 – February 2014, by comparison with the same period of 2012–2013, is forecasted to be -0.4%; that of Rosstat index – 0.4%. The average monthly values of Rosstat and CEC – NRU HSE industrial production indices for the production of foodstuffs will amount to 3.6% and 1.4% respectively. The average monthly values of Rosstat and CEC – NRU HSE industrial production indices for metallurgical production and the production of finished metal products in September 2013 – February 2014 will amount to 2.6% and 2.7% respectively. In the production of machinery and equipment, average growth is predicted to be at the level of (-2.8%) and (-8.9%) with regard to Rosstat and CEC – NRU HSE indices, respectively

The average growth of Rosstat industrial production index for the production and distribution of electric power, gas and water in September 2013 – February 2014, against that in the same period of 2012–2013, will amount to 1.1%; the corresponding value of the CEC – NRU HSE industrial production index will amount to 0.4%.

In 2013, the annual growth of Rosstat industrial production indices by type of economic activity will be 1.2%, and that of the CEC – NRU HSE industrial production indices – (-0.7%).

Retail Sales

This section (see Table 2) presents forecasts of monthly retail sales made on the basis of monthly Rosstat data in the January 1999 – June 2013 period.

From *Table 2* it follows that the average predicted rise on the same period of 2012–2013 in the monthly volumes of retail turnover in the period of September 2013 through February 2014 will amount to approximately 12.5%.

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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.

Table 2

THE OUTPUTS OF CALCULATIONS OF FORECAST
VALUES OF THE RETAIL SALES
AND 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)
Sep 2013	2054.5 (11.1)	104.9
Oct 2013	2124.9 (11.6)	104.9
Nov 2013	2129.8 (12.1)	105.2
Dec 2013	2598.0 (13.2)	105.2
Jan 2014	1931.7 (13.1)	105.3
Feb 2014	1927.5 (14.0)	105.7
For reference: actual value in the same months of 2012-2013		
Sep 2012	1849.6	105.3
Oct 2012	1904.5	104.7
Nov 2012	1900.3	105.0
Dec 2012	2295.4	105.0
Jan 2013	1708.2	104.4
Feb 2013	1690.3	103.1

Note: series of retail sales and real retail sales in the January 1999 – June 2013 period.

Table 3

THE OUTPUTS OF CALCULATIONS OF FORECAST
VALUES OF THE VOLUME 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)
Sep 2013	1226.1 (8.3)	101.8
Oct 2013	1474.8 (10.7)	101.3
Nov 2013	1348.4 (6.2)	101.0
Dec 2013	2462.2 (10.9)	102.2
Jan 2014	474.0 (-4.9)	102.4
Feb 2014	669.1 (4.6)	102.2
For reference: actual values in the same months of 2012–2013		
Sep 2012	1132.3	99.7
Oct 2012	1332.7	106.2
Nov 2012	1269.84	102.5
Dec 2012	2220.3	99.6
Jan 2013	498.3	101.1
Feb 2013	639.8	100.3

Note: series of investments in capital assets in the January 1999 – June 2013 period are series of DS type.

The real average increase of the retail turnover index for the period from September 2013 through January 2014 will amount to 5.2% against the corresponding period of 2012–2013.

It is predicted that by the end of 2013, the volume of retail turnover will amount to Rb 2,598bn (a 13% growth on the end of 2012). In per annum terms, the predicted real growth of retail turnover index by the end of 2013 will hover around 1%.

INVESTMENTS IN CAPITAL ASSETS

Table 3 presents the outputs of calculations of forecast values of investments in capital assets in September2013 – February 2014. The forecasts were made on the basis of time-series models with utilization of the Rosstat data of the January 1999 – June 2013 period.

The results presented in *Table 3* indicate that over the period from September 2013 through February 2014, the average predicted growth of investments on the same period of 2012–2013 amounts to approximately 6%.

Over the period under consideration, the average predicted real terms growth of investment on the same period of 2012–2013 amounts to 1.8%.

The predicted per annum growth, in nominal terms, of investments in capital assets will amount in 2012 to 13.1%. The decline of real investments in capital assets by the results of the year 2012 is forecasted to be at the level of 3.4%.

It is expected that the 2013 annual growth of investments in capital assets will amount to Rb 2,462m (a 10.9% rise on 2012). In real terms, the year-on-year rise in the index of investments in capital assets will amount to 0.5%.

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 June 2013 on the basis of the data of the Central Bank of Russia[1]. The outputs of the calculations are shown in Table 4.

The average predicted increase in the indices of exports, imports, exports to countries outside the CIS, and imports from the countries outside the CIS over the period from September 2013 through February 2014 will amount to 0.7%, 7.8%, 1.9%, and 8.9% respectively on the same period of 2012–2013. The average predicted balance of trade with all foreign countries in September 2013 – February 2014 will amount to $ 82.4bn, thus pointing to a decline of 12.2% on the same period of 2012 – 2013. It is predicted that, on the whole over the course of 2013, the average predicted trade surplus with all foreign countries will amount to $ 194.2bn, which represents a 1% rise on 2012.

Table 4

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

Month	Export, total				Import, total				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
Sep 2013	42.6	44.1	99	102	27.6	30.4	101	111	37.3	36.1	103	100	25.5	25.2	108	107
Oct 2013	44.8	44.6	96	96	28.5	33.8	89	105	39.4	39.1	101	100	27.9	28.0	102	102
Nov 2013	45.6	44.3	101	98	32.6	32.0	106	104	38.8	37.1	102	97	25.5	26.4	98	101
Dec 2013	44.4	45.3	92	94	32.0	33.8	101	106	40.3	37.6	100	93	28.1	28.1	102	103
Jan 2014	43.8	42.8	113	110	28.4	28.9	131	133	35.4	36.7	108	111	26.0	24.0	141	130
Feb 2014	45.4	44.1	108	105	29.4	29.7	111	112	37.6	38.6	104	107	28.1	24.7	123	108
For reference: actual values in respective months of 2012-2013 (billion USD)																
Sep 2012	43.1				27.4				36.0				23.5			
Oct 2012	46.5				32.2				39.2				27.4			
Nov 2012	45.3				30.6				38.2				26.1			
Dec 2012	48.3				31.9				40.3				27.4			
Jan 2013	38.9				21.7				32.9				18.5			
Feb 2013	42.0				26.5				36.1				22.9			

Note: in the period from January 1999 till June 2013, 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

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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.

evaluated on the basis of the Rosstat data in the period from January 1999 to June 2013[1]. Table 5 presents the outputs of model calculations of forecast values in September 2013 – February 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)	PPI of industrial goods (ARIMA)	PPI of industrial goods (BS)	Mineral resources extraction	Manufacturing industry	Production of power, gas and water	Production of food products	Textile and sewing industry	Woodworking and production of wood products	Pulp and paper industry	Production of charred coal and oil products	Chemical industry	Iron and steel industry and production of finished metal goods	Production of machines and equipment	Production of transport vehicles and equipment
								Producer price indices:								
Forecast values (% of the previous month)																
Sep 2013	100,2	100,2	100,5	102,8	100.5	100.2	100.0	100.9	100.5	100.5	100.1	103.2	100.5	100.6	100.1	99.9
Oct 2013	100,4	100,4	99,3	98,3	99.8	99.6	100.0	100.8	100.4	101.1	100.5	102.3	100.2	100.5	100.1	100.7
Nov 2013	100,4	100,3	100,6	99,0	101.3	99.5	100.2	100.8	100.5	100.8	100.0	101.9	100.2	100.8	100.0	100.0
Dec 2013	100,4	100,4	99,8	98,9	102.0	99.7	99.7	101.0	100.0	100.6	100.5	101.6	100.3	100.4	99.9	100.6
Jan 2014	101,1	100,8	100,6	102,1	101.9	100.0	102.5	100.9	100.6	100.8	100.3	101.6	100.4	101.9	100.6	100.7
Feb 2014	100,6	100,4	100,0	100,5	101.7	100.2	105.8	100.7	100.4	100.5	100.6	102.2	100.4	102.5	100.5	100.6
Forecast values (% of December 2012/2013)																
Sep 2013	104.1	104.8	101.2	107,4	111.2	99.9	98.8	104.1	103.6	105.3	102.5	106.3	103.3	96.9	100.0	99.7
Oct 2013	104.6	105.1	100.5	105,6	110.9	99.5	98.8	105.0	104.1	106.4	103.0	108.8	103.5	97.3	100.1	100.4
Nov 2013	105.0	105.4	101.2	104,5	112.4	99.0	99.0	105.8	104.6	107.3	103.0	110.9	103.6	98.1	100.1	100.4
Dec 2013	105.4	105.8	101.0	103,3	114.6	98.8	98.7	106.9	104.6	107.9	103.5	112.6	104.0	98.5	100.0	101.0
Jan 2014	101.1	100.8	100.6	102,1	101.9	100.0	102.5	100.9	100.6	100.8	100.3	101.6	100.4	101.9	100.6	100.7
Feb 2014	101.6	101.2	100.5	102,6	103.7	100.2	108.5	101.5	101.0	101.3	100.9	103.8	100.9	104.4	101.1	101.3
For reference: actual values in the same periods of 2012-2013 (% of December 2011/2012)																
Sep 2012	105.2		109.1		124.4	104.4	107.3	105.2	99.6	101.8	101.3	110.5	104.8	98.1	103.6	102.6
Oct 2012	105.7		107.3		114.9	104.9	108.1	106.5	100.0	101.7	101.6	111.1	105.2	98.7	104.0	102.5
Nov 2012	106.1		106.0		110.9	104.5	107.5	107.2	100.6	101.8	101.2	108.8	105.1	98.0	104.2	102.8
Dec 2012	106.6		104.9		109.2	103.3	107.1	107.5	100.7	101.7	101.6	104.7	103.4	96.6	104.2	102.9
Jan 2013	101.0		99.6		99.9	99.5	99.4	100.3	100.5	100.6	99.3	96.6	99.7	99.8	100.3	100.0
Feb 2013	101.6		100.4		102.4	99.9	99.2	100.1	101.1	101.0	100.0	98.4	100.6	99.7	100.5	99.3

Note: in the period from January 1999 till June 2013, the series of the chain producer price index of industrial goods as regards production of machines and equipment 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.

The predicted average monthly growth rate of the consumer price index (CPI) over the period from September 2012 through February 2013 will amount to 0.5%. For that period, the growth rate of producer price indices is predicted to be, on the average, at the level of 0.2% per month. The average per annum growth of the consumer price index (based on two models) will be 5.6%. The same index for producer prices will hover around 2.2%.

