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THE BULLETIN OF MODEL CALCULATION 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 *August 2012 – January* 2013 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 pervious 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.

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.

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.

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.

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 production of primary products		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		CES–NRU HSE															
	ARIMA	BS	ARIMA	BS	Rosstat	CES–NRU HSE	Rosstat	CES–NRU HSE	Rosstat	CES–NRU HSE	Rosstat	CES–NRU HSE	Rosstat	CES–NRU HSE	Rosstat	CES–NRU HSE	Rosstat	CES–NRU HSE
Expected growth on the respective month of the previous year																		
August 2012	1.5	2.3	3.2	2.1	0.3	0.9	3.8	3.2	1.4	0.6	4.5	8.7	5.1	3.0	7.6	0.7	4.5	4.3
Sept. 2012	3.1	2.4	4.9	2.3	0.2	0.6	4.4	3.4	3.4	2.8	3.8	5.2	8.0	7.0	8.5	4.6	0.3	3.8
October 2012	2.2	2.2	3.2	2.1	0.7	0.8	3.6	2.1	3.2	4.8	3.8	6.1	5.6	5.8	4.6	5.6	10.3	7.2
Nov. 2012	3.0	2.2	2.2	2.4	0.0	-0.4	4.2	5.9	-0.1	1.6	3.3	2.4	6.2	6.5	8.5	8.5	-8.8	-7.5
Dec. 2012	4.7	2.4	4.3	2.5	0.6	0.1	4.1	3.1	3.2	7.0	3.0	2.4	2.6	6.4	6.8	5.2	7.7	0.9
January 2013	4.8	2.8	2.8	2.7	0.3	-0.7	4.6	6.0	0.7	1.1	3.6	1.9	1.9	5.4	11.3	6.4	-7.7	9.0
For reference: actual growth in 2011/2012 on the respective month of 2010/2011																		
August 2011	6.2		4.3		3.3	2.5	7.1	5.4	2.3	3.0	-1.9	-1.1	3.9	2.0	7.9	3.2	9.8	9.9
Sept. 2011	3.9		2.4		1.4	2.1	4.4	2.8	0.2	0.1	0.0	2.2	-1.2	-3.3	4.6	0.7	2.0	2.5
October 2011	3.6		2.0		-0.3	0.1	5.7	3.8	-2.2	-3.4	1.7	3.8	1.9	-2.2	7.1	3.1	3.0	-3.3
Nov. 2011	3.9		3.1		1.3	1.7	4.9	3.6	3.2	3.7	2.1	5.1	0.5	-0.4	-1.2	-3.2	23.5	18.8
Dec. 2011	2.5		0.6		1.8	1.7	3.3	2.0	-5.1	-8.3	3.8	5.8	-1.3	-1.9	2.6	0.0	-15.2	-12.2
January 2012	3.8		1.9		1.4	1.9	4.8	2.4	-0.2	-0.4	5.6	6.8	0.9	-0.5	5.7	-0.7	42.0	9.5

Note: in the time spans under review, the series of the Rosstat and CES–NRU HSE chain indices of industrial production as regards industry in general, as well as the CES–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 CES–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 CES–NRU HSE chain indices of industrial production as regards production of primary products 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 August 2012 – January 2013, the series of monthly data of the indices of industrial production of the Federal State Statistics Service (Rosstat) from January 2002 till May 2012, as well as the series of the base indices of industrial production of the Center for the Economic Situation under the Government of the Russian Federation (CES) and the National Research University Higher School of Economics (NRU HSE) in the period from January 1999 till June 2012 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 FSSS and CES–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 CES–NRU HSE average indices of industrial production growth within August 2012 – January 2013 as compared to the relevant period of the previous year for the industry in general is 2.9%. For the Rosstat indices of industrial production this indicator made 2.8%. As per 2012 results, the estimated annual indices of industrial production growth in the Russian National Classifier of Economic Activities (NASE) makes 3.6%, and according to CES–NRU HSE, the index of industrial production growth is 3.4%.

Average monthly indices of industrial production growth indicators in mining industry forecasted by Rosstat and CES–NRU HSE in August 2012–January 2013 make, respectively, 0.3% and 0.2%. In the manufacture of coke and refined oil products average growth is forecasted at 4.9% and 5.7% for the index of Rosstat and CES–NRU HSE, respectively.

CES–NRU HSE average growth index of industrial production in manufacturing industry in August 2012 – January 2013 as compared to the same period of the previous year was 4.0%, the Rosstat – 4.1%. Average monthly index of industrial production in the manufacture of food products of Rosstat and CES–NRU HSE are 3.7% and 4.5%, respectively. Rosstat and CES–NRU HSE average monthly values of the indices of industrial production for iron and steel industry and production of finished metal goods in August 2012 – January 2013 are 7.9% and 5.2%, respectively. In the production of machines and equipment average growth is forecasted by the Rosstat and CES–NRU HSE indices at 1.1% and 2.9%, respectively.

Average increase in the Rosstat index of industrial production in the manufacturing industry and distribution of electricity, gas and water in August 2012 – January 2013 as compared to the same period of the previous year makes 2.0%; the same indicator of the CES–NRU HSE index is 3. 0%.

The Rosstat growth of the indices of industrial production by economic activity in 2012 will make on average (by activity) 4%, as per CES–NRU HSE – 3.6%.

Retail Sales

This section (Table 2) presents forecasts of monthly retail sales made on the basis of monthly Rosstat data in the January 1999 – May 2012 period.

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)
August 2012	1827.2 (10.6)	105.8
September 2012	1814.7 (10.4)	105.0
October 2012	1881.7 (10.6)	104.9
November 2012	1874.4 (10.7)	105.3
December 2012	2285.3 (11.8)	105.2
January 2013	1686.6 (10.9)	105.4
For reference: actual value in the same months of 2011/2012		
August 2011	1652.6	108.2
September 2011	1643.2	109.3
October 2011	1701.3	109.1
November 2011	1693.9	108.4
December 2011	2044.0	109.3
January 2012	1520.8	107.4

Note: series of retail sales and real retail sales in the January 1999 – May 2012 period.

As follows from *Table 2*, forecast of the average monthly retail sales growth in the period of August 2011 to January 2012 as compared to the corresponding period of 2011–2012 is about 10.8%.

The average forecast growth of real monthly turnover in the period from August 2012 to January 2013 as compared to the relevant period of 2011–2012 is 5.2%.

In annual terms, the forecast growth of retail sales nominal indicator as of 2012 results will make 11.8%, and in real terms – 5.2%.

INVESTMENTS IN CAPITAL ASSETS

Table 3 presents the outputs of calculations of forecast values of investments in capital assets in August 2012 to January 2013. The forecasts were made on the basis of time-series models with utilization of the Rosstat data of the January 1999 – May 2012 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)
August 2012	1068.7 (15.5)	106.1
September 2012	1212.9 (16.0)	105.7
October 2012	1336.3 (16.3)	103.9
November 2012	1386.0 (16.2)	104.6
December 2012	2441.2 (18.3)	103.4
January 2013	469.4 (6.6)	105.9
For reference: actual values in the same months of 2011/2012		
August 2011	925.2	107.0
September 2011	1045.9	109.5
October 2011	1149.4	113.7
November 2011	1192.3	112.8
December 2011	2064.0	114.0
January 2012	440.4	115.6

Note: series of investments in capital assets in the January 1999 – May 2012 period are series of DS type.

The results presented in *Table 3* show that the forecast average growth of investments from August 2012 to January 2013 as compared to the relevant period of 2011–2012 makes about 14.8%.

Average forecast growth of real investment in the period from August 201 through January 2013 as compared to the same period of 2011–2012 is 4.9%.

The annual growth of nominal indicator of investments in capital assets will make 18.3%. For the indicator of real investments in capital assets growth as of 2012 results is forecast rate is 3.4%.

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 May 2012 on the basis of the data of the Central Bank of Russia[1]. The outputs of the calculations are shown in Table 4.

Average forecast growth in exports, imports, exports outside the CIS and imports from non-CIS countries in August 2012 – January 2013 as compared to the similar period of 2011–2012 will be -1.3%, 5.8%, 2.6% and 8.3% respectively. The forecast average balance of trade volume with all countries in August 2012 – January 2013 will amount to $91.8bn, demonstrating a decrease by 12.7% as compared to the similar period in 2011–2012.

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
August 2012	49.1	41.3	110	93	30.0	30.0	100	99	37.6	40.7	99	108	26.8	27.3	104	106
September 2012	46.1	39.9	105	91	27.0	29.9	98	109	36.3	39.7	100	109	25.1	24.9	108	107
October 2012	51.7	40.1	112	87	27.6	30.9	94	105	37.1	41.5	96	107	25.4	26.1	101	104
November 2012	48.2	41.1	102	87	31.2	30.9	103	101	38.8	41.0	97	103	26.8	26.4	102	101
December 2012	51.1	42.5	100	83	30.7	32.0	100	104	41.5	40.9	97	96	26.5	26.6	101	102
January 2013	47.4	40.1	119	101	27.3	27.7	140	141	35.5	41.4	104	121	25.7	22.3	157	136
For reference: actual values in respective months of 2011/2012 (billion USD)																
August 2011	44.5				30.2				37.9				25.8			
September 2011	43.8				27.6				36.4				23.3			
October 2011	46.0				29.4				38.7				25.2			
November 2011	47.3				30.4				39.9				26.2			
December 2011	51.3				30.7				42.8				26.1			
January 2012	39.8				19.6				34.2				16.4			

Note: in the period from January 1999 till May 2012, 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 May 2012[2]. Table 5 presents the outputs of model calculations of forecast values in August 2012 – January 2013 in accordance with ARIMA-models, structural models (SM) and models built with utilization of business surveys (BS).

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.

