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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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CONTENTS

INTRODUCTION TO ALL THE ISSUES

This Bulletin presents calculations of values of different economic indices of the Russian Federation in March–August 2012 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.

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

1 See, for example, R.M. Entov, Drobyshevsky, V.P. Nosko S.M., 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.

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.

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 polls (BP) 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 the Outputs of the Polls of Industries*. 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 manufactu-ring industry		IIP as regards produ-ction and distribu-tion 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	
	FSSS		CES–NRU HSE															
	ARIMA	BP	ARIMA	BP	FSSS	CES–NRU HSE	FSSS	CES–NRU HSE	FSSS	CES–NRU HSE	FSSS	CES–NRU HSE	FSSS	CES–NRU HSE	FSSS	CES–NRU HSE	FSSS	CES–NRU HSE
Expected growth on the respective month of the previous year																		
March 12	2.1	4.0	3.8	2.7	0.0	2.6	4.0	0.1	-4.9	1.3	4.4	5.3	-3.1	2.1	6.1	1.1	2.5	15.9
April 12	4.5	4.1	3.6	2.5	1.8	2.3	6.1	0.7	-2.8	2.3	5.5	6.4	0.2	3.6	5.6	2.5	5.1	16.3
May 12	3.6	3.9	3.5	3.5	1.6	1.7	5.7	0.6	1.2	2.7	5.7	5.7	-3.0	1.0	3.4	1.0	2.0	23.3
June 12	3.7	4.0	2.4	3.3	2.4	1.7	3.9	-1.5	3.9	1.4	4.2	7.4	-2.9	-1.3	0.0	0.1	-8.3	0.2
July 12	3.8	4.2	4.2	3.4	1.8	1.8	6.1	3.6	3.0	0.5	3.6	7.9	-2.2	0.2	-0.4	-1.5	-0.3	14.6
August 12	4.2	4.2	4.4	3.8	1.5	2.0	5.9	-0.3	3.4	0.7	3.5	8.0	-1.4	2.0	-0.6	-3.3	10.1	14.7
For reference: actual growth in 2011 on the respective month of 2010																		
March 11	5.3		4.2		3.1	0.9	8.6	6.6	0.8	0.5	0.5	1.9	3.2	1.7	6.9	3.2	7.1	17.8
April 11	4.5		4.1		1.4	1.5	5.3	5.9	2.3	2.2	2.3	2.1	0.8	3.2	-7.2	2.0	5.6	7.0
May 11	4.1		4.1		2.1	2.5	5.0	5.3	2.3	1.2	0.1	0.7	3.3	5.2	0.1	0.7	5.2	-3.6
June 11	5.7		4.9		1.6	2.2	7.1	6.5	1.5	1.7	-0.3	-0.8	10.2	9.5	-3.2	5.3	28.7	35.4
July 11	5.2		4.1		1.8	2.1	5.5	5.3	1.9	3.1	0.0	1.3	7.8	5.8	-5.4	4.0	25.7	11.3
August 11	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

Note. In the time spans under review, the series of the FSSS 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 FSSS 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 FSSS 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 March–August 2012, the series of monthly data of the indices of industrial production of the Federal State Statistics Service (FSSS) from January 2002 till December 2011, 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 January 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 polls (BP) as well. The obtained outputs are shown in Table 1.

As seen from *Table 1*, the average[1] growth in the CES–NRU HSE index of industrial production in March–August 2012 on the corresponding period of 2011 as regards industry in general amounts to 3.4%. As regards the FSSS index of industrial production, it amounts to 3.9%.

In March–August 2012, the average values of the FSSS and CES–NRU HSE indices of industrial production as regards production of primary products amount to 1.5% and 2.0%, respectively. As regards production of charred coal and oil products, the average growth is expected at the level of (-2.1%) and 1.3% for the indices of the FSSS and CES–NRU HSE, respectively.

In March–August 2012, the average growth in the CES–NRU HSE index of industrial production as regards manufacturing industry amounts to 0.5% on the corresponding period of 2011, while that in the FSSS index, to 5.3%. The average monthly values of the FSSS and CES–NRU HSE indices of industrial production as regards production of food products amount to 4.5% and 6.8%, respectively. In March–August 2012, the average monthly values of the FSSS and CES–NRU HSE indices of industrial production as regards iron and steel industry and production of finished metal goods amount to 2.3% and 0.0%, respectively. As regards production of machines and equipment, the average growth is expected at the level of 1.9% and 14.2% for the indices of the FSSS and CES–NRU HSE, respectively. In March–August 2012, the average growth in the FSSS index of industrial production as regards production and distribution of power, gas and water amounts to 0.6% on the corresponding period of 2011, while that in the CES–NRU HSE index, to 1.5%.

Retail Sales

This section (see Table 2) presents forecasts of monthly retail sales made on the basis of monthly FSSS data in the January 1999 – December 2011 period.