As regards the OKVED's indices of manufacturing prices, the following monthly rates of growth are forecast for the period from September 2013 through February 2014: 1.2% in the extraction of mineral resources, (-0.1%) in manufacturing industries, 1.4 % in the production and distribution of electric power, gas and water, 0.8% in the production of foodstuffs, 0.4% in textile and clothing manufacture, 0.7% in the processing of timber and the production of millwork, 0.3% in pulp and paper production, 2.1% in the production of coke and petroleum products, 0.3% in chemical production, 1.1% in metallurgical production and the production of finished metal products, 0.2% in the production of machinery and equipment, and 0.4% in the production of transport facilities and equipment.

Thus, the predicted average growth of manufacturing prices, by type of economic activity, in 2008 amounts to 4.3%. The highest growth rate – 14.6% – is forecast for manufacturing prices in the

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

extraction of mineral resources, while the lowest growth rate (a decline) – (-1.5%) – is forecast for manufacturing prices in metallurgical production and the production of finished metal products.

The dynamics of the cost of the minimum package of food products

This section presents the outputs of calculations of forecast values of the cost of the minimum package of food products in September 2013 – February 2014. The forecasts were made on the basis of time series with use the Rosstat data in the period from January 2000 till June 2013. The outputs of calculations are shown in Table 6.

As seen from *Table 6*, it is predicted that the price of the minimum set of food products will indeed rise on the corresponding level of last year. At the same time, the average predicted price of the minimum set of food products amounts to approximately Rb 2,889.5. The predicted rise in the cost of the minimum set of food products amounts, on the average, to approximately 10.9%, by comparison with the level of the corresponding period of last year. It is expected that in 2013, the annual rise in the cost of the minimum set of food products will amount to 10.7%.

Indices of Transportation Tariffs on Cargo Carriage

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 November 1998 till June 2013. Table 7 shows the outputs of model calculations of forecast values in September 2013 – February 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.

According to the forecast for the autumn and winter of 2013-2014, the cargo transportation rate composite index will grow at 1.1% per month. It is expected that, in January 2014, there will be a 5 p.p. seasonal leap in the value of this index. In 2013, the annual growth of the cargo transportation rate composite index will amount to 9.3%.

Over the course of this period, the motor vehicle cargo transportation rate index will grow at an average monthly rate of 0.3%. As a result, its annual growth in 2013 will amount to 2.8%.

Table 6

THE FORECAST OF THE COST OF THE MINIMUM PACKAGE OF FOOD PRODUCTS (PER PERSON A MONTH)

Forecast values according to ARIMA-model (Rb)	
September 2013	2916.6
October 2013	2910.3
November 2013	2900.3
December 2013	2888.2
January 2014	2875.1
February 2014	2846.4
For reference: actual values in the same months of 2012–2013 (billion Rb)	
September 2012	2550.8
October 2012	2550.5
November 2012	2570.8
December 2012	2608.9
January 2013	2662.2
February 2013	2693.3
Expected growth on the respective month of the previous year (%)	
September 2013	14.3
October 2013	14.1
November 2013	12.8
December 2013	10.7
January 2014	8.0
February 2014	5.7

Note: the series of the cost of the minimum package of food products in the period from January 2000 till June 2013 are stationary in the first-order differences.

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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).

Over the next six months, the index of the pipeline transportation tariffs will be gradually decreasing at a monthly rate of 2.3%. As a result, the 2013 annual growth of the index of the pipeline transportation tariffs will amount to 29.5%.

Table 7

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

Period	Composite index of transportation tariffs on cargo carriage	Index of tariffs on motor cargo carriage	Index of tariffs on pipeline transportation
Forecast values according to ARIMA-models (% of the previous month)			
September 2013	100.3	100.0	101.7
October 2013	100.3	100.0	102.7
November 2013	100.3	100.0	103.1
December 2013	100.3	100.0	101.9
January 2014	105.3	101.6	101.7
February 2014	100.3	99.9	102.9
Forecast values according to ARIMA-models (% of December of the previous year)			
September 2013	108.3	102.8	120.1
October 2013	108.7	102.8	123.3
November 2013	109.0	102.8	127.1
December 2013	109.3	102.8	129.5
January 2014	105.3	101.6	101.7
February 2014	105.5	101.6	104.6
For reference: actual values in the same period of 2012–2013 (% of the previous month)			
September 2012	100.0	100.0	100.0
October 2012	97.9	99.9	95.8
November 2012	99.1	99.8	97.9
December 2012	100.0	100.1	100.0
January 2013	101.7	101.2	97.9
February 2013	99.2	100.2	100.0

Note: In the period from September 1998 till June 2013, 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 June 2013, too; fictitious variables for taking into account particularly dramatic fluctuations were used in respect of all the series.

The dynamics of world prices on natural resources

This section presents calculations of such average monthly values of prices on Brent oil ($ per barrel), Aluminum ($ per ton), gold ($ per ounce), copper ($ per ton) and nickel ($ per ton) in September 2013 – February 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 July 2013.

The average predicted level of oil prices amounts to approximately $ 116.5 per barrel, which exceeds last year's corresponding indicators by 3.7% on the average. Prices of aluminum are predicted to hover around $ 1,714 per ton, and their average predicted drop amounts to approximately 15% against the corresponding level of last year. Prices of gold are predicted to hover around $ 1,369 per ounce. The average predicted prices of copper amount to approximately $ 6,748 per ton, while those of nickel – to approximately $ 13,499 per ton. The average predicted drop in prices of gold amounts to approximately 5%, the average predicted drop in prices of copper – to approximately 16%, while that in prices of nickel – to approximately 22% by comparison with the corresponding level of last year.

By the end of 2013, the per barrel price of Brent crude oil is forecast to be at around $ 117.07 (an annual growth of 6.8%); the per ton price of aluminum – at $ 1,709 (a decline by 18.1%); the per

ounce price of gold – at $ 1,371 (an 18.8% decline); the per ton price of copper – at $ 6,734 (a 15.5% decline); the per ton price of nickel – at $ 13,499 (a 22.6% decline).

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 according to ARIMA–models					
September 2013	112.57	1742	1355	6830	13668
October 2013	114.26	1723	1362	6800	13609
November 2013	115.49	1714	1363	6771	13555
December 2013	117.07	1709	1371	6734	13499
January 2014	118.92	1701	1379	6698	13394
February 2014	120.60	1695	1384	6657	13271
Growth on the respective month of the previous year (%)					
September 2013	-0.7	-15.6	-22.3	-15.6	-20.9
October 2013	2.0	-12.7	-22.0	-15.7	-20.7
November 2013	5.3	-12.1	-20.8	-12.2	-17.0
December 2013	6.8	-18.1	-18.8	-15.5	-22.6
January 2014	5.3	-16.5	-17.5	-16.8	-23.4
February 2014	3.6	-17.5	-15.0	-17.4	-25.0
For reference: actual values in the same period of 2012-2013					
September 2012	113.38	2064	1744	8088	17288
October 2012	111.97	1974	1747	8062	17169
November 2012	109.71	1949	1721	7711	16335
December 2012	109.64	2087	1689	7966	17449
January 2013	112.93	2038	1671	8054	17494
February 2013	116.46	2054	1628	8061	17690

Note: in the period from January 1980 till July 2013, the series of prices on oil, nickel, gold, copper and aluminum are series of DS type.

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 September 2013 – February 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 June 2013. 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.

In the autumn and winter of 2013, the monetary base and the M_2 money supply index will grow, on the average, by 0.8 and 1.5% per month respectively. It is expected that in December 2013, the monetary base and the M_2 index will see seasonal leaps of 10.2% and 7.9% respectively. According to our forecasts, the annual growth of the monetary base in 2013 will amount to 43.6%. The average monthly increase of M_2 is predicted to be around 15.2%.

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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.

THE FORECAST OF M$_2$ MONETARY AGGREGATE AND THE MONETARY BASE

Period	Monetary base		M$_2$	
	Billion Rb	Growth on the previous month, %	Billion Rb	Growth on the previous month, %
September 2013	7783	0.3	28828	0.3
October 2013	7850	0.9	28909	0.3
November 2013	7832	-0.2	29251	1.2
December 2013	8635	10.2	31575	7.9
January 2014	8021	-7.1	30919	-2.1
February 2014	8086	0.8	31344	1.4
For reference: actual value in the respective months of 2012–2013 (growth on the previous month, %)				
September 2012	0.3		0.3	
October 2012	0.9		0.3	
November 2012	-0.3		1.4	
December 2012	11.2		9.3	
January 2013	-7.7		-2.4	
February 2013	0.9		1.6	

Note: in the period from October 1998 to June 2013, 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.

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 June 2013. 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.

As indicated by the results of our forecasts for September 2013 - February 2014, the gold and foreign exchange reserves will be increasing at an average monthly rate of 1.1%. The annual drop in the international reserves in 2013 is predicted to be at around of 1.1%.

THE FORECAST OF INTERNATIONAL (GOLD AND FOREIGN EXCHANGE) RESERVES

Period	Forecast values according to ARIMA-models	
	Billion USD	Growth on the previous month, %
September 2013	510.7	0.6
October 2013	520.8	2.0
November 2013	528.4	1.5
December 2013	531.6	0.6
January 2014	535.3	0.7
February 2014	541.4	1.1
For reference: actual values in the same period of 2012–2013		
September 2012	529.9	3.0
October 2012	526.8	-0.6
November 2012	528.2	0.3
December 2012	537.6	1.8
January 2013	532.2	-1.0
February 2013	526.2	-1.1

Note: in the period from October 1998 till June 2013, 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

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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 August 2013 and between January 1999 and August 2013[1], respectively.

As predicted for the period under consideration, the average USD to ruble exchange rate (based on two models) will be Rb 33.13 per USD. The index predicted for the end of 2013 will be Rb 33.1 per USD. The average euro – USD exchange rate will be 1.34 USD per 1 euro – the same as its index for the end of 2012.

Table 11

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

Period	Forecast values of the RUR/USD exchange rate (RUR per USD) according to ARIMA-model		Forecast values of the USD/EUR (USD per EUR) according to ARIMA-model	
	ARIMA	SM	ARIMA	SM
September 2013	32.79	33.10	1.33	1.32
October 2013	32.66	33.09	1.33	1.32
November 2013	32.56	33.23	1.33	1.32
December 2013	32.50	33.23	1.33	1.33
January 2014	32.43	33.37	1.33	1.33
February 2014	32.36	33.37	1.34	1.33
For reference: actual values in the similar period of 2012–2013				
September 2012	32.29		1.26	
October 2012	31.22		1.29	
November 2012	31.53		1.30	
December 2012	31.06		1.30	
January 2013	30.37		1.32	
February 2013	30.03		1.35	

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

INDICES OF THE STANDARD OF LIVING

This section (Table 12) presents such outputs of calculations of forecast values of indices of real wages, real disposable cash income and real cash 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 July 2013. 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 cash 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 results shown in *Table 12* predict growth of all standard of living indices. Thus, real disposable cash income is expected to increase, on the average, by approximately 5.3%; growth of real cash income will be somewhat similar – 5.8% on its last year's index; and real accrued wages and salaries will increase by 4.7% on the same period of last year.