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

Table 5

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF PRICE INDICES

Month	The consumer price index (ARIMA)	The consumer price index (SM)	Producer price indices:													
			PPI of industrial goods (ARIMA)	PPI of industrial goods (BS)	Production of primary products	Manufacturing	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
Forecast values (% of the previous month)																
August 2012	100.3	100.5	101.2	103.2	103.8	100.8	99.8	100.4	100.2	100.5	100.3	101.3	99.3	101.5	100.2	100.7
September 2012	100.4	100.5	100.7	100.7	100.2	100.5	100.0	100.2	100.3	100.4	100.4	102.8	101.7	102.8	100.0	100.1
October 2012	100.6	100.6	100.5	100.5	101.2	100.6	100.0	100.4	100.4	100.8	100.4	102.1	101.6	101.9	100.1	100.8
November 2012	100.5	100.3	100.8	101.0	103.1	100.5	100.1	100.5	100.5	101.2	100.4	102.1	100.9	101.6	100.3	100.2
December 2012	100.5	100.5	101.4	100.3	102.6	99.7	99.7	100.5	100.0	100.8	100.3	101.6	101.2	100.9	100.5	100.9
January 2013	101.5	101.0	101.0	100.2	102.2	100.0	101.2	100.3	100.5	100.7	101.2	101.2	100.8	101.1	101.1	101.4
Forecast values (% of December 2011/2012)																
August 2012	103.7	105.0	101.4	102.0	111.2	101.1	97.3	102.0	98.5	102.4	102.4	99.9	102.1	100.4	104.5	103.1
September 2012	104.1	105.5	102.1	102.7	111.4	101.5	97.3	102.1	98.8	102.9	102.9	102.7	103.8	103.2	104.5	103.2
October 2012	104.7	106.2	102.6	103.2	112.8	102.1	97.3	102.6	99.1	103.7	103.3	104.9	105.5	105.2	104.6	104.0
November 2012	105.2	106.5	103.5	104.2	116.2	102.7	97.4	103.1	99.6	105.0	103.7	107.1	106.4	106.9	104.9	104.3
December 2012	105.7	107.1	105.0	104.5	119.3	102.4	97.1	103.7	99.5	105.9	104.1	108.8	107.8	107.9	105.4	105.2
January 2013	101.5	101.0	101.0	100.2	102.2	100.0	101.2	100.3	100.5	100.7	101.2	101.2	100.8	101.1	101.1	101.4
For reference: actual values in the same periods of 2011/2012 (% of December 2010/2011)																
August 2011	104.8		109.5	117.1	107.6	104.2	102.0	111.8	106.1	103.0	113.9	110.0	107.0	105.1	108.0	
September 2011	104.8		110.1	118.0	108.3	103.5	101.6	112.9	105.8	103.1	115.4	112.2	107.5	105.4	108.1	
October 2011	105.3		111.1	119.0	109.1	105.0	101.5	113.4	107.6	103.4	118.2	114.5	107.4	105.7	108.5	
November 2011	105.7		112.2	123.3	109.2	105.0	101.9	113.7	108.5	103.4	119.7	113.7	106.3	105.6	108.4	
December 2011	106.1		112.4	126.5	108.4	105.3	102.0	112.6	108.8	102.9	117.6	110.5	104.7	105.5	109.4	
January 2012	100.5		99.7	101.8	98.9	99.7	99.4	98.7	99.5	100.4	95.7	99.3	99.2	100.3	99.5	

Note: in the period from January 1999 till May 2012, 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 forecast average monthly consumer price index in August 2012 – January 2013 will make 0.6%. Increase in producer price index of industrial goods for that period is forecasted at an average level of 1.0% per month. The annual increase in consumer price index on average in the two models will make 6.4%. A similar indicator of the producer price index is forecasted at the level of 4.8%.

For NACE, producer price indices from August 2012 to January 2013 the following average monthly growth rates are forecasted at: 2.2% in mining, 0.4% in manufacturing, 0.1% in manufacturing and distribution of electricity, gas and water, 0.4% in foodstuff production, 0.3% in the textile and clothing industry, 0.7% in the wood processing and manufacture of wood products, 0.5% in the pulp and paper industry, 1.9% in the production of coke and oil products, 0.9% in the chemical industry, 1.6% in the iron and steel industry and production of finished metal goods, 0.4% in the production of machinery and equipment and 0.7% in the production of vehicles and equipment.

The annual growth of producer price indices by economic activities will make 5.6% on average. Maximum annual increase is forecasted in mining – 19.3%. In the production of electricity, gas and water as per 2012 results, a downfall is expected at the level of 2.9%.

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 August 2012 – January 2013. The forecasts were made on the basis of time series with use the Rosstat data in the period from January 2000 till May 2012. The outputs of calculations are shown in Table 6.

As one can see from *Table 6*, an increase of the cost of minimum food basket is forecasted as compared to the level of last year. Herewith, the average forecast cost of the minimum food basket is about Rb 2,379. The forecast decline in the value of minimum food basket makes on average about 2.0% as compared to the corresponding period of the last year. The annual decline in the value of minimum food basket will amount to 1.5% in 2012.

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)	
August 2012	2402.9
September 2012	2363.9
October 2012	2361.7
November 2012	2370.0
December 2012	2382.7
January 2013	2392.9
For reference: actual values in the same months of 2011/2012 (billion Rb)	
August 2011	2512.9
September 2011	2409.1
October 2011	2390.8
November 2011	2399.6
December 2011	2419.9
January 2012	2437.4
Expected growth on the respective month of the previous year (%)	
August 2012	-4.4
September 2012	-1.9
October 2012	-1.2
November 2012	-1.2
December 2012	-1.5
January 2013	-1.8

Note: the series of the cost of the minimum package of food products in the period from January 2000 till May 2012 are stationary in the first-order differences.

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 September 1998 till May 2012. Table 7 shows the outputs of model calculations of forecast values in August 2012 – January 2013. 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 August 2012 – January 2013, the behavior of the integrated index of tariffs on motor cargo carriage will be relatively stationary: the average monthly growth is forecasted at the level of 0.4%. In January 2013, a seasonal growth in the index by 5.8% is expected. The annual index growth will make about 5.8%.

Index of tariffs on motor cargo carriage will grow at the average monthly rate of 0.2%. As a result, its annual growth in 2011 will make 6.8%. Index for pipeline transportation will grow over the next six months at an average monthly rate of 1.7%, which will lead to the annual growth rate of 12.9%

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).

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)			
August 2012	100.4	100.3	102.6
September 2012	100.4	100.3	101.2
October 2012	100.4	100.2	101.5
November 2012	100.4	100.2	101.7
December 2012	100.4	100.2	101.7
January 2013	105.8	101.9	101.4
Forecast values according to ARIMA-models (% of December of the previous year)			
August 2012	104.7	105.5	106.9
September 2012	99.9	106.0	96.9
October 2012	105.2	106.3	109.6
November 2012	105.4	106.6	109.2
December 2012	105.8	106.8	112.9
January 2013	105.8	101.9	101.4
For reference: actual values in the same period of 2011/2012 (% of the previous month)			
August 2011	100.1	100.2	100.1
September 2011	100.5	100.4	100.7
October 2011	92.7	100	85.9
November 2011	100.5	100.5	100.9
December 2011	99	100.3	97.7
January 2012	99.1	102.2	93.0

Note: in the period from November 2000 till May 2012, 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 November 1998 till April 2012, too; fictitious variables for taking into account particularly dramatic fluctuations were used in respect of all the series.

The dynamics of prices on some types of primary products on the global market

This section presents calculations of such average monthly values of prices on Brent oil, aluminum, gold, copper and nickel in August 2012 to January 2013 period 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 June 2012.

Table 8

THE OUTPUTS OF CALCULATIONS OF FORECAST VALUES OF PRICES ON PRIMARY PRODUCTS

Month	Brent oil ($ per barrel)	Aluminum ($ per ton)	Gold ($ per ounce)	Copper ($ per ton)	Nickel ($ per ton)
Forecast values according to ARIMA-models					
August 2012	98.44	1805	1631	7206	16737
September 2012	98.76	1763	1640	7188	16593
October 2012	97.72	1740	1652	7136	16573
November 2012	93.60	1729	1665	7079	16489
December 2012	92.77	1712	1676	7022	16368
January 2013	92.72	1701	1687	6973	16221
Growth on the respective month of the previous year (%)					
August 2012	-10.6	-24.2	-7.3	-19.9	-23.5
September 2012	-10.9	-23.1	-7.9	-13.4	-18.6
October 2012	-10.7	-20.2	-0.9	-3.5	-13.0
November 2012	-15.3	-16.9	-4.1	-6.6	-7.7
December 2012	-14.1	-15.4	1.4	-7.1	-10.3
January 2013	-16.5	-20.9	1.9	-13.5	-18.5

Table 8, cont'd

Month	Brent oil ($ per barrel)	Aluminum ($ per ton)	Gold ($ per ounce)	Copper ($ per ton)	Nickel ($ per ton)
For reference: actual values in the same period of 2011/2012					
August 2011	110.09	2381	1760	8998	21865
September 2011	110.88	2294	1781	8300	20378
October 2011	109.48	2181	1668	7394	19039
November 2011	110.51	2080	1736	7581	17873
December 2011	107.97	2024	1653	7559	18246
January 2012	110.99	2151	1656	8062	19909

Note: in the period from January 1980 till June 2012, the series of prices on oil, nickel, gold, copper and aluminum are series of DS type.

Average forecast oil price is about $95.7 per barrel, which is lower than the corresponding average indicator of the previous year by 13%. Aluminum prices are forecasted at the level of about $74 /t, and their average forecast reduction is about 20% as compared to the level of the last year. Forecast price of gold is about $1,659/oz. The average copper price forecast is around $7,101/ton, while the price of nickel – about $16,497/t. The average forecast downgrading in gold prices makes about 3%, the average decrease in copper prices is about 11%, and the average decrease in nickel prices is 15% as compared to the same level of last year.

At the end of 2012, the price of Brent crude oil is forecasted at $92.72 per barrel (annual decline is 16.5%), aluminum – $1701/t (20.9% decline), gold – $1,686/oz (1.9% growth), copper – $6,973/t (13.5% decrease), nickel – $16,221/ton (18.5% downfall).

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 August 2012 – January 2013 were received on the basis of models of time-series of respective indices calculated by the CBR[1] in the period from October 1998 till May 2012. 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.

Table 9

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, %
August 2012	7087.1	-0.9	25198.8	1.0
September 2012	7372.0	4.0	25443.5	1.0
October 2012	7309.8	-0.8	25687.1	1.0
November 2012	7595.8	3.9	25929.3	0.9
December 2012	10210.1	34.4	26170.2	0.9
January 2013	7826.5	-23.3	26409.9	0.9
For reference: actual value in the respective months of 2011/2012 (growth on the previous month, %)				
August 2011	1.9		1.1	

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, cont'd

Period	Monetary base		M_2	
	Billion Rb	Growth on the previous month, %	Billion Rb	Growth on the previous month, %
September 2011	0.6		1.9	
October 2011	1.5		-0.5	
November 2011	0.9		2.7	
December 2011	10.6		11.7	
January 2012	-5.9		-3.5	

Note: in the period from October 1998 to May 2011, 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.

Within August 2012 – January 2013, forecast average monthly growth of the monetary base will make 2.9%, and in December 2012, a seasonal increase in the monetary base by 34.4% is expected. The forecast annual growth of the monetary base will reach 42.8%. M_2 monetary indicator will grow at an average monthly rate of 1% in the period under review. As a result, the annual growth of M2 indicator for 2012 is forecasted at 6.6%.

INTERNATIONAL (GOLD AND FOREIGN EXCHANGE) 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 May 2012. 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.

According to the forecast results, in August 2012 – January 2013 gold and international currency reserves will grow at an average monthly rate of 1.3%. The annual growth of gold and international currency reserves in 2012 is forecasted at the level of 9.6%.

Table 10

THE FORECAST OF INTERNATIONAL (GOLD AND FOREIGN EXCHANGE) RESERVES

Period	Forecast values according to ARIMA-models	
	Billion USD	Growth on the previous month, %
August 2012	514.8	0.3
September 2012	527.1	2.4
October 2012	538.4	2.1
November 2012	543.0	0.9
December 2012	546.5	0.6
January 2013	553.9	1.3
For reference: actual values in the same period of 2011/2012		
August 2011	545.0	2.1
September 2011	516.8	-5.2
October 2011	525.6	1.7
November 2011	510.9	-2.8
December 2011	498.6	-2.4
January 2012	505.4	1.3

Note: in the period from October 1998 till May 2012, the series of the gold and foreign exchange reserves of the Russian Federation were identified as stationary series in difference.