As seen from *Table 2*, in Spring–Summer 2012 the average expected growth in retail sales volumes amounts to about 15.6% on the corresponding period of 2011.

In February–July 2012, the average expected growth in monthly real sales amounts to 9.3% on the corresponding period of 2011.

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)
March 2012	1691.7 (15.5)	109.6
April 2012	1719.2 (15.3)	109.6
May 2012	1769.1 (15.4)	109.3
June 2012	1795.1 (15.6)	109.2
July 2012	1849.4 (16.0)	109.2
August 2012	1910.4 (15.9)	108.6
For reference: actual value in the same months of 2011		
March 2011	1464.7	105.3
April 2011	1490.6	106.1
May 2011	1532.4	106.0
June 2011	1552.8	106.1
July 2011	1594.2	106.0
August 2011	1648.2	108.1

Note. Series of retail sales and real retail sales in the January 1999 – December 2011 period.

1 The average growth in the indices of industrial production means here the average value of such indices in the period of six months of the forecast.

INVESTMENTS IN CAPITAL ASSETS

Table 3 presents the outputs of calculations of forecast values of investments in capital assets in March-August 2012. The forecasts were made on the basis of time-series models with utilization of the FSSS data of the January 1999 – December 2011 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)
February 2012	515.9 (11.8)	107.0
March 2012	606.1 (13.1)	106.2
April 2012	671.7 (13.8)	107.4
May 2012	868.3 (15.3)	108.5
June 2012	1048.3 (16.2)	109.9
July 2012	927.8 (15.7)	111.6
For reference: actual values in the same months of 2011		
February 2011	461.3	99.6
March 2011	535.9	99.7
April 2011	590.1	102.2
May 2011	752.9	107.4
June 2011	902.0	104.9
July 2011	802.0	107.9

Note. Series of investments in capital assets in the January 1999 – December 2011 period are series of DS type.

The outputs in *Table 3* show that in Spring–Summer 2012 the average expected growth in investments amounts to about 13.2% on the corresponding period of 2011.

In the March–August 2012 period, the average expected growth in real investments amounts to 8.4% on the corresponding period of 2011.

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 November 2011 on the basis of the data of the Central Bank of Russia[1]. The outputs of the calculations are shown in Table 4.

In March–August 2012, the average expected growth in the export, import, export to countries outside the CIS and import from countries outside the CIS will amount to 3.9%, 2.4%, 8.7% and 8.3%, respectively on the corresponding period of 2011. In March–August 2012, the average expected volume of the trade balance with all the countries will amount to $ 102.8bn which figure is equal to growth of 6.6% as compared to the same period of 2011.

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

Table 4

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
March 2012	46.1	45.6	106	105	30.5	26.1	113	97	39.5	40.2	112	104	25.8	23.5	112	105
April 2012	47.4	47.7	103	104	30.2	26.8	111	99	41.7	42.0	108	96	27.2	24.2	118	102
May 2012	42.5	45.6	97	104	28.4	26.6	101	94	41.0	39.4	119	108	26.8	27.5	112	104
June 2012	43.3	46.2	98	105	29.0	28.0	105	101	41.1	39.3	117	101	26.2	26.2	112	105
July 2012	44.5	46.2	106	110	30.5	27.7	111	101	39.9	39.2	123	106	27.1	26.2	116	111
August 2012	45.1	48.2	101	108	30.1	28.9	100	96	41.3	39.7	112	99	27.7	25.1	107	98
For reference: actual values in respective months of 2011 (billion USD)																
March 2011	43.6				26.9				36.1				23.0			
April 2011	45.9				27.1				39.0				23.1			
May 2011	43.6				28.1				37.2				24.0			
June 2011	44.2				27.7				37.3				23.3			
July 2011	42.0				27.4				35.5				23.3			
August 2011	44.6				30.1				37.9				25.9			

Note. In the period from January 1999 till December 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 FSSS data in the period from January 1999 to December 2011[1]*. Table 5 presents the outputs of model calculations of forecast values in Spring–Summer 2012 in accordance with ARIMA-models, structural models (SM) and models built with utilization of business polls (BP).*