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1 The Bulletin applies the IMF's data for the period between January 1999 and June 2013. The data for July and August 2013 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.).

It is forecasted that, by the results of the year 2012, all the indices of the standard of living are going to increase: real disposable cash income – by 4.2%; real cash income – by 4.8%; and real accrued wages and salaries – by 5.5% over 12 months.

Table 12

THE FORECAST OF THE INDICES OF THE STANDARD OF LIVING

Period	Real disposable cash income	Real cash income	Real accrued wages and salaries
Forecast values according to ARIMA-models (% of the respective month of 2012–2013)			
September 2013	104.7	105.1	108.7
October 2013	106.3	107.3	105.6
November 2013	102.1	102.6	104.7
December 2013	104.7	105.4	99.6
January 2014	107.9	107.7	104.6
February 2014	106.2	106.9	105.0
For reference: actual values in the respective period of 2012–2013 (% of the same period of 2011–2012)			
September 2012	105.3	107.5	104.7
October 2012	103.8	103.9	107.1
November 2012	108.1	108.2	106.7
December 2012	105.5	104.2	105.0
January 2013	100.6	102.3	105.4
February 2013	106.6	106.2	103.3

Note: for calculating purposes, the series of the disposable cash income, real cash income and real wages in the base form were used (March 1999 was adopted as a base period). In the period from January 1999 till July 2013, 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 June 2013 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 based on the ARIMA model (*Table 13*), over the autumn and winter of 2013–2014, the average monthly drop in employment across the national economy will amount to 0.2% on the same period of the previous year. The employment index predicted for the end of 2012 will be 71.4m for the national economy taken as a whole.

The average growth in the overall number of unemployed is predicted to be at the level of 7.6% per month against the index registered in the corresponding period of last year. The average number of unemployed at the end of 2013 is expected to be close to 4.1m.

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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 June 2013.

3 For example, deemed as such a difference may be a simultaneous decrease both in the number of the gainfully employed population and the total number of the unemployed. 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
September 2013	72.0	-0.6	4.0	5.4	5.6	3.9	0.5	5.4
October 2013	71.6	-0.2	4.1	4.0	5.7	3.9	0.3	5.4
November 2013	71.6	0.0	4.0	3.5	5.6	3.9	0.3	5.4
December 2013	71.4	-0.1	4.1	8.4	5.8	3.8	0.5	5.3
January 2014	70.8	0.1	4.5	-0.7	6.3	4.4	-3.3	6.2
February 2014	70.9	-0.1	4.4	2.7	6.2	4.2	-3.5	5.9
For reference: actual values in the same periods of 2012–2013 (million people)								
September 2012	72.6				3.8			
October 2012	72.4				3.8			
November 2012	71.7				3.9			
December 2012	71.6				3.9			
January 2013	71.5				3.8			
February 2013	70.7				4.5			