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

FOREIGN EXCHANGE RATES

The model calculations of future values of the foreign exchange rate (RUR/USD) were received on the basis of evaluations of the models of time series of respective indices set by the CBR as of the last day of the month in the period from October 1998 till July 2012 as of the last day of the month in the period from January 1999 till July 2012[1].

According to the results of the forecast for August 2012 – January 2013, the U.S. dollar against the ruble will average Rb32/$1. Forecasted for the end of the 2012 value of the index was Rb32.2/$1. The mean value of the euro exchange rate against the U.S. dollar will amount to $1.22 per euro and matches its value at 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
August 2012	31.70	1.23
September 2012	31.80	1.23
October 2012	31.90	1.22
November 2012	32.00	1.22
December 2012	32.10	1.22
January 2013	32.20	1.22
For reference: actual values in the similar period of 2011/2012		
August 2011	28.67	1.43
September 2011	30.50	1.38
October 2011	30.50	1.38
November 2011	30.67	1.36
December 2011	31.30	1.31
January 2012	31.26	1.29

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 June 2012. 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 presented in *Table 12*, predicted an increase in real disposable cash income, real wages and real cash income in comparison with the corresponding period of the last year. Thus, an average increase in real disposable cash income about 4.7% is expected. Growth of real cash income

1 In the Bulletin, the data of the IMF on the period from January 1999 till May 2012 was used. The data on June and July 2012 was taken from the Web-site of the exchange rates statistics 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).

will make about 5% as compared to the last year, and the increase in real wages is forecasted in the amount of 13.1% as compared to the similar period of the last year.

As of 2012 results, it is forecasted to raise all indicators of living standards: real cash disposable income – by 3.5%, real cash income – by 4%, real payable wages – by 11.9%.

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 2011/2012)		
August 2012	104.0	104.7	113.2
September 2012	104.1	104.3	113.2
October 2012	104.4	104.8	113.2
November 2012	105.2	105.7	113.1
December 2012	104.7	104.9	112.9
January 2013	105.5	105.7	112.7
For reference: actual values in the respective period of 2011/2012 (% of the same period of 2010/2011)			
August 2011	101.3	102.1	103.9
September 2011	102.7	102.3	105.3
October 2011	100.1	100.0	106.2
November 2011	100.7	100.8	107.0
December 2011	106.3	106.9	111.4
January 2012	101.0	101.9	110.5

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 June 2011, 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 May 2012 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.

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 2011/2012 (%)	Million people	Growth on the respective month of 2011/2012 (%)	% of the index of the number of the gainfully employed population	Million people	Growth on the respective month of 2011/2012 (%)	% of the index of the number of the gainfully employed population
August 2012	72.9	1.3	3.9	-17.0	5.4	4.3	-8.7	5.9
September 2012	72.5	0.7	4.0	-12.0	5.6	4.2	-8.9	5.8

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 May 2012.

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, cont'd

Month	Employment (ARIMA)		Unemployment (ARIMA)			Unemployment (BS)		
	Million people	Growth on the respective month of 2011/2012 (%)	Million people	Growth on the respective month of 2011/2012 (%)	% of the index of the number of the gainfully employed population	Million people	Growth on the respective month of 2011/2012 (%)	% of the index of the number of the gainfully employed population
October 2012	71.8	1.4	4.1	-15.0	5.7	4.3	-9.8	6.0
November 2012	71.7	0.9	4.2	-12.4	5.9	4.4	-8.7	6.1
December 2012	71.3	0.6	4.3	-5.6	6.1	4.3	-7.4	6.0
January 2013	70.8	1.1	4.6	-5.2	6.6	4.4	-10.0	6.2
For reference: actual values in the same periods of 2011/2012 (million people)								
August 2011	72.0		4.7					
September 2011	72.0		4.6					
October 2011	70.8		4.8					
November 2011	71.0		4.8					
December 2011	70.9		4.6					
January 2012	70.0		4.9					

Note: in the period from October 1998 till May 2012, 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.

According to forecasts of ARIMA-models (*Table 13*), in August 2012 – January 2013, the growth of employment in the economy will average 1.0% per month as compared to the relevant period of the previous year. Forecast indicator of the number of economically active population for the end of 2012 is 71.3m people.

Average reduction in total unemployment indicator is forecasted at 10.1% per month as compared to the similar period of the last year. The average number of unemployed at the end of 2012 is forecasted at 4.3m people.

ANNEX

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

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

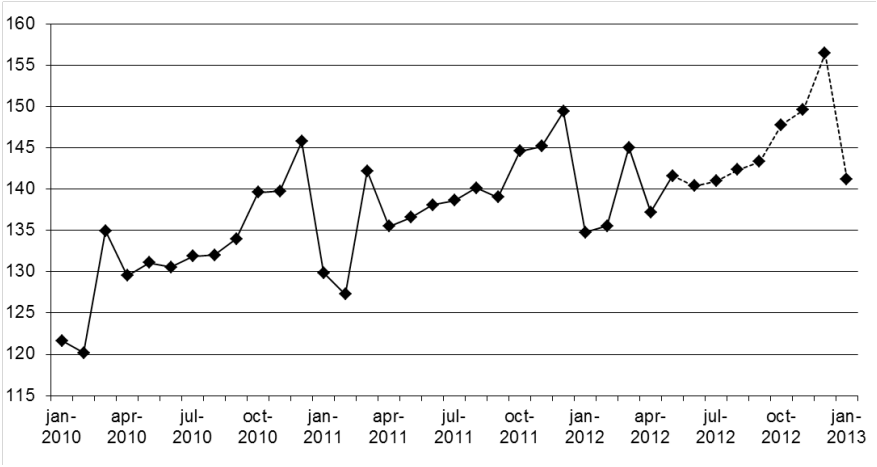

Fig. 1b. The CEC–NRU HSE index of industrial production (ARIMA-model) (% of January 1995)

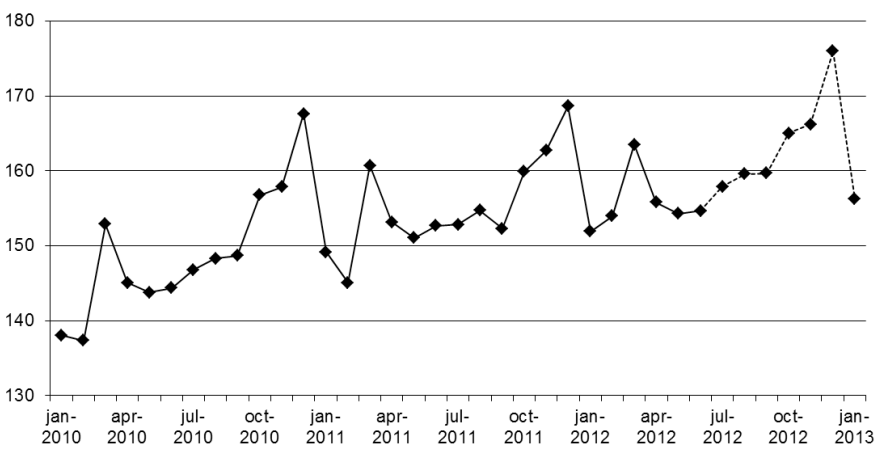

Fig. 2a. The FSSS index of industrial production as regards production of primary products (% of December 2001)

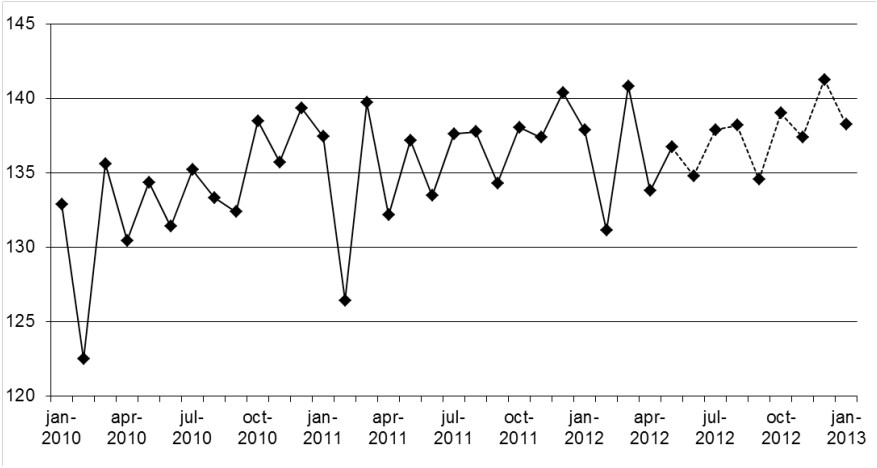

Fig. 2b. The CEC–NRU HSE index of industrial production as regards production of primary products (% of January 1995)

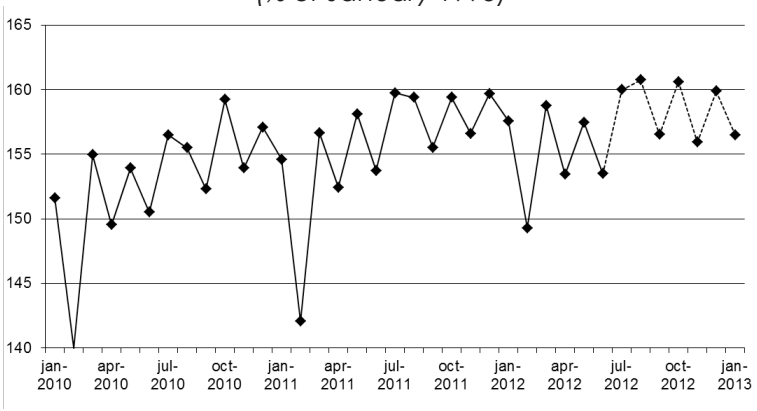

Fig. 3a. The FSSS index of industrial production as regards manufacturing industry (% of December 2001)

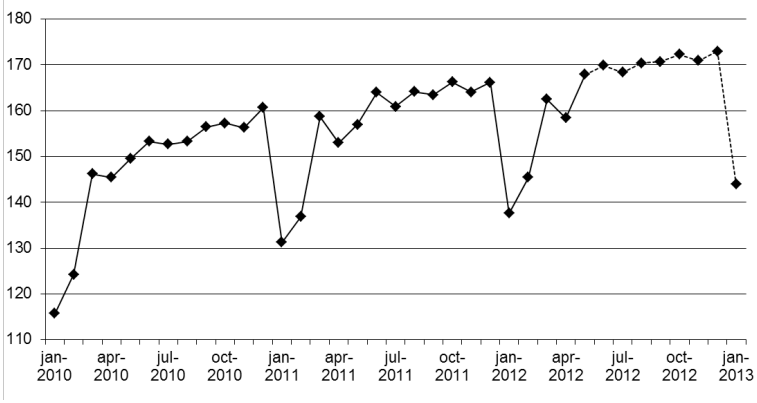

Fig. 3b. The CEC–NRU HSE index of industrial production as regards manufacturing industry (% of January 1995)