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 (BP)	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)																
Mar.12	100.4	100.5	101.0	101.6	103.2	101.3	102.2	100.9	100.3	100.3	100.5	101.8	102.4	100.9	100.2	100.8
Apr.12	100.3	100.5	101.4	101.9	102.7	101.0	99.3	100.9	100.5	101.0	100.5	102.2	101.7	99.9	100.2	100.9
May12	100.4	100.7	100.7	101.1	100.7	101.0	99.6	100.8	100.7	101.0	100.4	102.2	101.5	99.5	100.2	100.8
Jun.12	100.3	100.7	100.4	98.5	100.2	100.4	98.8	100.9	100.6	101.0	100.4	101.5	101.4	100.5	99.9	100.5
Jul.12	100.3	100.9	101.7	98.1	103.0	100.8	97.1	100.4	100.7	100.8	100.3	101.8	100.0	100.6	100.3	100.8
Aug.12	99.9	100.6	101.6	101.5	103.1	101.3	99.1	100.5	100.6	100.6	100.3	102.2	101.5	101.5	100.7	100.7
Forecast values (% of December 2011)																
Mar.12	102.3	101.2	105.4	104.3	107.6	102.9	112.4	101.6	100.2	101.9	102.0	106.3	101.7	101.8	102.7	103.1
Apr.12	102.6	101.7	106.9	106.2	110.5	103.9	111.5	102.5	100.7	103.0	102.5	108.6	103.4	101.7	102.9	104.0
May.12	103.0	102.5	107.6	107.4	111.3	105.0	111.1	103.3	101.4	104.0	103.0	111.0	104.9	101.1	103.1	104.9
Jun.12	103.4	103.2	108.1	105.8	111.5	105.3	109.7	104.2	102.0	105.0	103.3	112.7	106.4	101.7	103.0	105.4
Jul.12	103.6	104.1	110.0	103.7	114.8	106.1	106.5	104.6	102.6	105.8	103.7	114.6	106.3	102.3	103.2	106.2
Aug.12	103.5	104.8	111.7	105.4	118.4	107.6	105.5	105.1	103.3	106.4	104.0	117.2	107.9	103.8	103.9	106.9
For reference: actual values in the same periods of 2011 (% of December 2010)																
Mar.11	103.8		107.2	113.1	103.8	111.9	102.8	109.6	102.9	103.5	100.0	106.4	108.5	103.6	104.9	
Apr.11	104.3		109.3	120.6	104.9	109.9	102.6	111.1	104.1	104.5	104.5	108.3	107.6	103.3	105.5	
May.11	104.8		110.5	123.5	106.0	108.3	102.3	111.9	105.0	104.5	109.2	107.6	107.8	104.4	106.6	
Jun.11	105.0		108.0	114.5	105.5	107.5	102.1	111.9	105.3	104.4	107.1	108.2	106.4	103.8	107.1	
Jul.11	105.0		106.0	107.1	105.8	103.8	102.3	111.9	105.2	103.7	107.9	109.4	105.1	104.8	107.8	
Aug.11	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	

Note. In the period from January 1999 till November 2011, 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.

In March–August 2012, the expected monthly average growth in the consumer price index will amount to 0.5%. In the above period, growth in prices of producers of industrial goods is expected on average at the level of 0.8% a month.

As regards NICS-producer price indices, in March–August 2012 the following average monthly growth rates are expected: production of primary products (2.1%), manufacturing (1.0%), production and distribution of power, gas and water (-0.7%), production of food products (0.7%), textile and

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

sewing industry (0.5%), woodworking and production of wood products (0.8%), pulp and paper industry (0.4%), production of charred coal and oil products (1.9%), chemical industry (1.4%), iron and steel industry and production of finished metal goods (0.5%), production of machines and equipment (0.2%) and production of transport vehicles and equipment (0.7%).

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 March–August 2012. The forecasts were made on the basis of time series with use the FSSS data in the period from January 2000 till December 2011. The outputs of calculations are shown in Table 6.

As seen from *Table 6*, growth in the cost of the minimum package of food products as compared to the respective level of 2011 is expected. It is to be noted that the average expected cost of the minimum package of food products amounts to about Rb 2,481.7. The expected drop in the cost of the minimum package of food products amounts on average to about -9.4% as compared to the level of the same period of 2011.

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)	
March 2012	2528.1
April 2012	2528.8
May 2012	2514.3
June 2012	2494.1
July 2012	2459.0
August 2012	2366.0
For reference: actual values in the same months of 2011 (billion Rb)	
March 2011	2845.1
April 2011	2840.4
May 2011	2807.0
June 2011	2761.5
July 2011	2689.0
August 2011	2512.9
Expected growth on the respective month of the previous year (%)	
March 2012	-11.1
April 2012	-11.0
May 2012	-10.4
June 2012	-9.7
July 2012	-8.6
August 2012	-5.8

Note. The series of the cost of the minimum package of food products in the period from January 2000 till December 2011 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 FSSS data in the period from September 1998 till December 2011. Table 7 shows the outputs of model calculations of forecast values in March–August 2012. 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.

On the basis of the results of the forecast for March–August 2012, the behavior of the composite index of transportation tariffs on cargo carriage will be relatively steady: the average monthly growth is expected at the level of 0.8%.

The index of tariffs on motor cargo carriage will not virtually change in the forecasting period. The index of tariffs on pipeline transportation will grow within the next six months at an average monthly rate of 2.3%.