Note: in the period from October 1998 till June 2013, the series of the number of the gainfully employed population is a stochastic process which is stationary around the trend. The series of the index of the total number of the unemployed 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 FSSS industrial production index (ARIMA-model)
(% of December 2001)
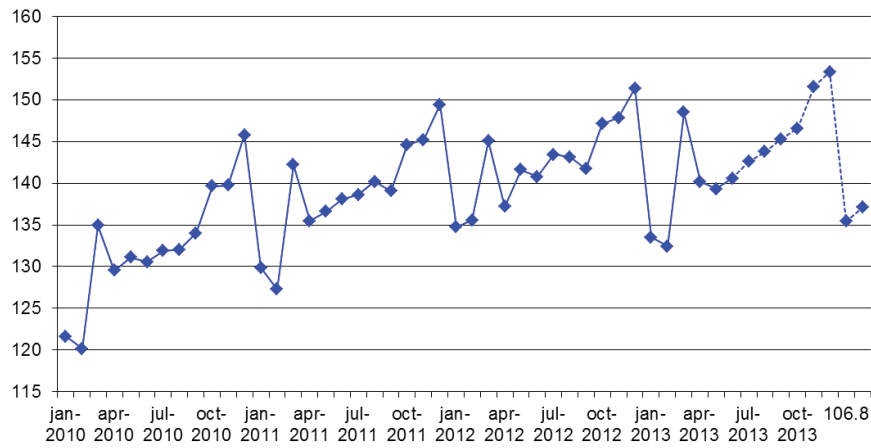
Fig. 1b. The CEC–NRU HSE industrial production index
(ARIMA-model) (% of January 1995)
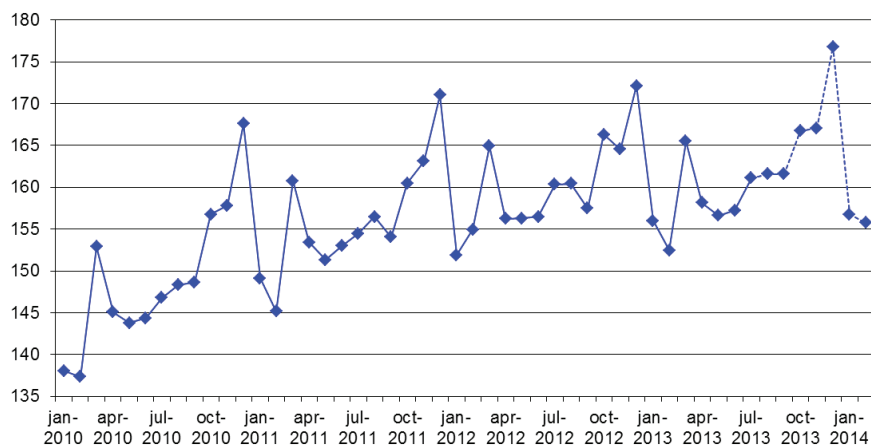
Fig. 2a. The FSSS index of industrial production as regards mineral resources extraction
(% of December 2001)
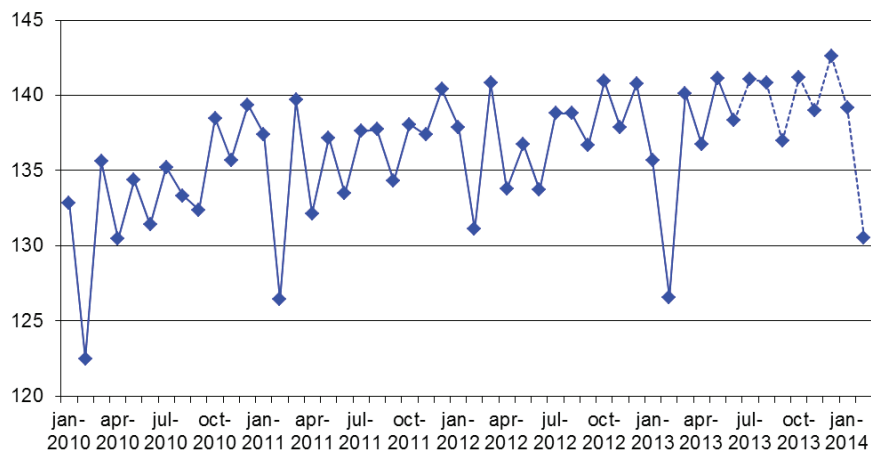
Fig. 2b. The CEC–NRU HSE index of industrial production as regards mineral resources extraction
(% of January 1995)
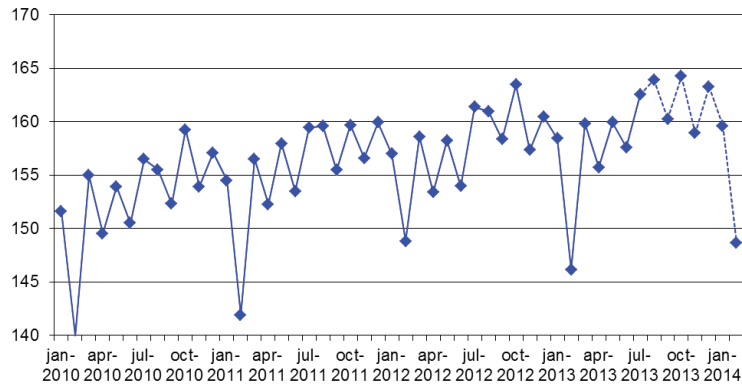
Fig. 3a. The FSSS index of industrial production as regards manufacturing industry
(% of December 2001)
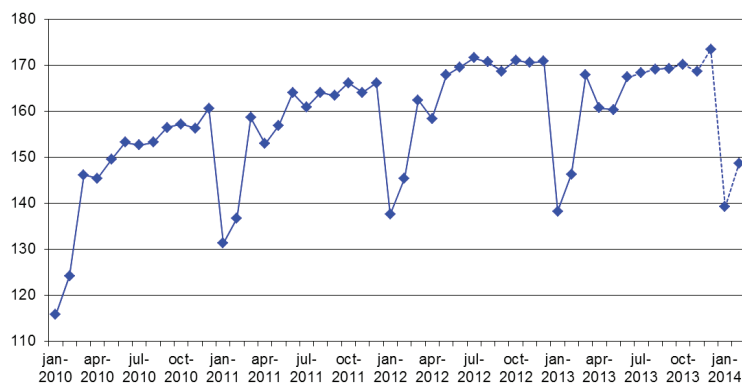
Fig. 3b. The CEC–NRU HSE index of industrial production as regards manufacturing industry
(% of January 1995)
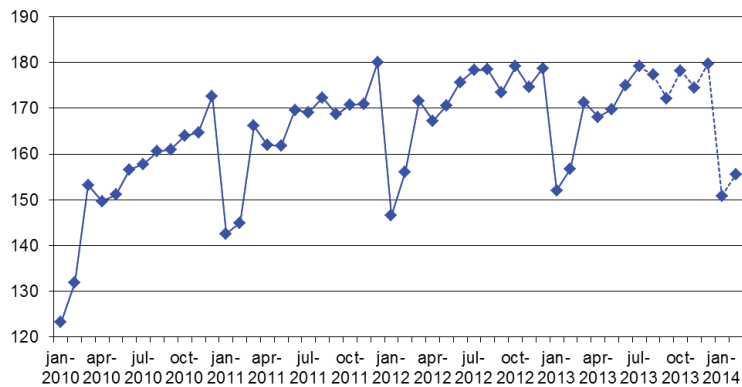
Fig. 4a. The FSSS index of industrial production as regards production and distribution of power, gas
and water (% of December 1998)
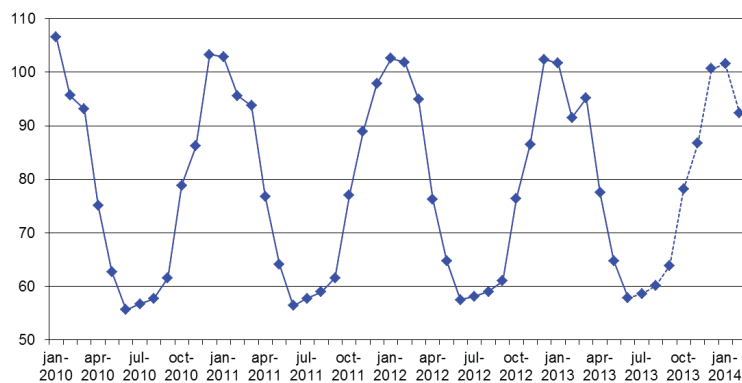
Fig. 4b. The NRU HSE index of industrial production as regards production and distribution of power, gas and water (% of January 1995)
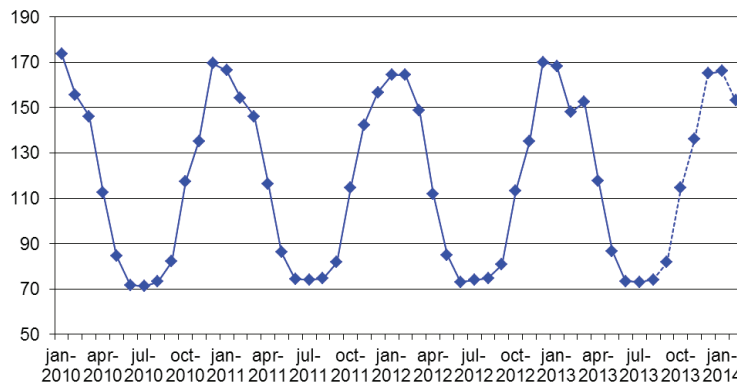
Fig. 5a. The FSSS index of industrial production as regards production of food products (% of December 2001)
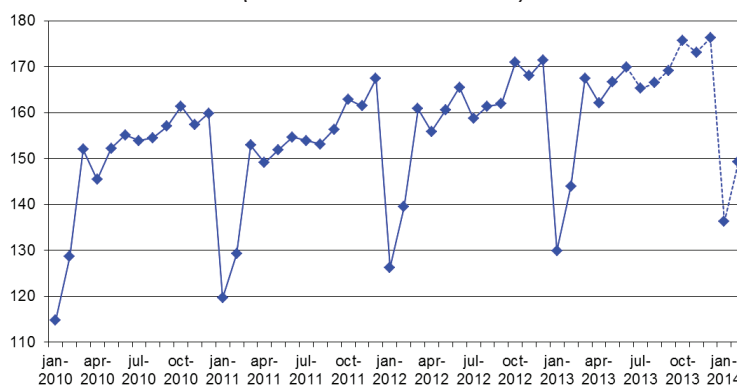
Fig. 5b. The NRU HSE index of industrial production as regards production of food products (% of January 1995)
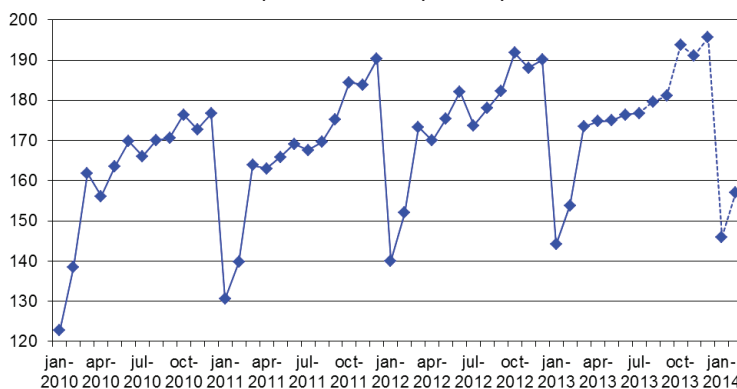
Fig. 6a. The FSSS index of industrial production as regards production of charred coal and oil products (% of December 2001)
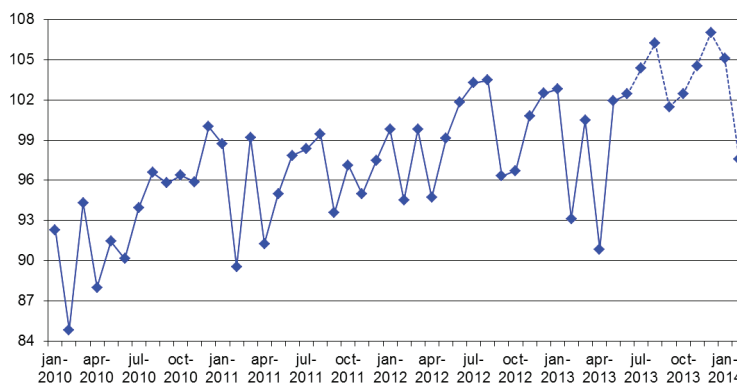
Fig. 6b. The NRU HSE index of industrial production as regards production of charred coal and oil products (% of January 1995)
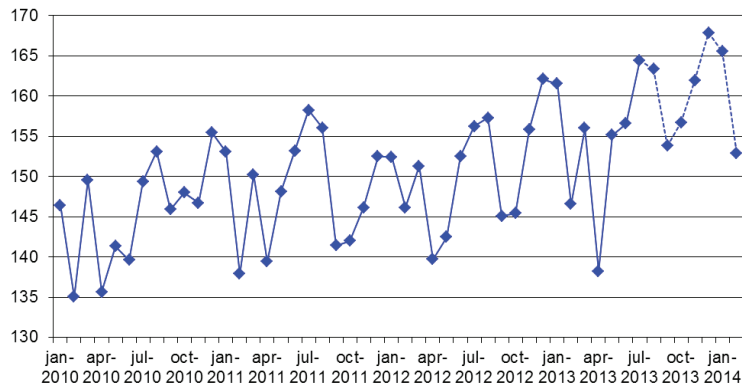
Fig.7a. The FSSS index of industrial production as regards iron and steel industry and production of finished metal goods (% of December 1998)
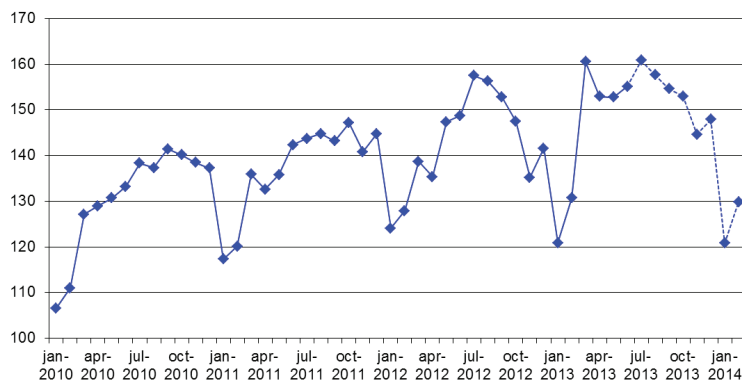