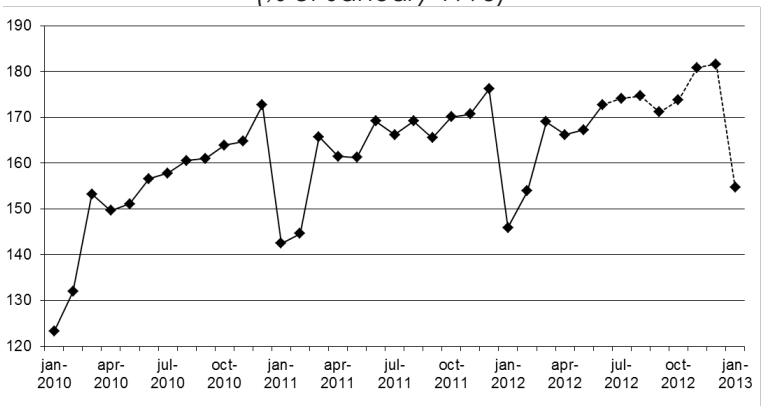

Fig. 4a. The FSSS index of industrial production as regards production and distribution of power, gas and water(% of December 1998)

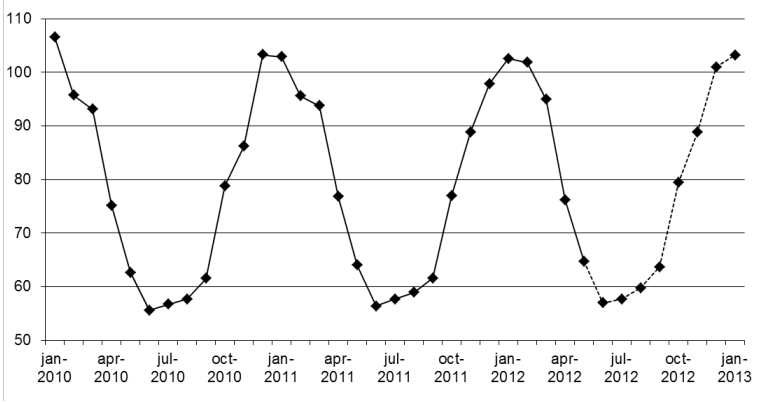

Fig. 4b. The CEC–NRU HSE index of industrial production as regards production and distribution of power, gas and water (% of January 1995)

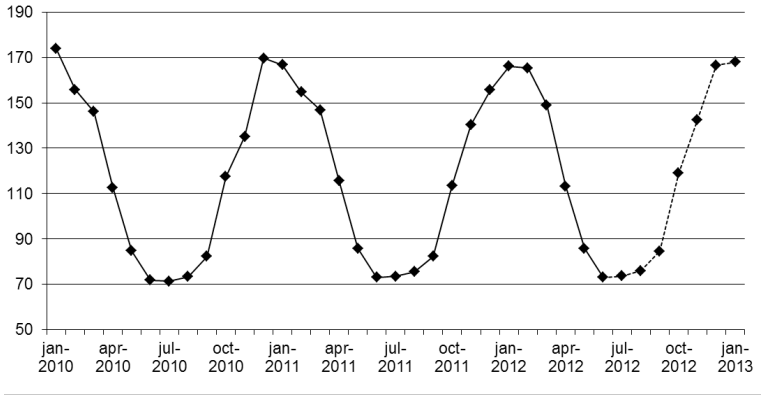

Fig. 5a. The FSSS index of industrial production as regards production of food products (% of December 2001)

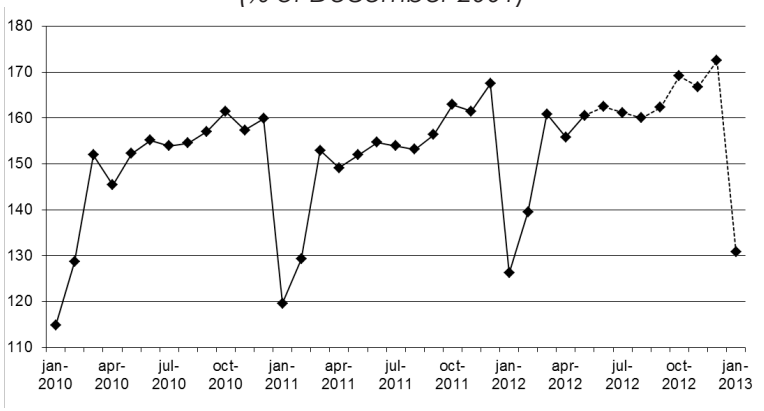

Fig. 5b. The CEC–NRU HSE index of industrial production as regards production of food products (% of January 1995)

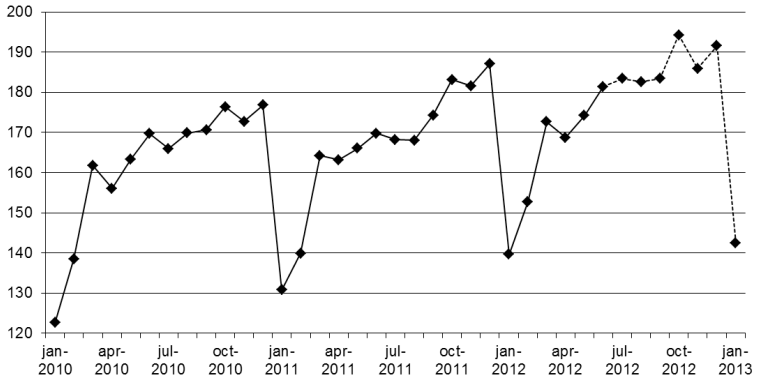

Fig. 6a. The FSSS index of industrial production as regards production of charred coal and oil products (% of December 2001)

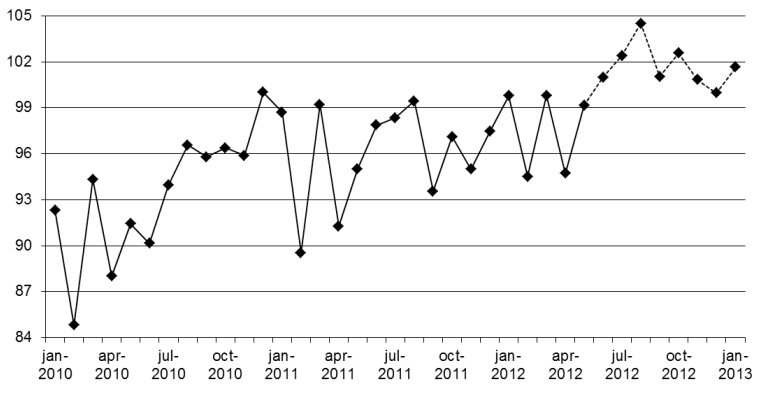

Fig. 6b. The CEC–NRU HSE index of industrial production as regards production of charred coal and oil products (% of January 1995)

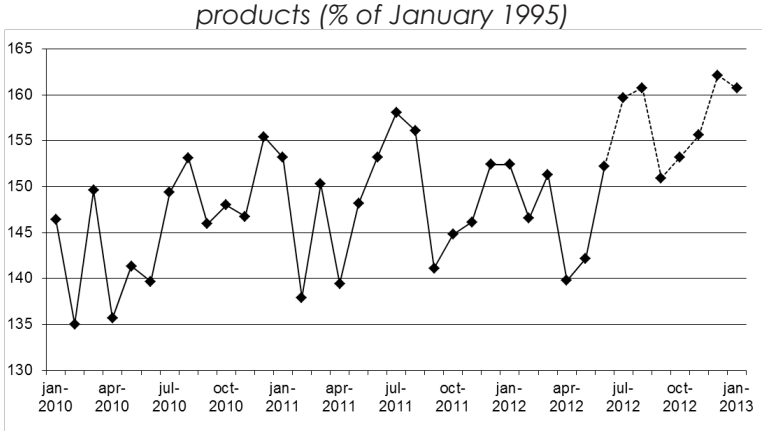

Fig.7a. The FSSS index of industrial production as regards iron and steel industry and production of finished metal goods (% of December 1998)

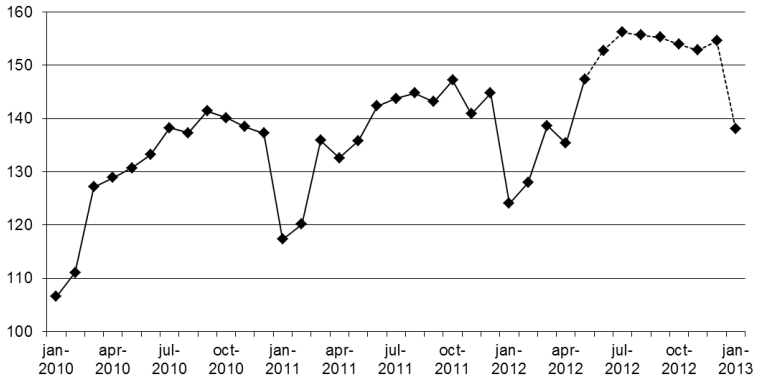

Fig. 7b. The CEC–NRU HSE index of industrial production as regards iron and steel industry and production of finished metal goods (% of January 1995)

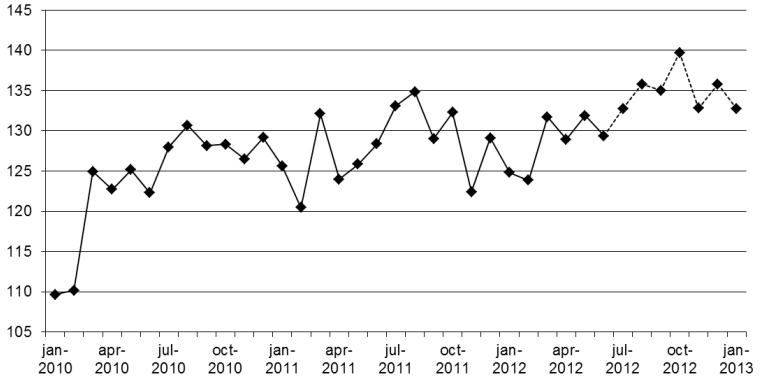

Fig. 8a. The FSSS index of industrial production as regards production of machines and equipment (% of December 1998)

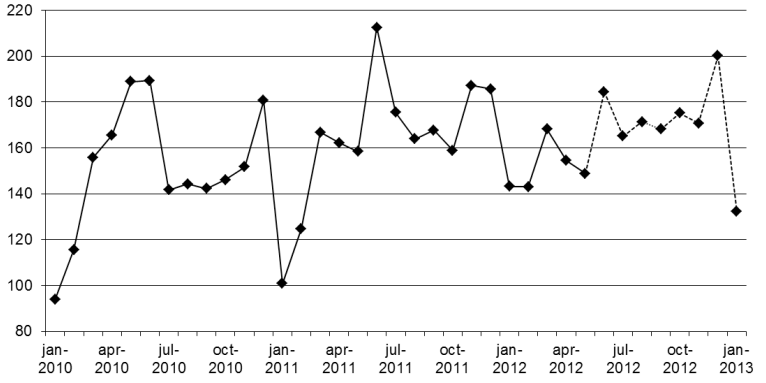

Fig. 8b. The CEC–NRU HSE index of industrial production as regards production of machines and equipment (% of January 1995)