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)			
March 2012	100.8	100.2	103.1
April 2012	100.8	100.2	101.7
May 2012	100.8	100.2	102.5
June 2012	100.8	100.2	102.1
July 2012	100.8	100.1	102.4
August 2012	100.8	100.1	102.2
Forecast values according to ARIMA-models (% of December of the previous year)			
March 2012	108.9	102.5	110.4
April 2012	109.7	102.7	112.3
May 2012	110.6	102.9	115.1
June 2012	103.1	101.3	109.0
July 2012	110.4	103.3	115.7
August 2012	111.3	103.4	116.6
For reference: actual values in the same period of 2011 (% of the previous month)			
March 2011	100.0	101.1	99.9
April 2011	106.3	100.9	113.7
May 2011	100.1	100.7	100.0
June 2011	100.1	100.7	100.0
July 2011	105.3	100.8	110.9
August 2011	100.1	100.2	100.1

Note. In the period from November 2000 till December 2011, 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 November 2011, 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 ($ per barrel), Aluminum ($ per ton), gold ($ per ounce), copper ($ per ton) and nickel ($ per ton) in Spring–Summer 2012 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 January 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					
March 2012	117.05	2168	1715	8227	20885
April 2012	119.41	2230	1728	8162	20913
May 2012	120.75	2246	1745	8166	21101
June 2012	122.22	2235	1765	8162	21210
July 2012	124.16	2255	1783	8153	21391
August 2012	126.02	2260	1799	8111	21509
Growth on the respective month of the previous year (%)					
March 2012	2.3	-15.2	20.6	-13.4	-21.8
April 2012	-3.0	-16.4	17.2	-13.9	-20.6
May 2012	5.5	-13.2	15.4	-8.6	-12.7
June 2012	7.4	-12.6	15.5	-10.0	-5.4
July 2012	6.6	-10.7	13.7	-15.5	-10.3
August 2012	14.5	-5.1	2.3	-9.9	-1.6
For reference: actual values in the same period of 2011					
March 2011	114.44	2556	1423	9503	26710
April 2011	123.15	2667	1474	9483	26332

Table 8, cont'd

Month	Brent oil ($ per barrel)	Aluminum ($ per ton)	Gold ($ per ounce)	Copper ($ per ton)	Nickel ($ per ton)
May 2011	114.46	2587	1512	8932	24165
June 2011	113.76	2558	1528	9067	22421
July 2011	116.46	2525	1569	9650	23848
August 2011	110.08	2381	1760	8998	21865

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

The average expected level of prices on oil amounts to about $ 122 per barrel which figure is on average 6% higher than the respective indices of the previous year. Prices on aluminum are expected at the level of about $ 2,232 per ton, while their average drop is expected to amount to about 12% against the respective level of the previous year. Prices on gold are expected to amount to about $ 1,756 per ounce. Average prices on copper are expected to amount to about $ 8,164 per ton, while those on nickel, to about 21,168 per ton. The average expected growth in prices on gold amounts to about 14%, while the average drop in prices on copper and nickel, to about 12% against the respective level of the previous year.

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 March–August 2012 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 December 2011. 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, %
March 2012	6889.8	3.3	25817.6	1.8
April 2012	6880.4	-0.1	26284.5	1.8
May 2012	7104.8	3.3	26758.9	1.8
June 2012	7100.6	-0.1	27240.9	1.8
July 2012	7326.6	3.2	27730.5	1.8
August 2012	7327.8	0.0	28228.0	1.8
For reference: actual value in the respective months of 2011 (growth on the previous month, %)				
March 2011	1.2		1.5	
April 2011	3.2		1.1	
May 2011	1.6		0.7	
June 2011	1.9		2.7	
July 2011	1.3		0.5	
August 2011	1.9		1.1	

Note. In the period from October 1998 to December 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.

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.

In March–August 2012, the expected average monthly growth in the monetary base will amount to 1.6% a month. The M_2 monetary index will grow at the average monthly rate of 1.8% in the period under review.

INTERNATIONAL (GOLD AND FOREIGN EXCHANGE) RESERVES

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, %
March 2012	519.2	1.6
April 2012	528.3	1.8
May 2012	538.5	1.9
June 2012	549.2	2.0
July 2012	560.4	2.0
August 2012	571.8	2.0
For reference: actual values in the same period of 2011		
March 2011	502.5	1.7
April 2011	523.9	4.3
May 2011	521.1	-0.5
June 2011	524.5	0.6
July 2011	533.9	1.8
August 2011	545.0	2.1

Note. In the period from October 1998 till December 2011, the series of the gold and foreign exchange reserves of the Russian Federation were identified as stationary series in difference.

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 December 2011. That index is forecasted without taking into account a decrease in the amount of the reserves due to payment of the foreign debt and for that reason the values of the volumes of the international reserves in the months where foreign debt payments are made may happen to be overestimated (or, otherwise, underestimated) as compared to the actual ones.

On the basis of the outputs of the forecast, in March–August 2012 the gold and foreign exchange reserves will grow at the average monthly rate of 1.8%.

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 January 2012 as of the last day of the month in the period from January 1999 till January 2012[2].