Fig. 7b. The NRU HSE index of industrial production as regards iron and steel industry and production of finished metal goods (% of January 1995)
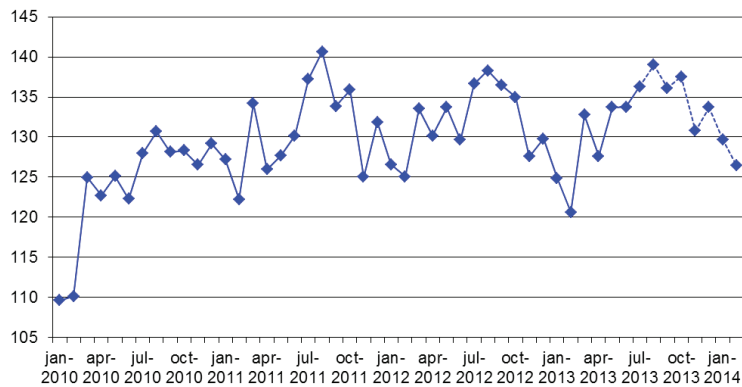
Fig. 8a. The FSSS index of industrial production as regards production of machines and equipment (% of December 1998)
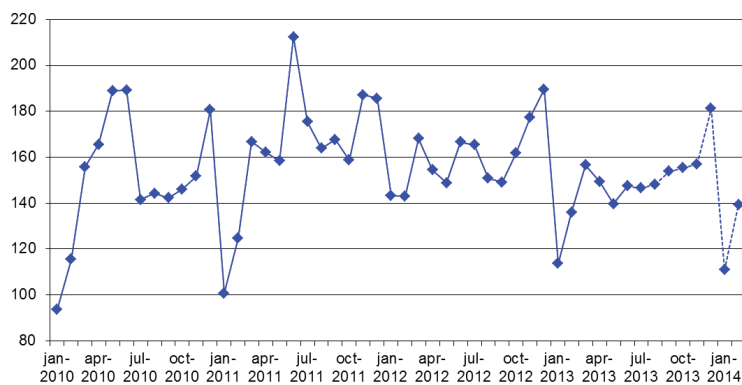
Fig. 8b. The NRU HSE index of industrial production as regards production of machines and equipment
(% of January 1995)
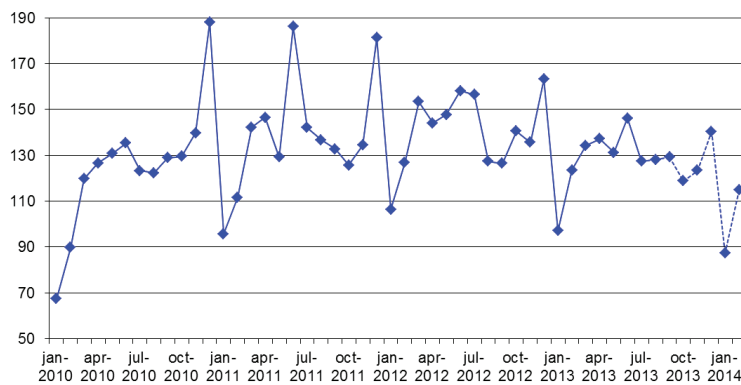
Fig. 9. The volume of retail sales (billion Rb)
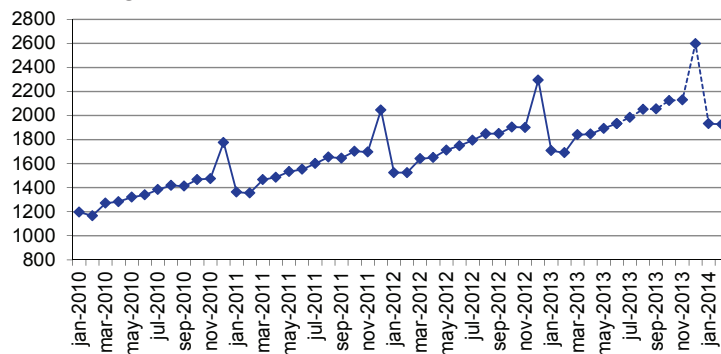
Fig. 9a. The real turnover of the retail trade
(% of the respective period of last year)
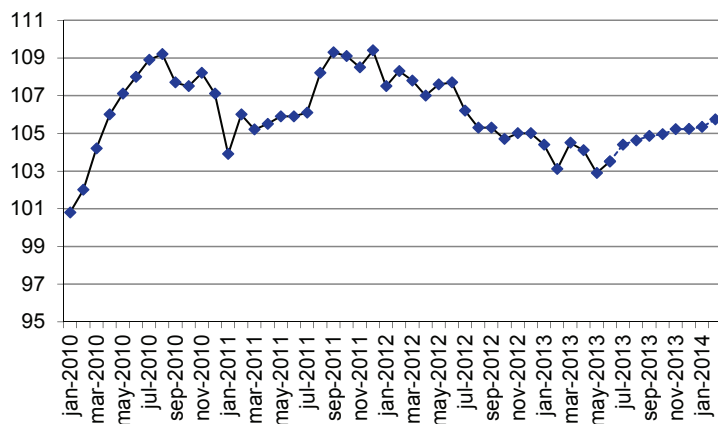
Fig. 10. Investments in capital assets (billion Rb)
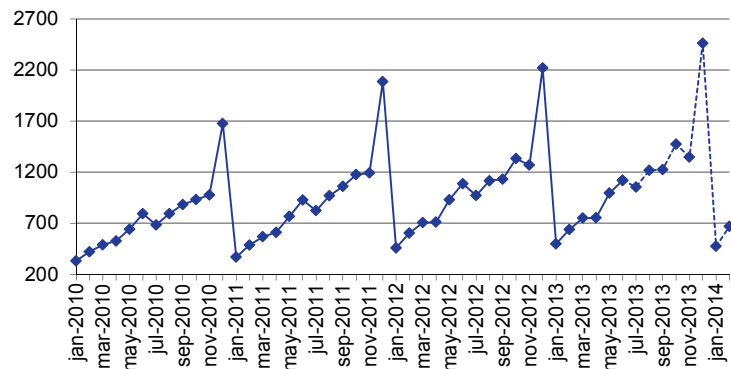
Fig. 10a. Real investments in capital assets (% of the respective period of the previous year)
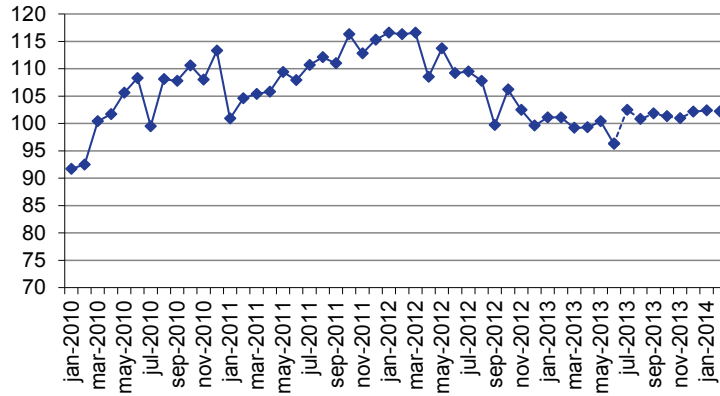
Fig.11. Export to all the countries (billion USD)
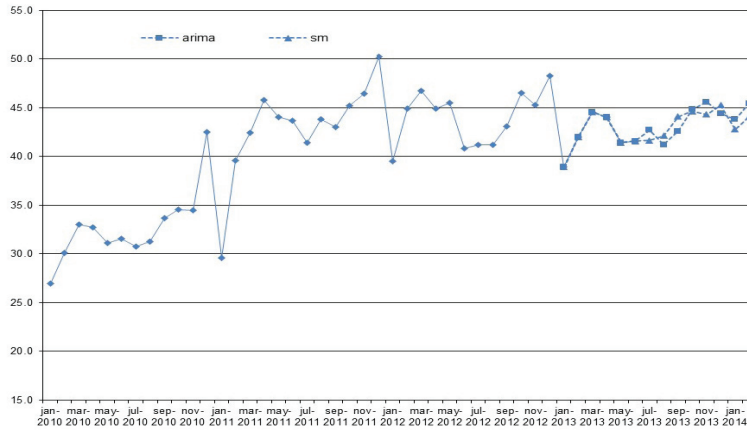
Fig. 12. Export to countries outside the CIS (billion USD)
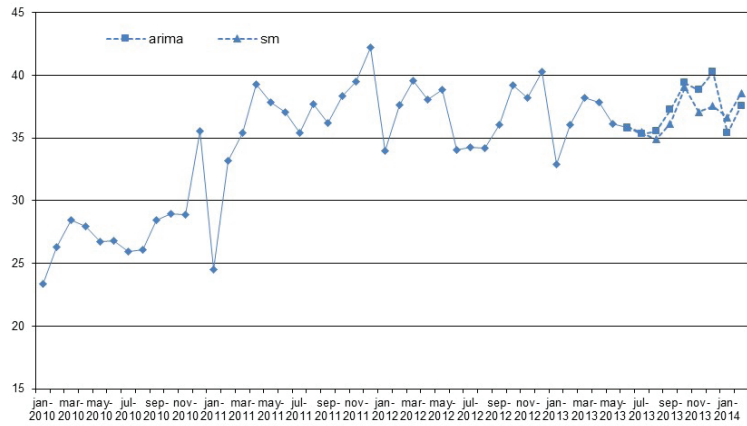
Fig. 13. Import from all the countries (billion USD)
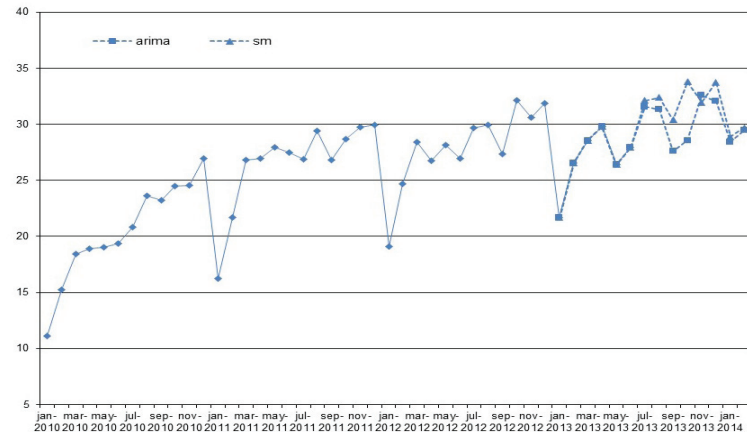
Fig. 14. Import from countries outside the CIS (billion USD)
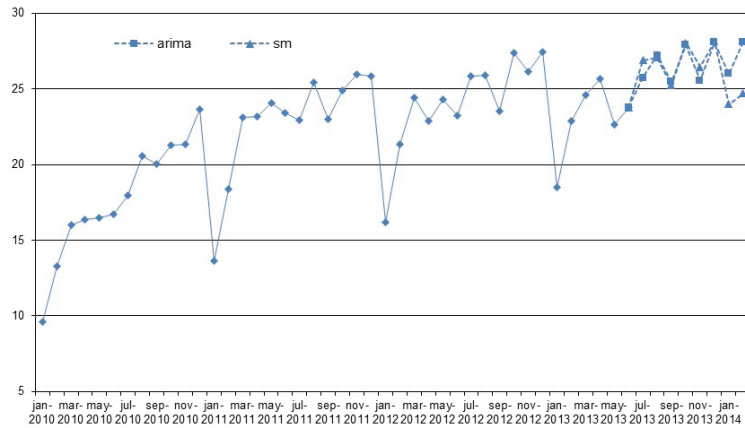
Fig. 15. Consumer price index as % of December of the previous year
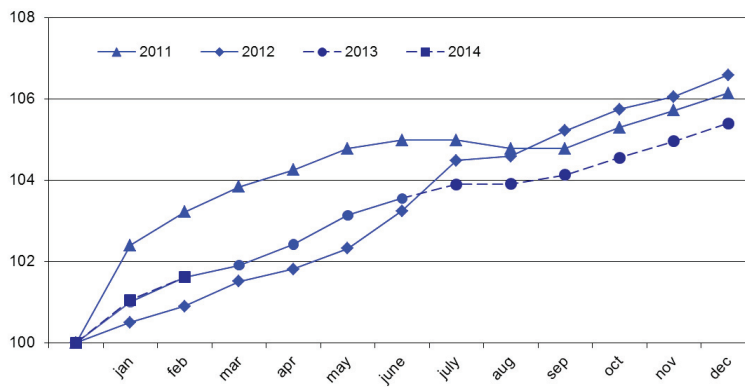
Fig. 15a. Consumer price index as % of December of the preceding year (SM)
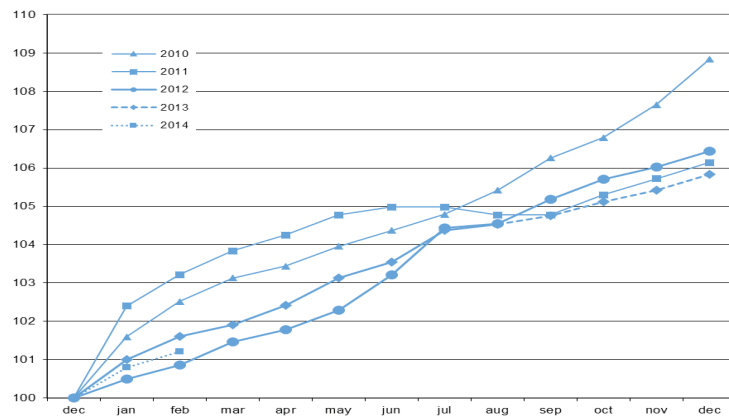
Fig.16. Producer price index (industrial goods), % of December of the previous year
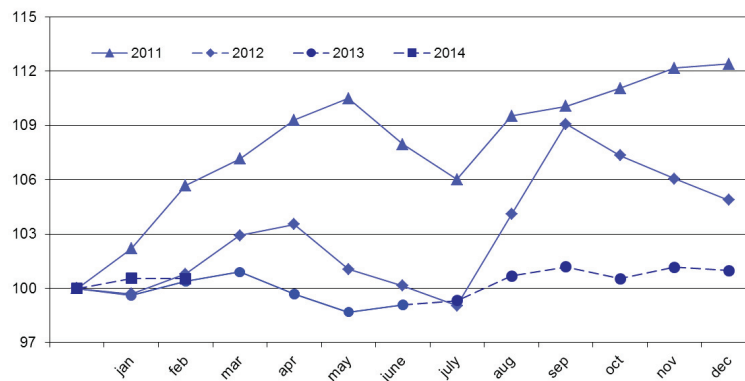
Fig. 17. Price index as regards mineral resources extraction,
% of December of the previous year
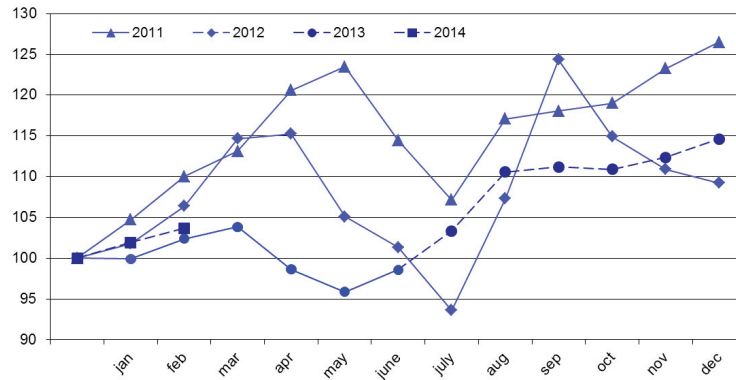
Fig. 18. Price index as regards manufacturing industries,
% of December of the previous year
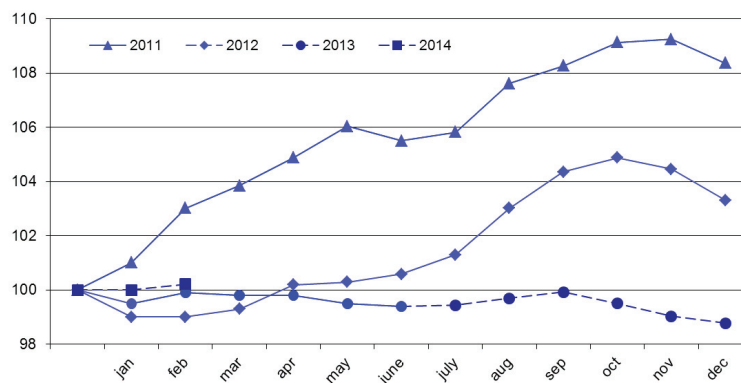
Fig. 19. Price index as regards production and distribution of power, gas and water,
% of December of the previous year
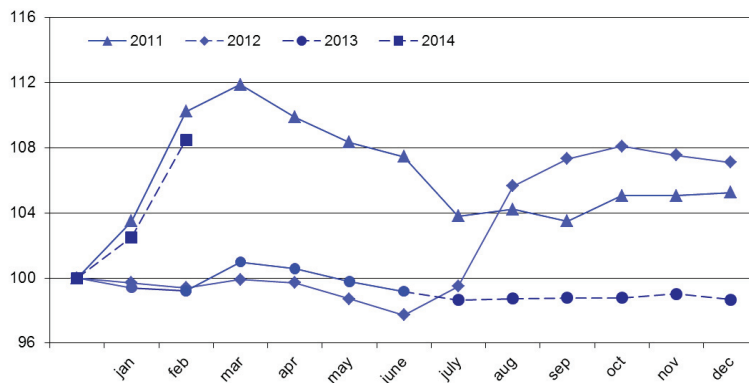
Fig. 20. Price index as regards production of food products,
% of December of the previous year
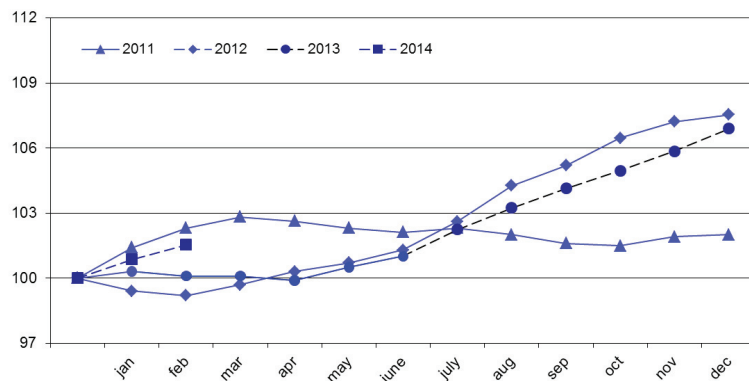
Fig. 21. Price index as regards textile and sewing industry,