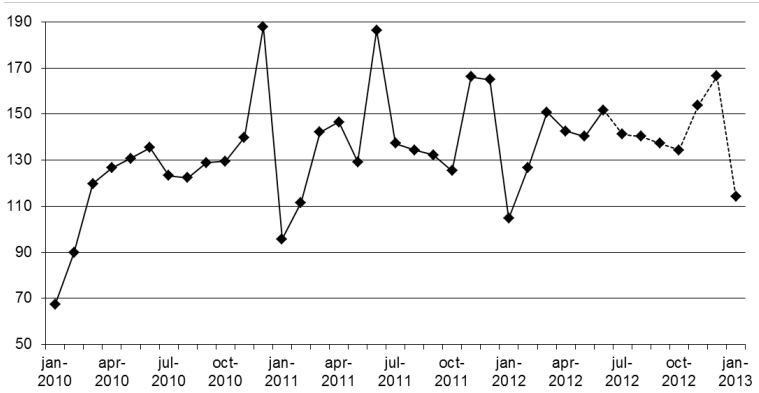

Fig. 9. The volume of retail sales (billion Rb)

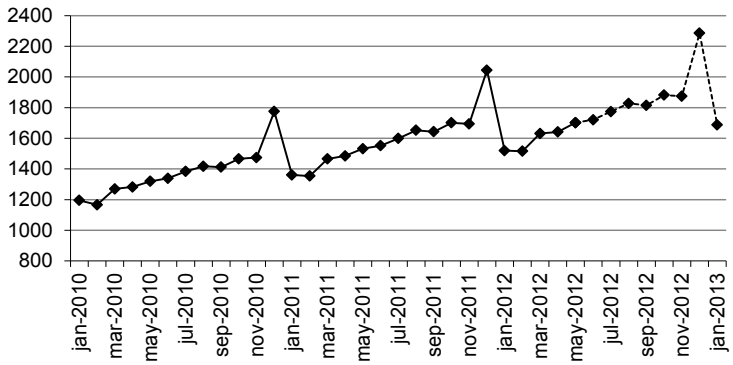

Fig. 9a. The real turnover of the retail trade (% of the respective period of last year)

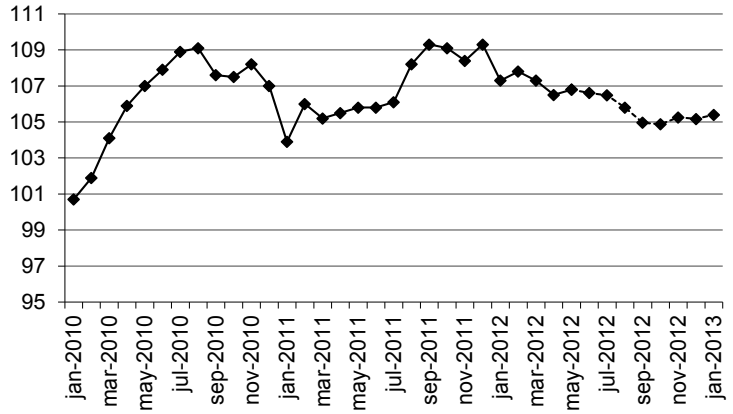

Fig. 10. Investments in capital assets (billion Rb)

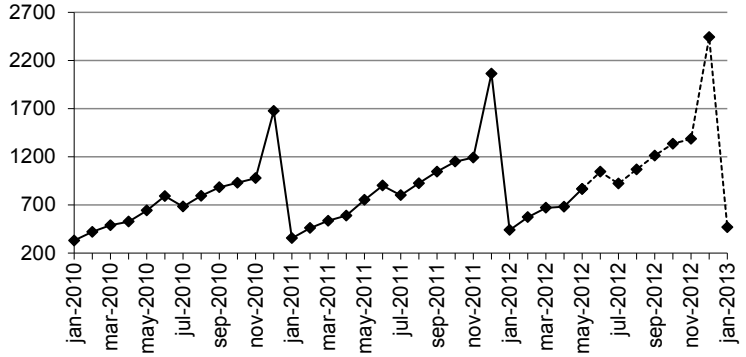

Fig. 10a. Real investments in capital assets (% of the respective period of the previous year)

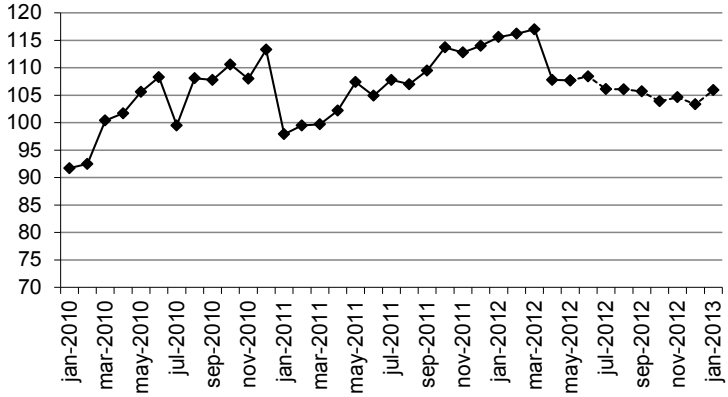

Fig.11. Export to all the countries (billion USD)

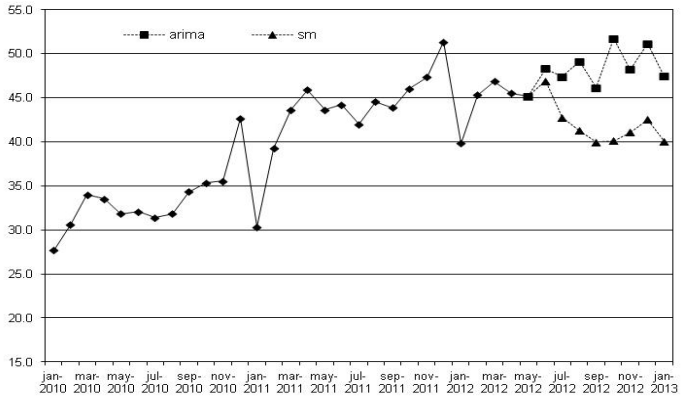

Fig. 12. Export to countries outside the CIS (billion USD)

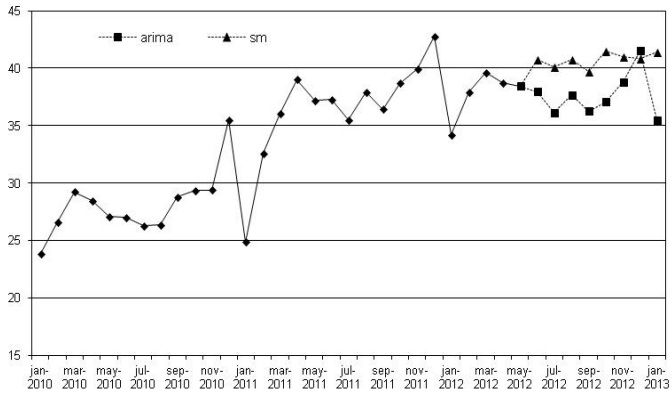

Fig. 13. Import from all the countries (billion USD)

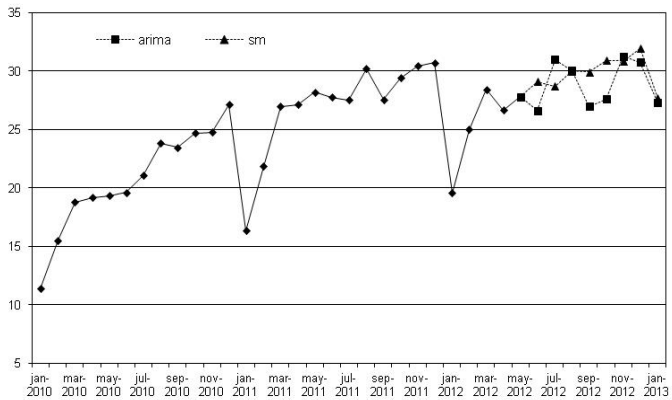

Fig. 14. Import from countries outside the CIS (billion USD)

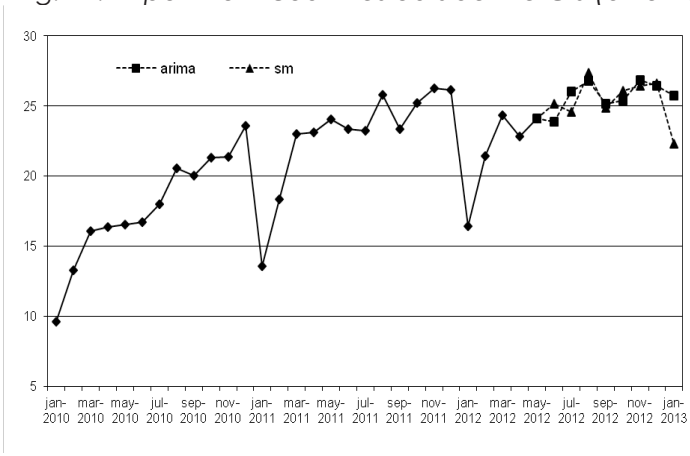

Fig. 15. Consumer price index as % of December of the previous year

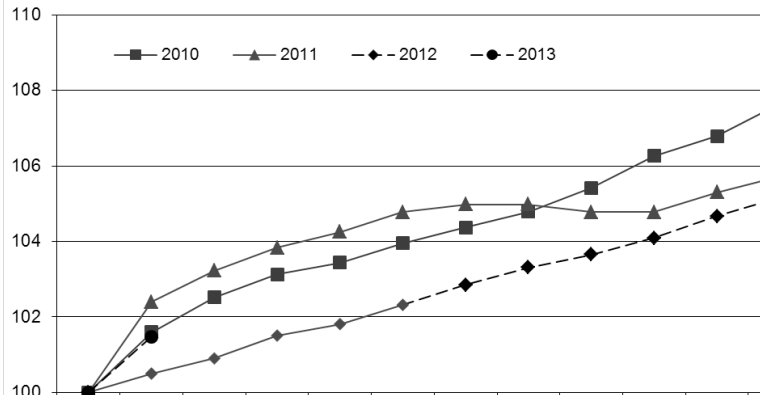

Fig. 15a. Consumer price index as % of December of the preceding year (SM)

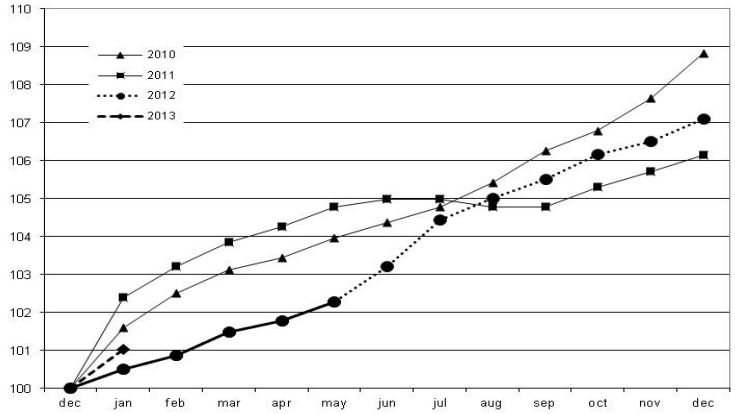

Fig.16. Producer price index (industrial goods), % of December of the previous year