On the basis of the results of the forecast for March-August 2012, the RUR/USD exchange rate will amount on average to Rb 29.1 per USD. The average value of the EUR/USD exchange rate will amount to $ 1.33 per Euro.

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
March 2012	29.08	1.33
April 2012	29.03	1.33
May 2012	29.07	1.33
June 2012	29.12	1.33

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

2 In the Bulletin, the data of the IMF on the period from January 1999 till December 2011 was used. The data on January and February 2012 was taken from the Web-site of the exchange rates statistics www.oanda.com.

Table 11, cont'd

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
July 2012	29.16	1.33
August 2012	29.21	1.33
For reference: actual values in the similar period of 2011		
March 2011	28.42	1.40
April 2011	28.08	1.44
May 2011	27.89	1.43
June 2011	27.93	1.44
July 2011	27.9	1.43
August 2011	28.67	1.43

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 (see Table 12) presents such outputs of calculations of forecast values of indices of real wages, real disposable cash income and real cash income [1] as were received on the basis of the model of time series of respective indices calculated by FSSS and taken in the period from January 1999 till January 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.

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)			
March 2012	108.8	111.0	108.3
April 2012	109.6	108.5	106.4
May 2012	112.5	112.9	106.8
June 2012	109.9	109.5	106.5
July 2012	111.3	110.1	106.9
August 2012	112.1	112.0	107.6
For reference: actual values in the respective period of 2011 (% of the same period of 2010)			
March 2011	98.1	98.8	102.4
April 2011	98.5	99.0	102.4
May 2011	95.6	96.6	103.5
June 2011	102.7	102.1	102.4
July 2011	100.4	101.1	102.4
August 2011	101.5	102.3	103.9

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 January 2011, those series were attributed to the class of processes which are stationary in differences and have an explicit seasonal component.

1 *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).

The outputs shown in *Table 12* point to growth in the real disposable cash income, real wages and real cash income on the level of the respective period of 2011. The average growth in the real disposable cash income is expected at the level of 11.6% a month. Growth in the real cash income will amount to 11% as compared to the respective level in 2011, while that in the real wages and salaries is expected to amount to 4.7% on the corresponding period of last year.

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 December 2011 on the basis of the monthly data of FSSS[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)		Unemloyment (ARIMA)			Unemployment (BP)		
	Million people	Growth on the respective month of 2011 (%)	Million people	Growth on the respective month of 2011 (%)	% of the index of the number of the gainfully employed population	Million people	Growth on the respective month of 2011 (%)	% of the index of the number of the gainfully employed population
March 2012	70.6	1.4	4.7	-13.2	6.6	5.0	-7.4	7.1
April 2012	71.0	1.9	4.5	-16.2	6.4	4.9	-8.5	6.9
May 2012	71.7	0.9	4.3	-11.8	6.0	4.6	-6.9	6.4
June 2012	72.1	0.9	4.1	-10.2	5.7	4.3	-6.5	6.0
July 2012	72.4	1.1	4.1	-18.8	5.6	4.7	-6.6	6.5
August 2012	72.7	1.0	4.1	-13.3	5.6	4.4	-6.4	6.1
For reference: actual values in the same periods of 2011 (million people)								
March 2011	69.6		5.4					
April 2011	69.7		5.4					
May 2011	71.0		4.9					
June 2011	71.4		4.6					
July 2011	71.6		5.0					
August 2011	72.0		4.7					

Note. In the period from October 1998 till December 2011, 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 the forecasts on the basis of ARIMA-models (*Table 13*), in the first six months of 2012 growth in the number of gainfully employed population will amount on average to 1.5% a month on the corresponding period of 2011.

The average decrease in the index of the total number of the unemployed is expected at the level of 10.5% a month as compared to the same period of 2011.

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 November 2011.

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.

ANNEX

Diagrams of the Time Series of the Economic Indices of the Russian Federation: the actual and forecast values.

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

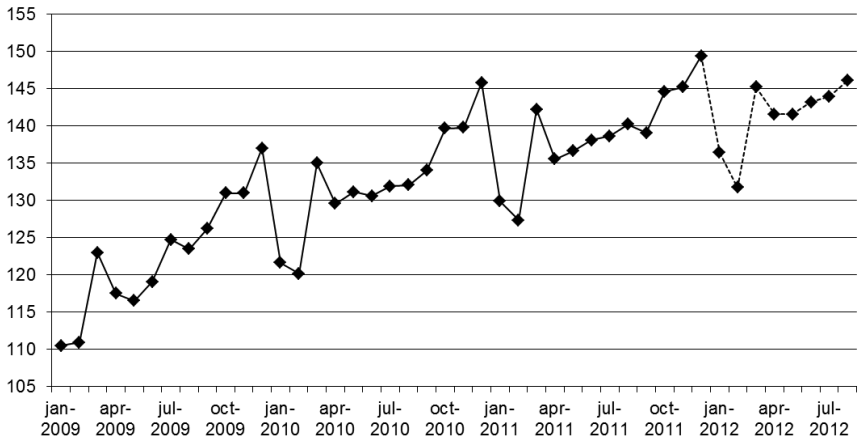

Fig. 1b. The CEC–NRU HSE index of industrial production (ARIMA-model)
(% of January 1995)