% of December of the previous year
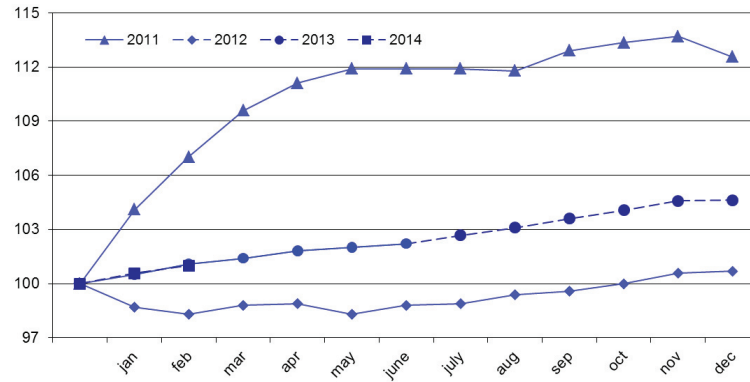
Fig. 22. Price index as regards woodworking and production of wood products,
% of December of the previous year
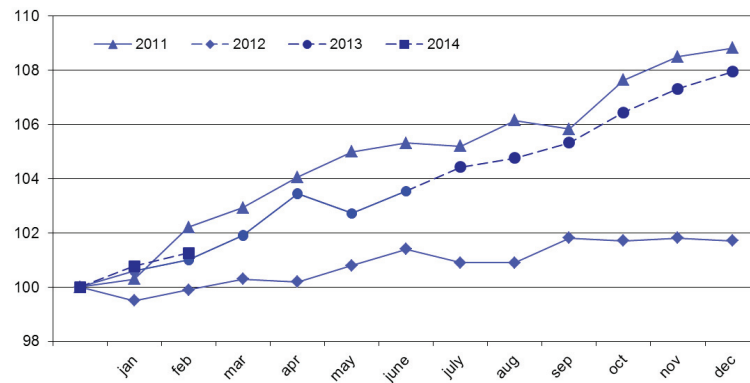
Fig. 23. Price index as regards pulp and paper industry,
% of December of the previous year
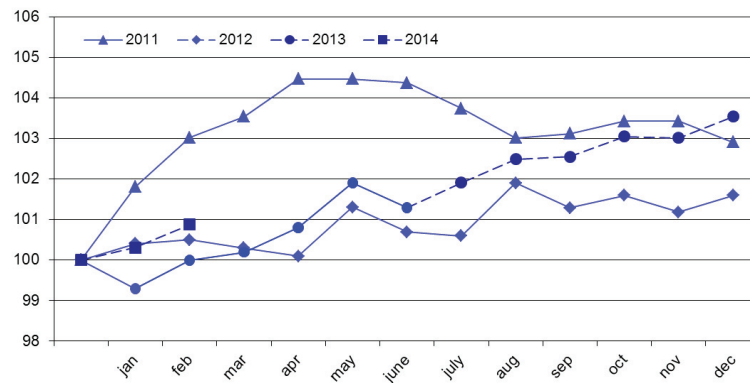
Fig. 24. Price index as regards production of charred coal and oil products,
% of December of the previous year
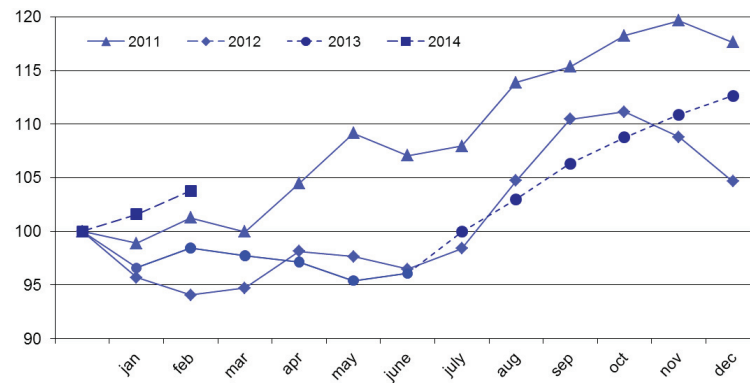
*Fig. 25. Price index as regards chemical industry,
% of December of the previous year*
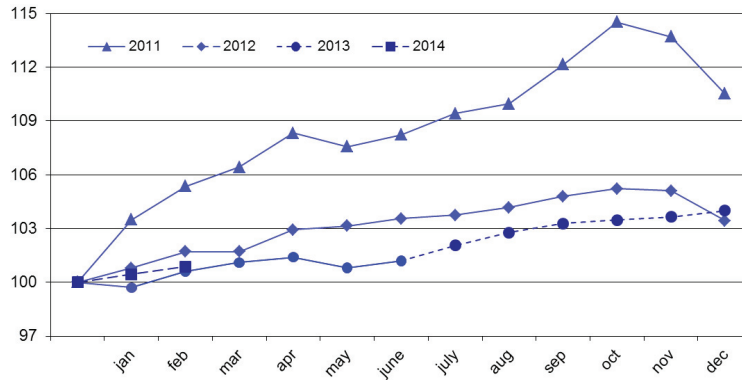
*Fig.26. Price index as regards iron and steel industry and production of finished metal goods,
% of December of the previous year*
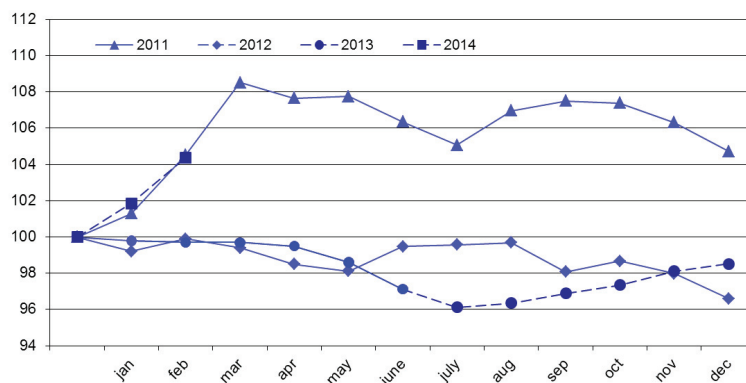
*Fig.27. Price index as regards production of machines and equipment,
% of December of the previous year*
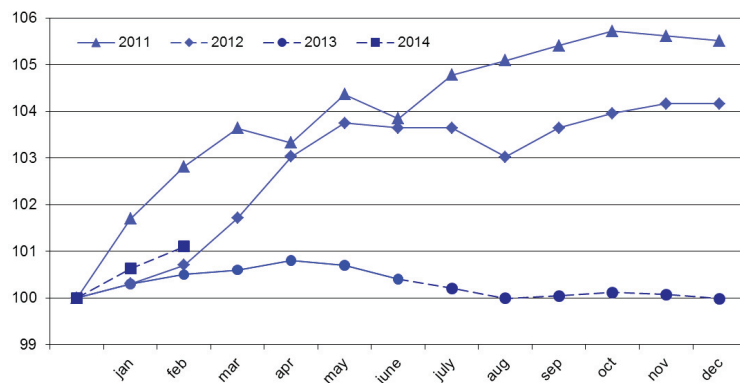
*Fig.28. Price index as regards production of transportation vehicles and equipment,
% of December of the previous year*
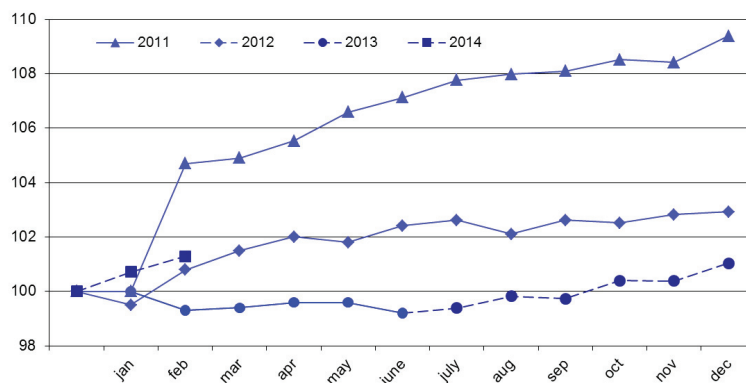
Fig. 29. The cost of the minimum package of food products
per person a month (Rb.)
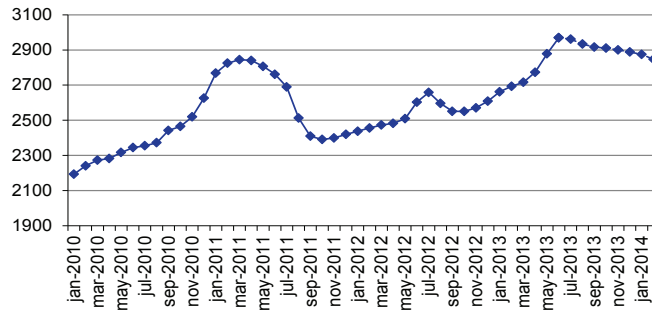
Fig. 30. The composite index of transportation tariffs
(for each year as % of the previous month)
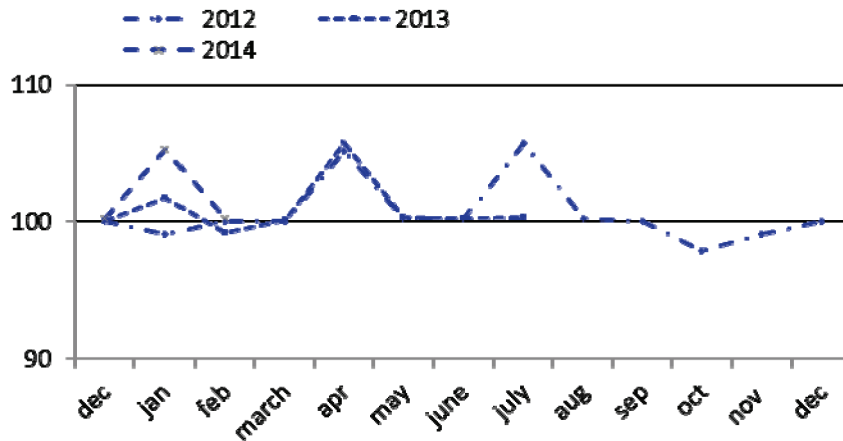
Fig. 31. Index of tariffs on motor cargo carriage
(for each year as % of the previous month)
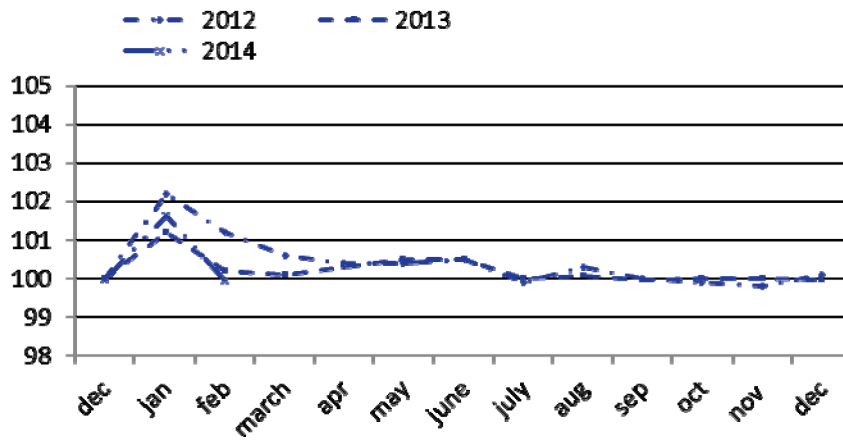
Fig. 32. Index of tariffs on pipeline transportation
(for each year as % of the previous month)
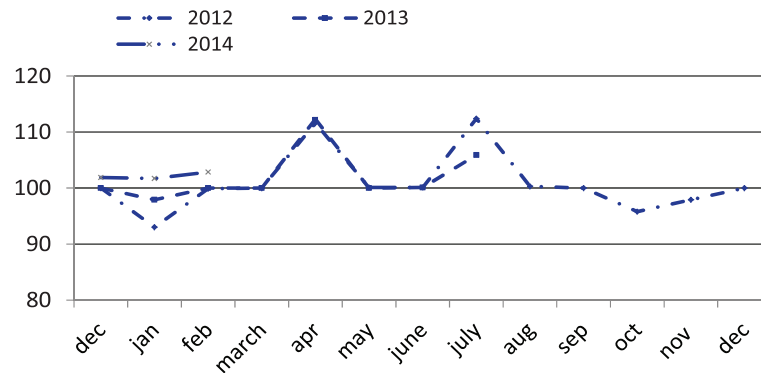
Fig. 33. Prices on Brent oil ($ a barrel)
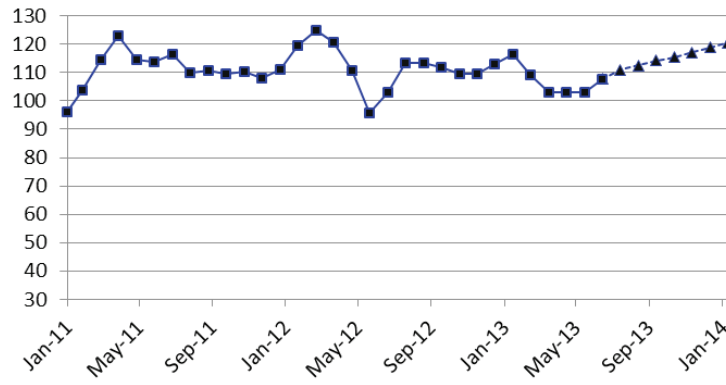
Fig. 34. Prices on aluminum ($ per ton)
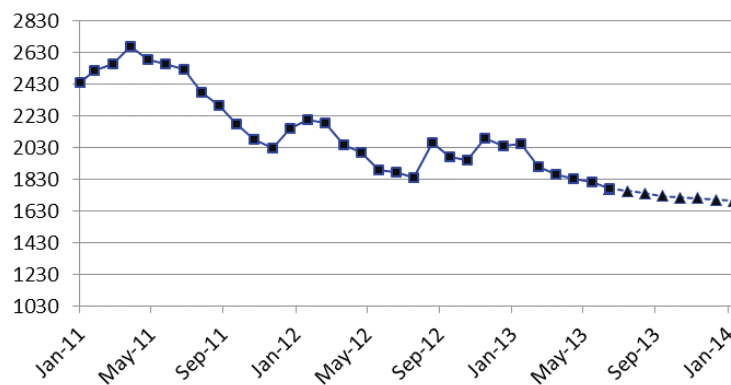
Fig. 35. Prices on gold ($ per ounce)
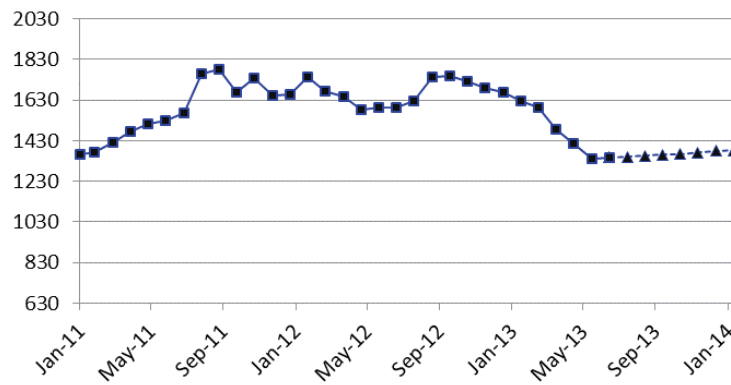
Fig. 36. Price on nickel ($ per ton)
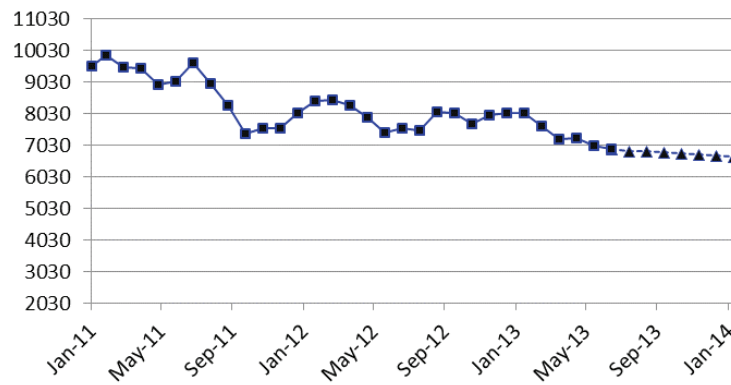
Fig. 37. Prices on copper ($ per ton)
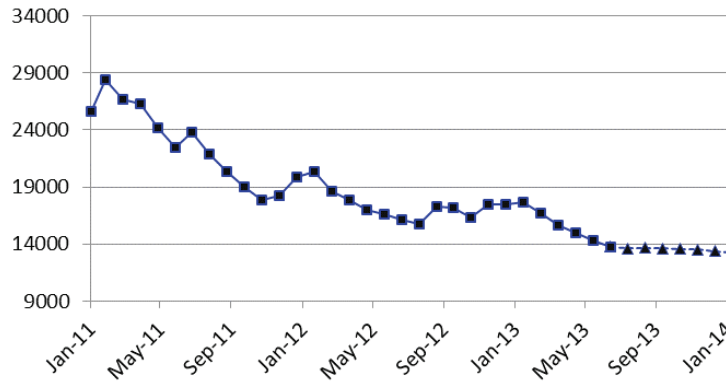
Fig. 38. Monetary base, million Rb.
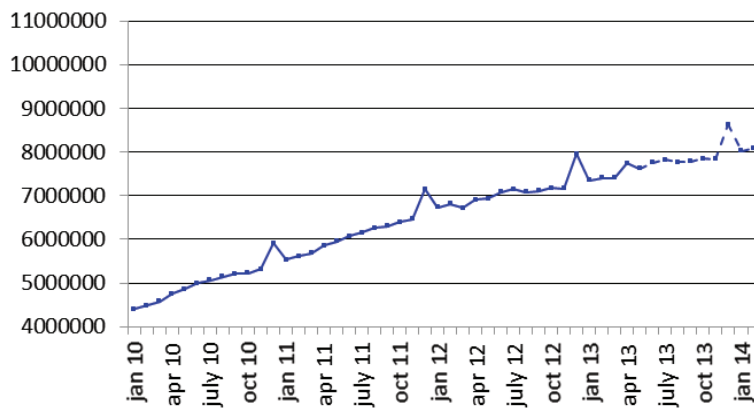
Fig. 39. M$_2$, billion Rb.
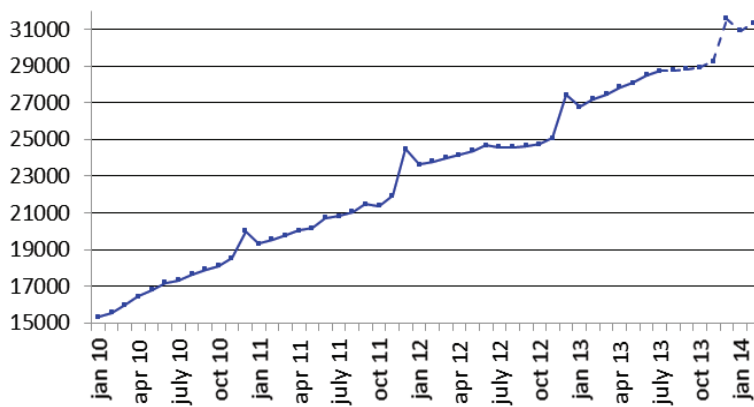
Fig. 40. International reserves of the Russian Federation, million USD