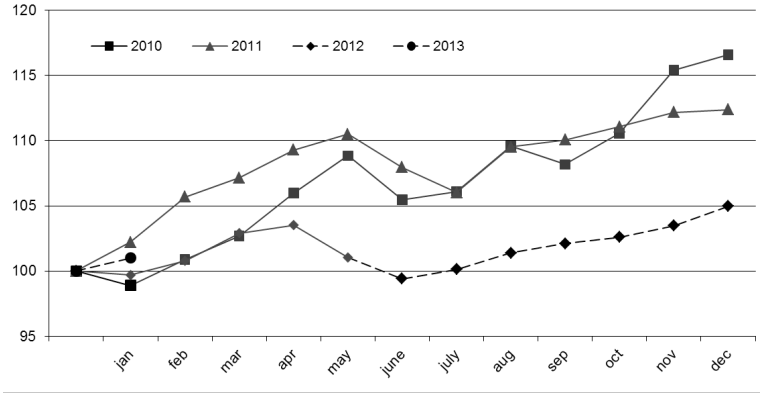

Fig. 17. Price index as regards production of primary products, % of December of the previous year

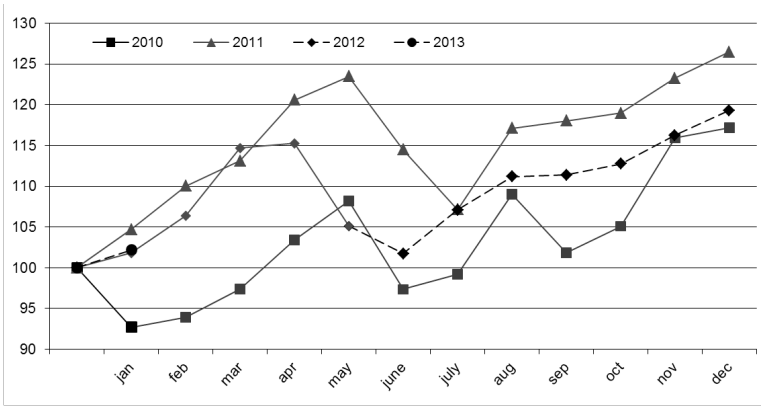

Fig. 18. Price index as regards manufacturing industries, % of December of the previous year

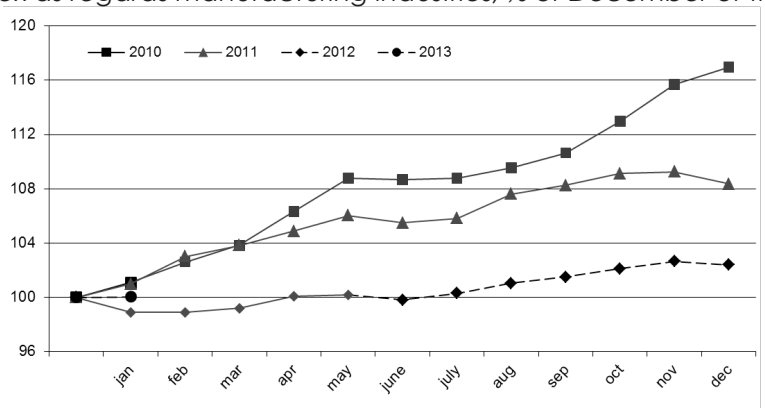

Fig. 19. Price index as regards production and distribution of power, gas and water, % of December of the previous year

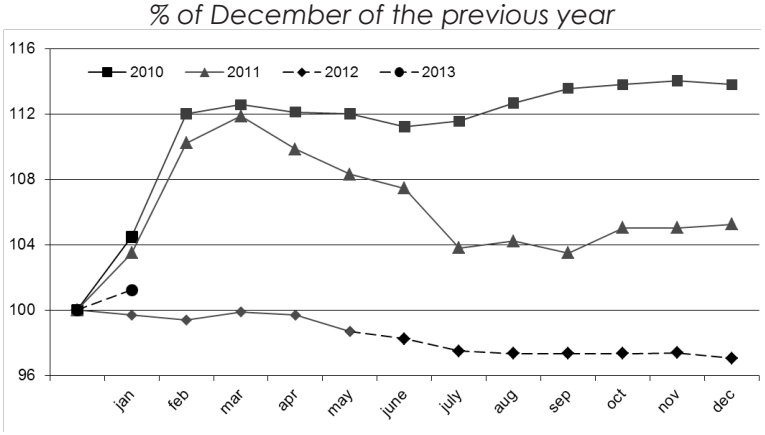

Fig. 20. Price index as regards production of food products, % of December of the previous year

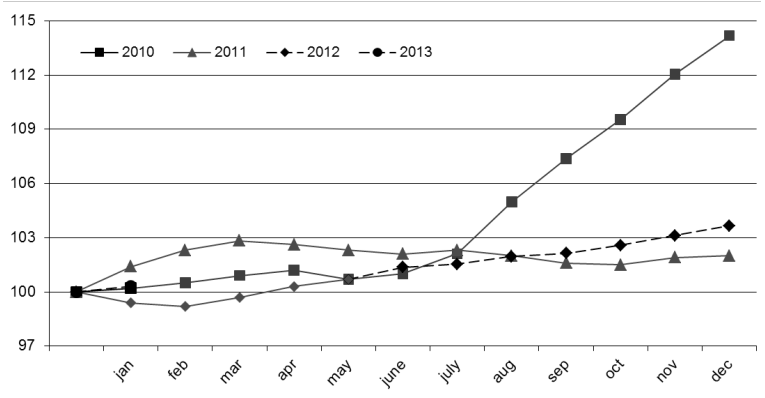

Fig. 21. Price index as regards textile and sewing industry, % of December of the previous year

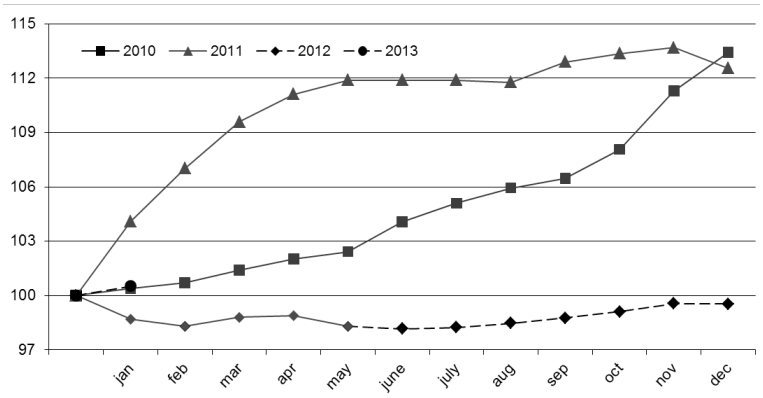

Fig. 22. Price index as regards woodworking and production of wood products, % of December of the previous year

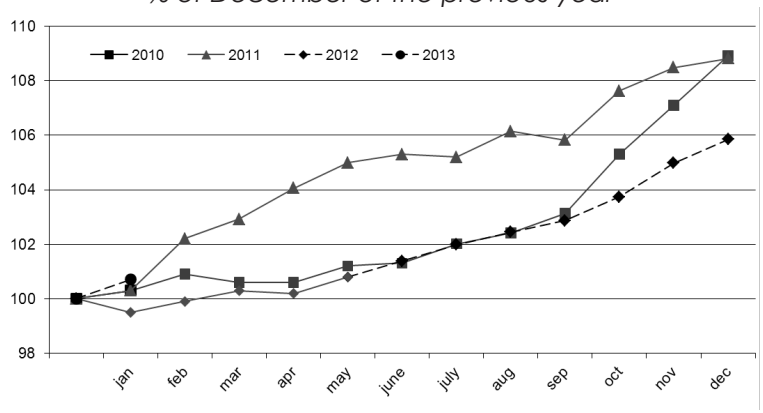

Fig. 23. Price index as regards pulp and paper industry, % of December of the previous year

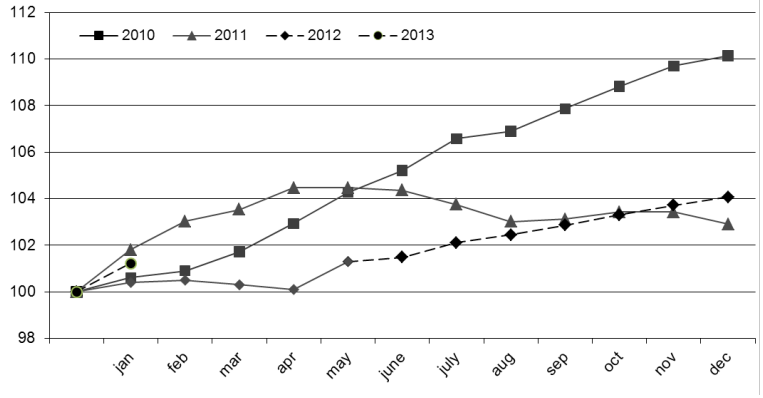

Fig. 24. Price index as regards production of charred coal and oil products, % of December of the previous year

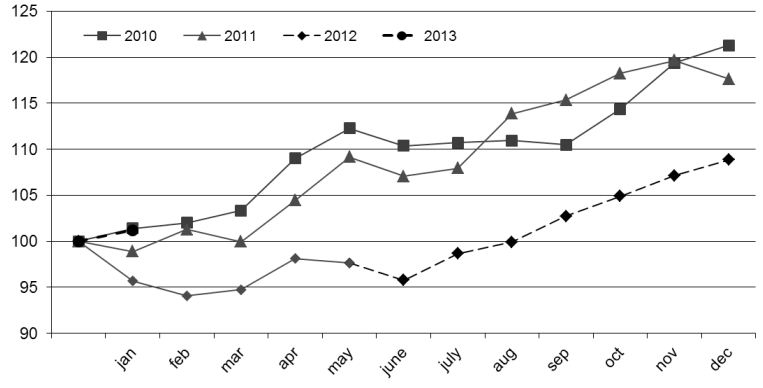

Fig. 25. Price index as regards chemical industry, % of December of the previous year

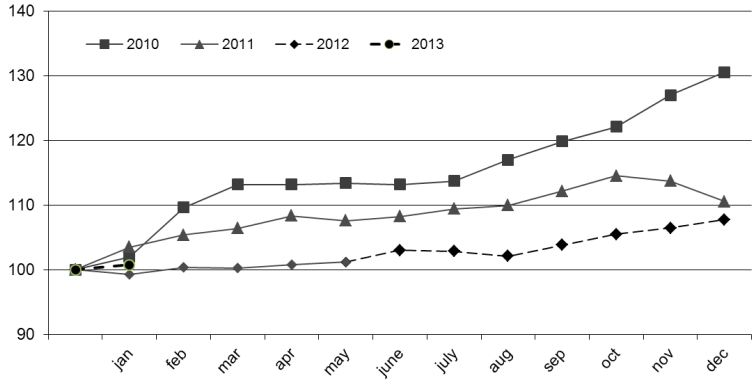

Fig.26. Price index as regards iron and steel industry and production of finished metal goods, % of December of the previous year