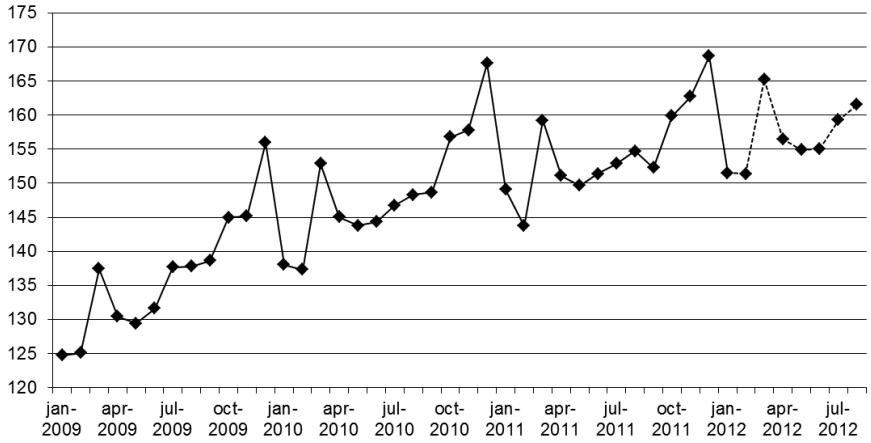

Fig. 2a. The FSSS index of industrial production as regards production of primary products
(% of December 2001)

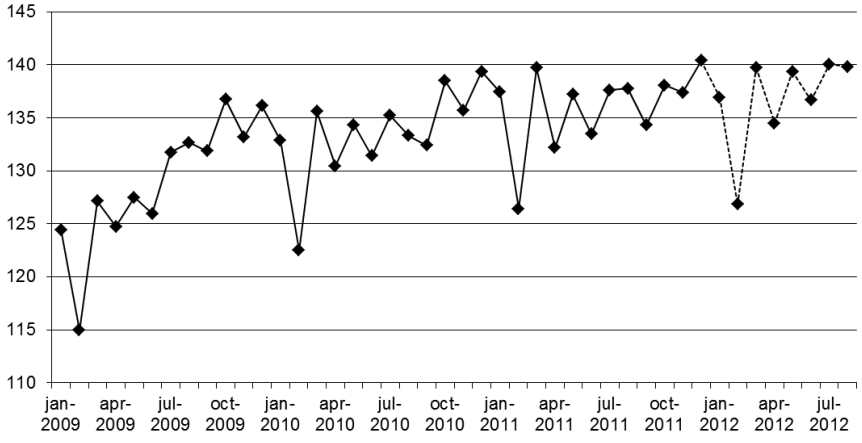

Fig. 2b. The CEC–NRU HSE index of industrial production as regards production of primary products (% of January 1995)

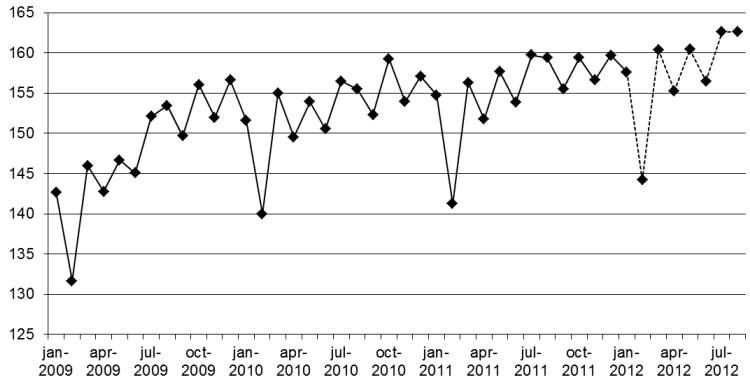

Fig. 3a. The FSSS index of industrial production as regards manufacturing industry (% of December 2001)

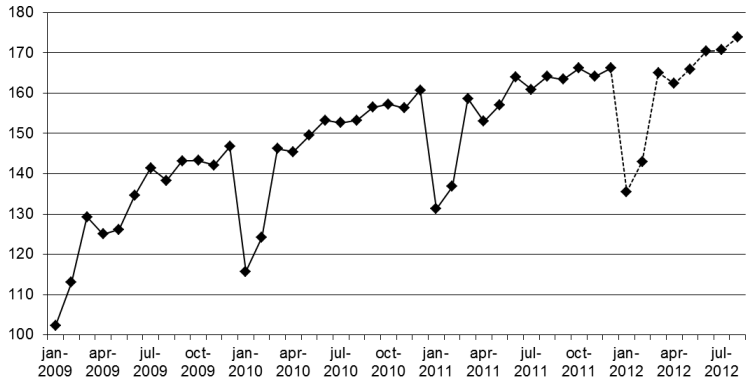

Fig. 3b. The CEC–NRU HSE index of industrial production as regards manufacturing industry (% of January 1995)