Fig. 41. The RUR/USD exchange rate
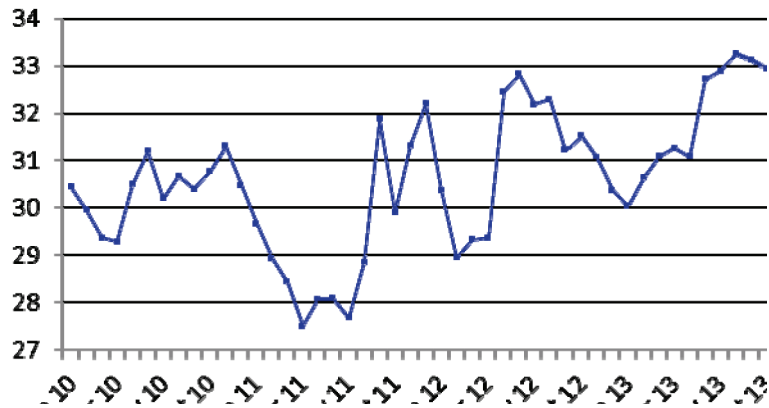
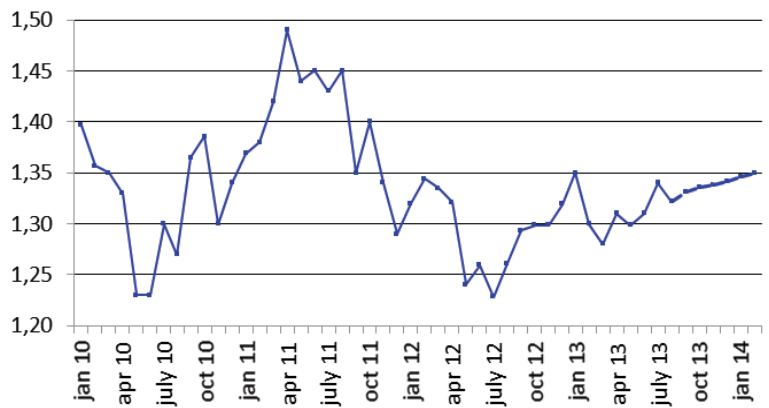*Fig. 41a. The RUR/USD exchange rate (SM)*
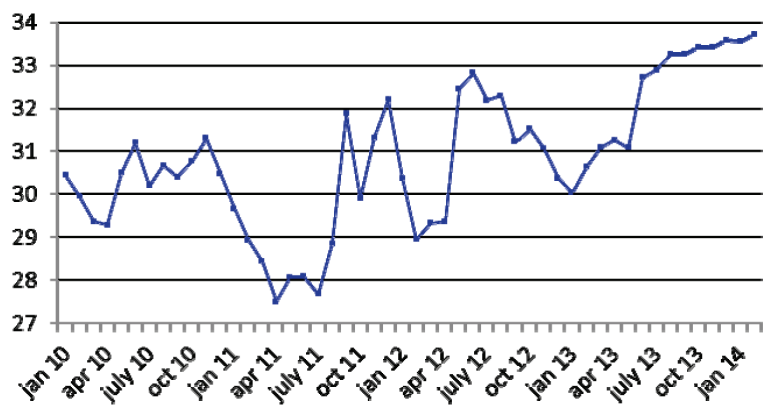
Fig. 42. The USD/EUR exchange rate