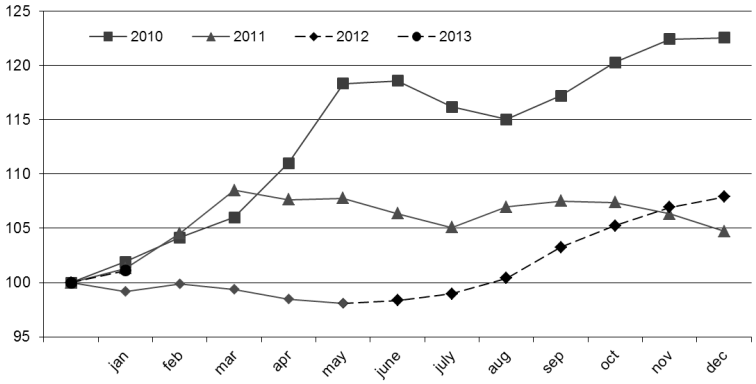

Fig.27. Price index as regards production of machines and equipment, % of December of the previous year

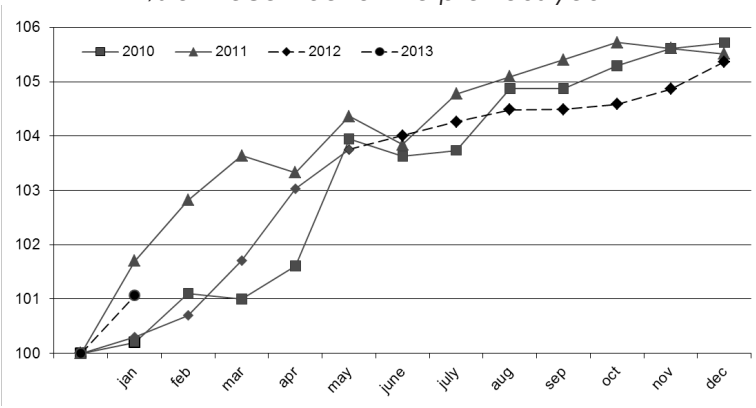

Fig.28. Price index as regards production of transportation vehicles and equipment, % of December of the previous year

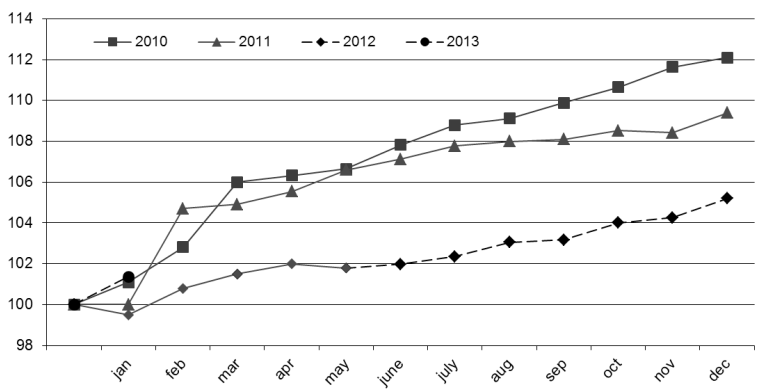

Fig. 29. The cost of the minimum package of food products per person a month (Rb.)

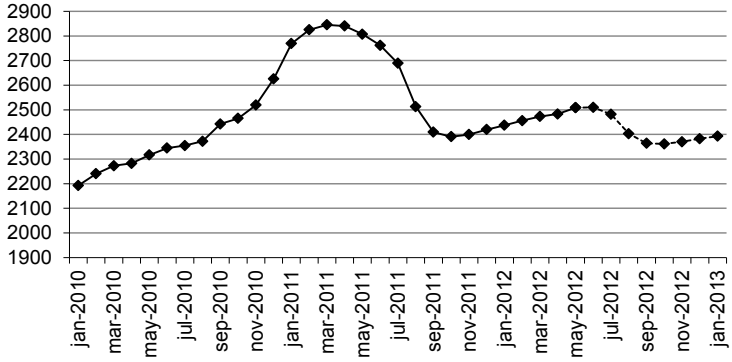

Fig. 30. The composite index of transportation tariffs (for each year as % of the previous month)

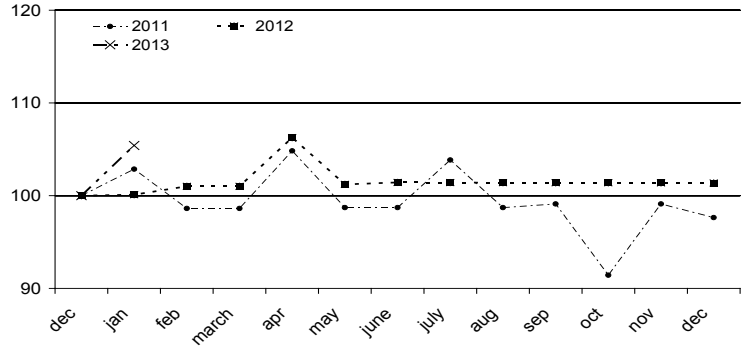

Fig. 31. Index of tariffs on motor cargo carriage (for each year as % of the previous month)

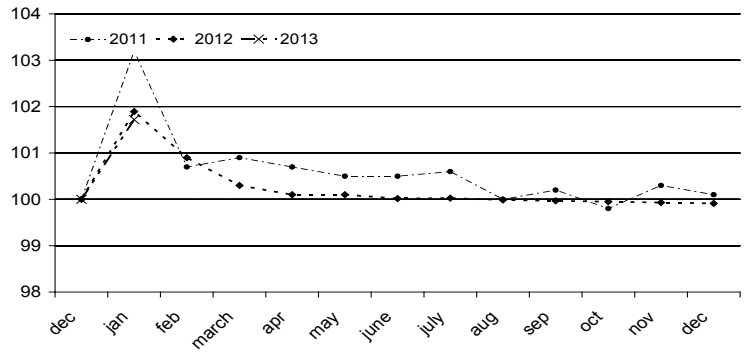

Fig. 32. Index of tariffs on pipeline transportation (for each year as % of the previous month)

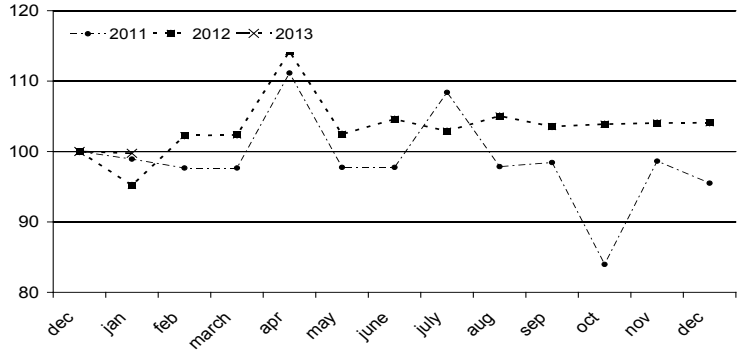

Fig. 33. Prices on Brent oil ($ a barrel)

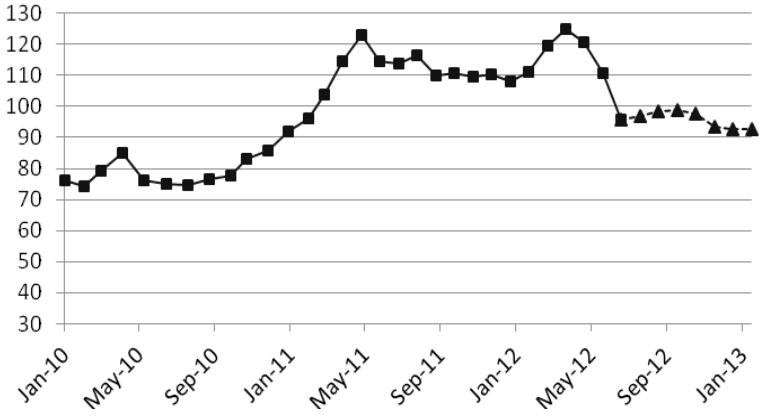

Fig. 34. Prices on aluminum ($ per ton)

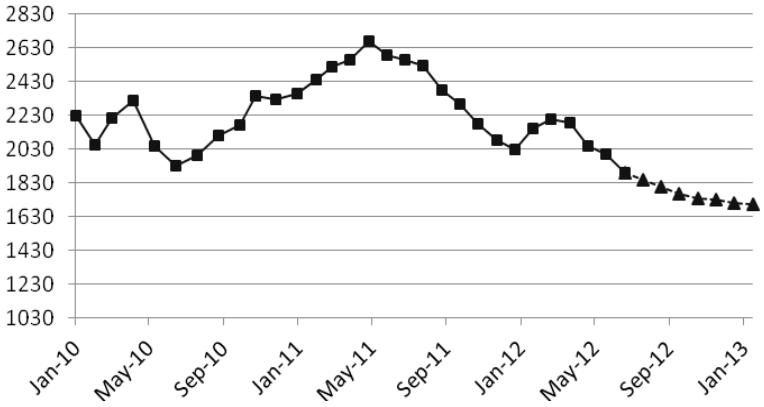

Fig. 35. Prices on gold ($ per ounce)

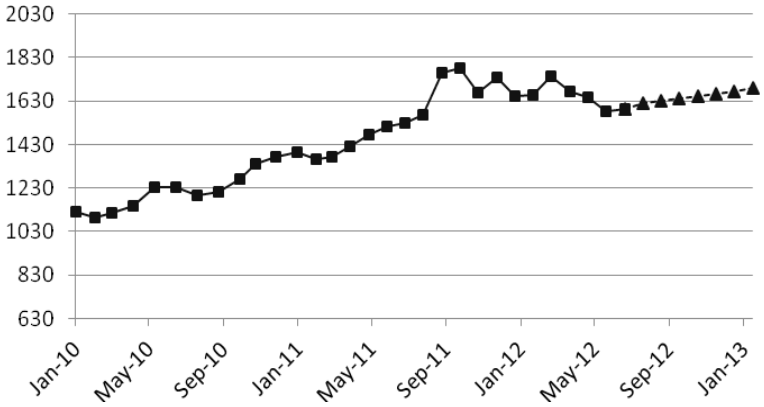

Fig. 36. Price on nickel ($ per ton)