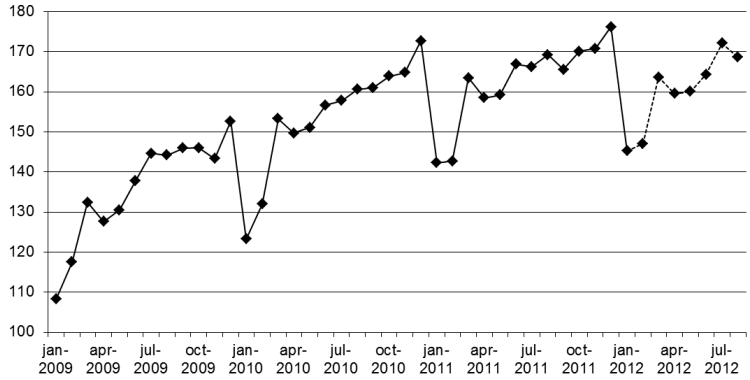

Fig. 4a. The FSSS index of industrial production as regards production and distribution of power, gas and water (% of December 1998)

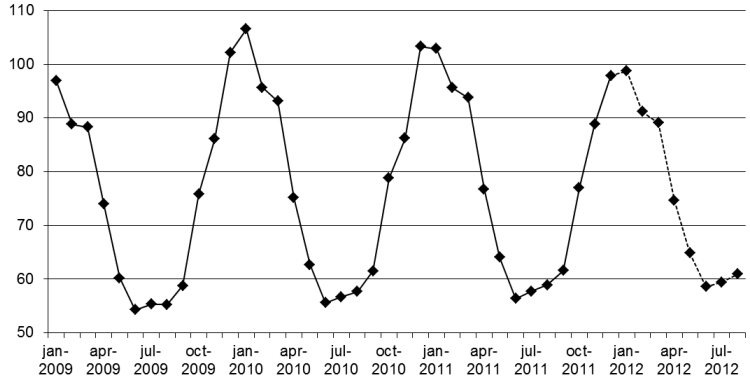

Fig. 4b. The CEC–NRU HSE index of industrial production as regards production and distribution of power, gas and water (% of January 1995)

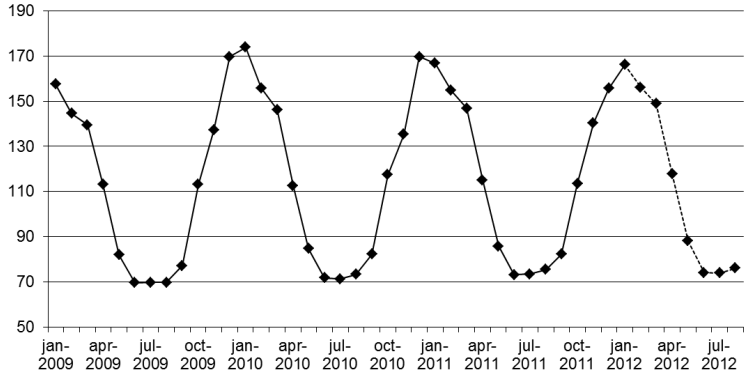

Fig. 5a. The FSSS index of industrial production as regards production of food products (% of December 2001)

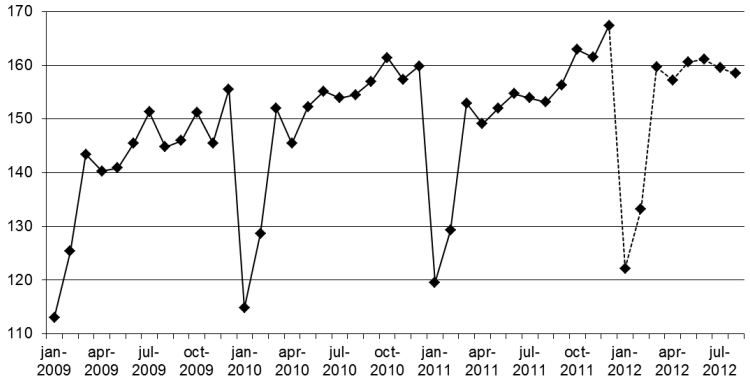

Fig. 5b. The CEC–NRU HSE index of industrial production as regards production of food products (% of January 1995)