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

*Fig. 43. Real disposable cash income
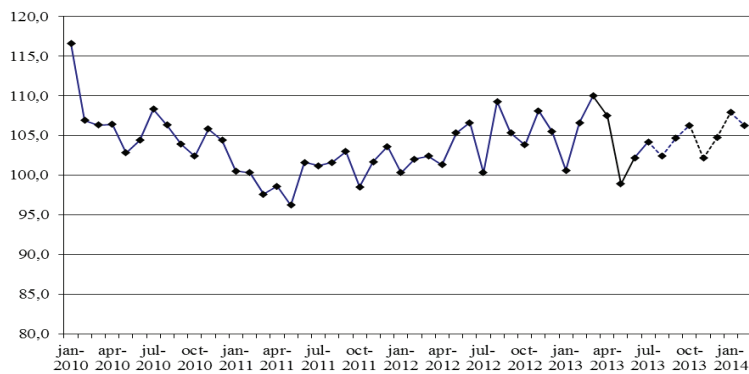(% of the respective period of the previous year)*

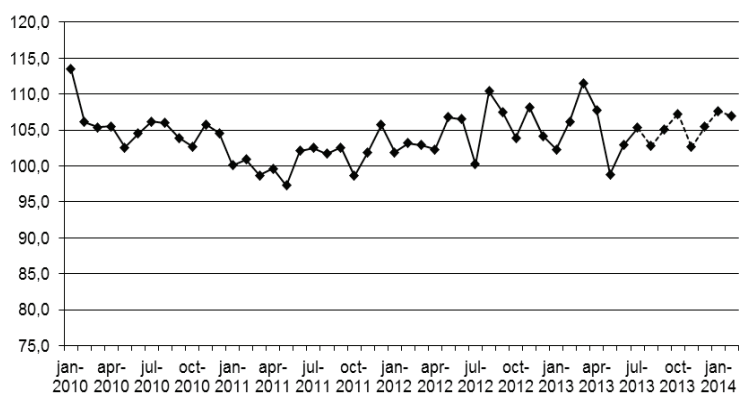*Fig. 44. Real cash income (% of the level of January 1999)*

*Fig. 45. Real accrued wages and salaries
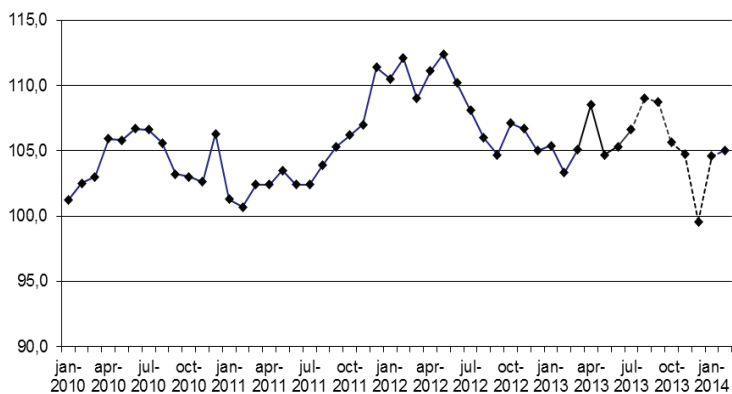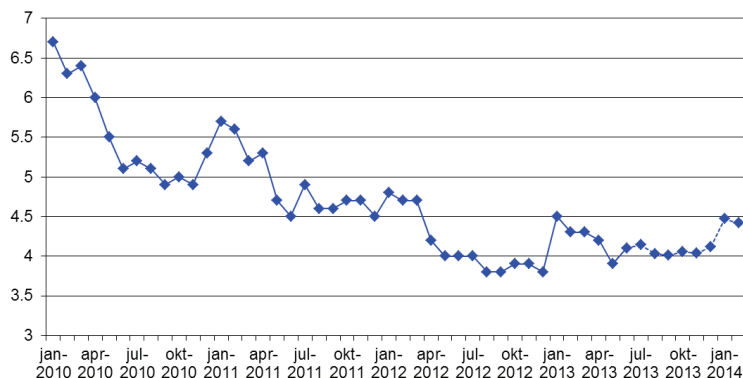(% of the respective period of the previous year)*

Fig. 46. Employment (million people)

Fig. 47. Unemployment (million people)