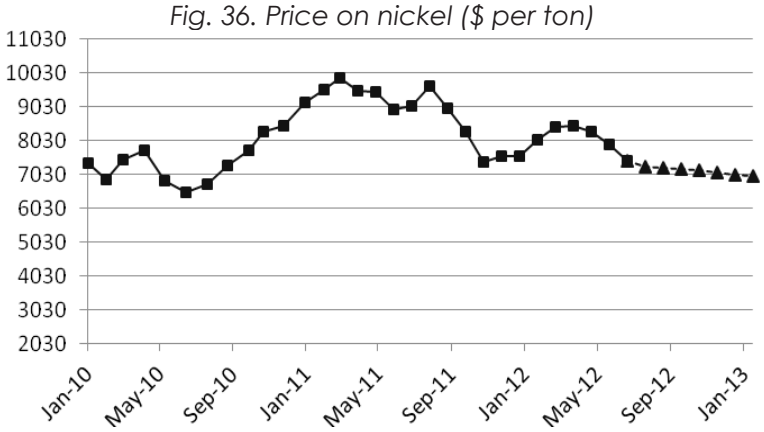

Fig. 37. Prices on copper ($ per ton)

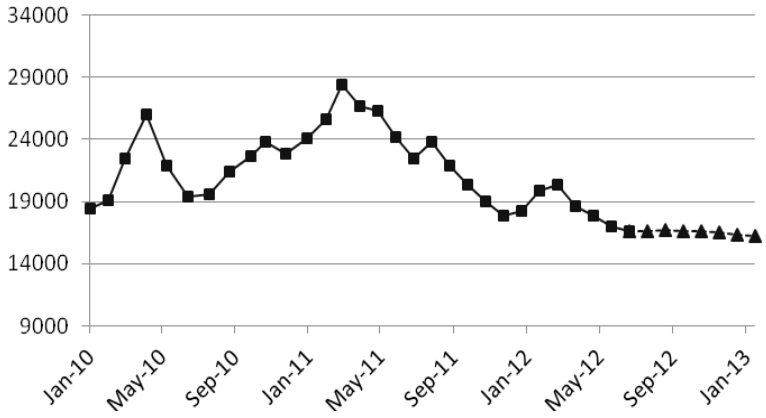

Fig. 38. Monetary base, million Rb

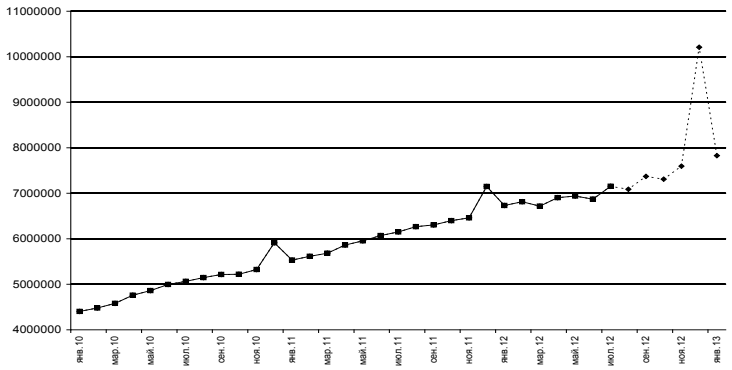

Fig. 39. M2, billion Rb

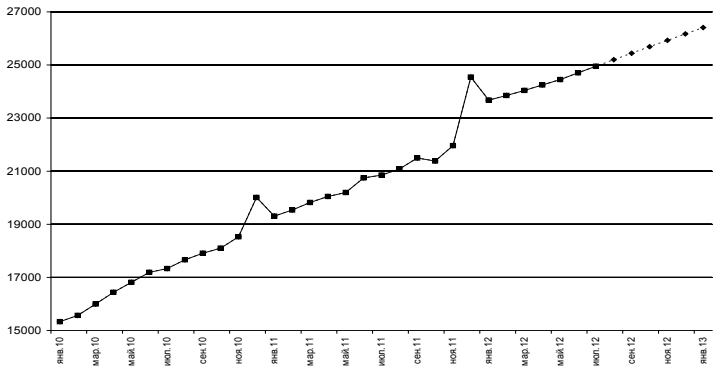

Fig. 40. Gold and foreign exchange reserves of the Russian Federation, million USD

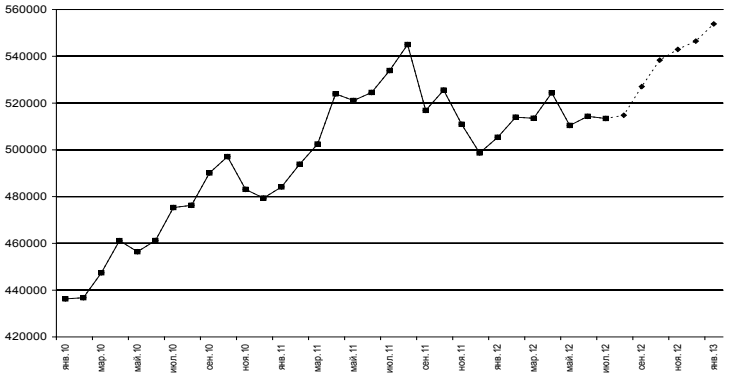

Fig. 41. The RUR/USD exchange rate

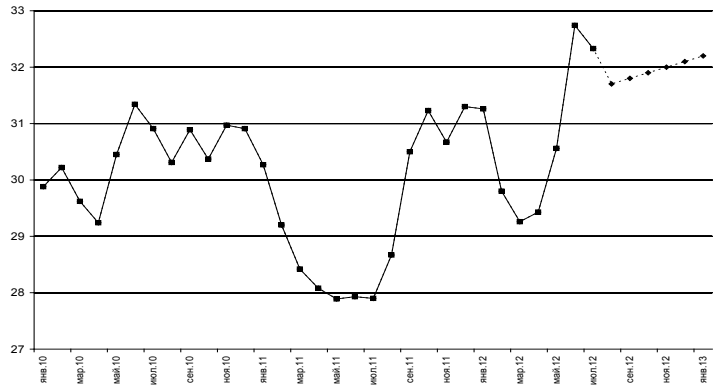

Fig. 42. The USD/EUR exchange rate

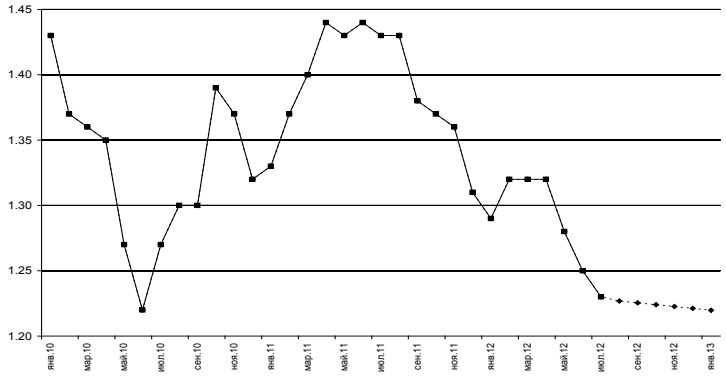

Fig. 43. Real disposable cash income (% of the respective period of the previous year)

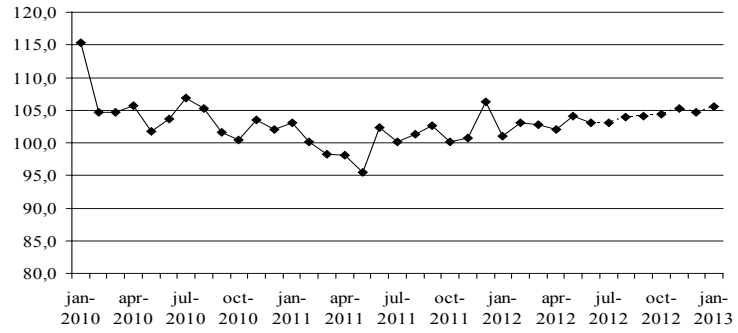

Fig. 44. Real cash income (% of the level of January 1999)

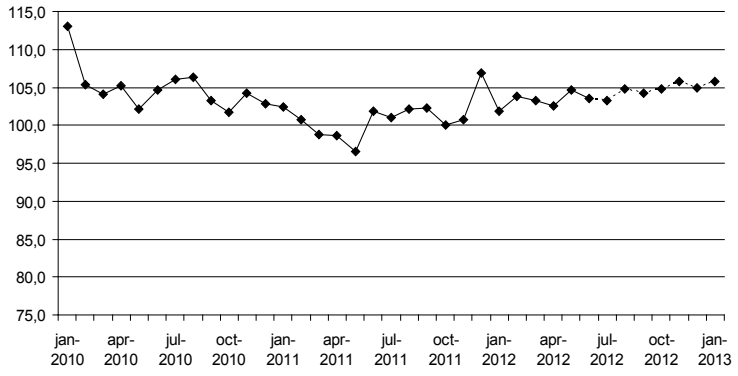

Fig. 45. Real accrued wages and salaries (% of the respective period of the previous year)

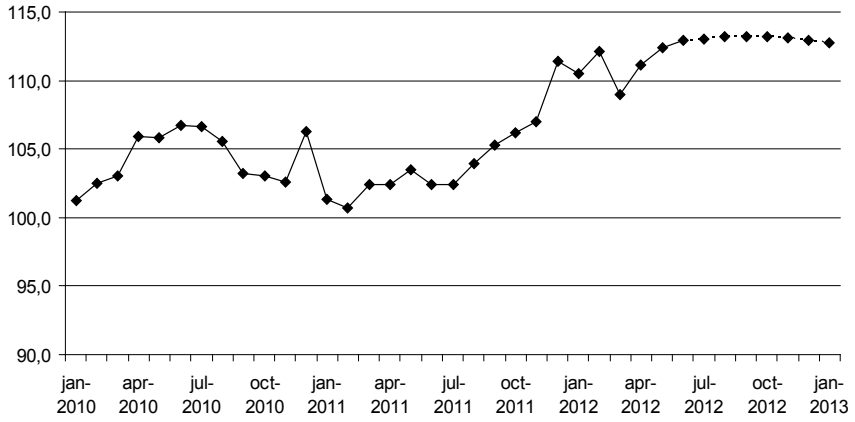

Fig. 46. Employment (million people)

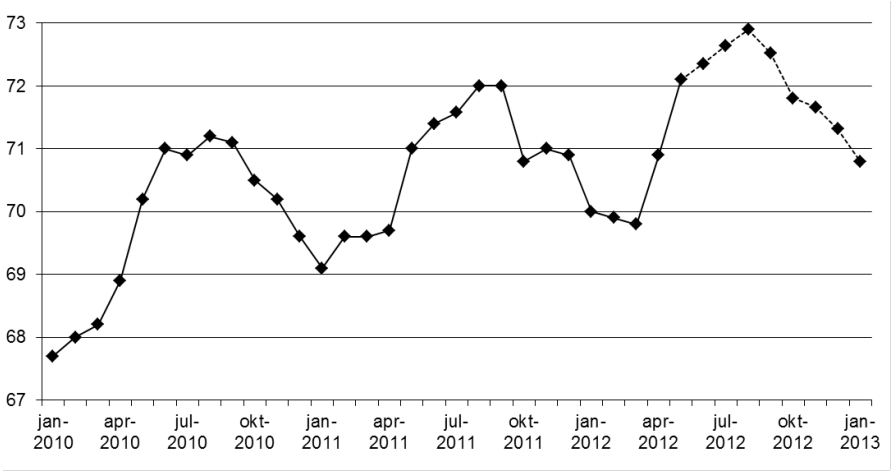

Fig. 47. Unemployment (million people)