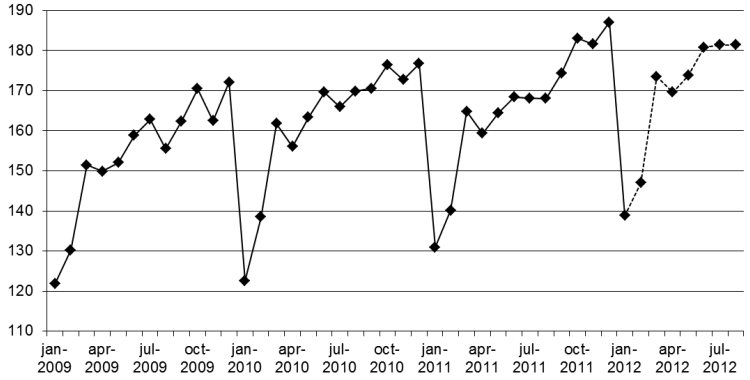

Fig. 6a. The FSSS index of industrial production as regards production of charred coal and oil products (% of December 2001)

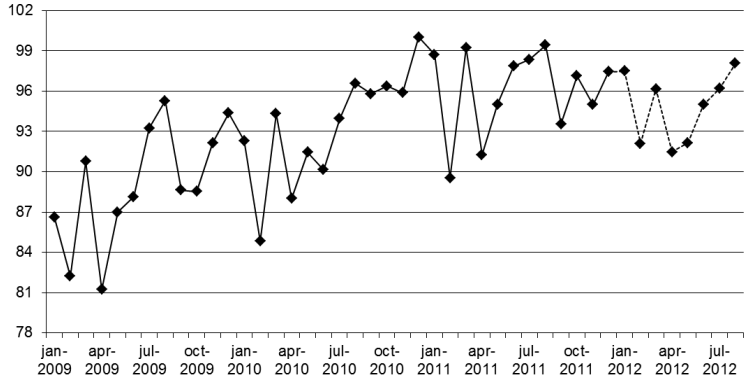

Fig. 6b. The CEC–NRU HSE index of industrial production as regards production of charred coal and oil products (% of January 1995)

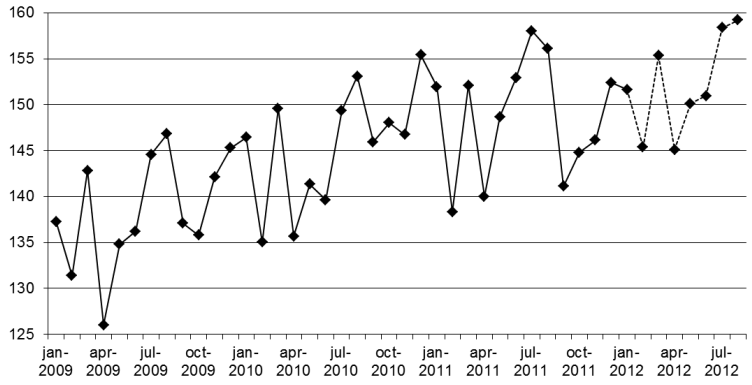

Fig.7a. The FSSS index of industrial production as regards iron and steel industry and production of finished metal goods (% of December 1998)

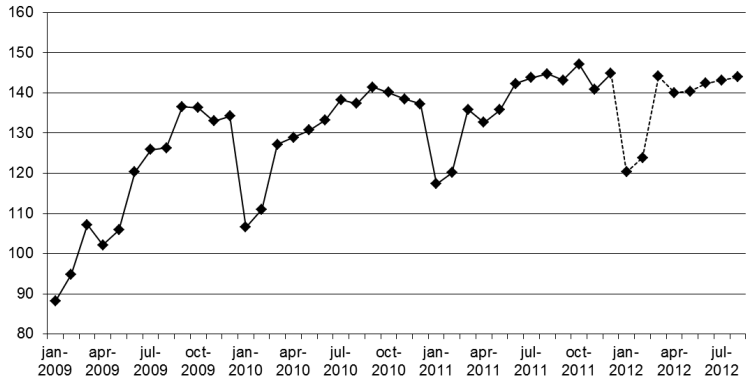

Fig. 7b. The CEC–NRU HSE index of industrial production as regards iron and steel industry and production of finished metal goods (% of January 1995)

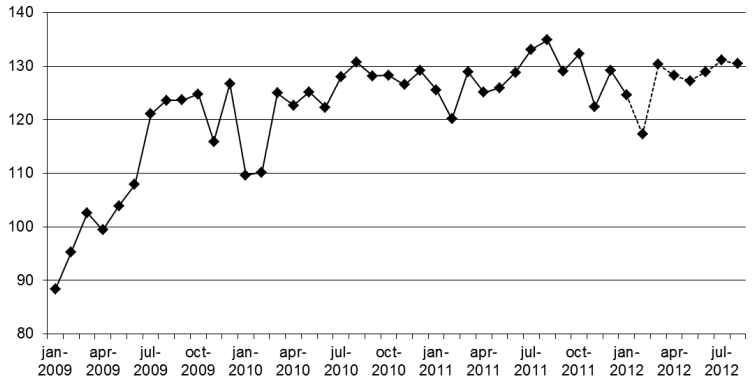

Fig. 8a. The FSSS index of industrial production as regards production of machines and equipment (% of December 1998)

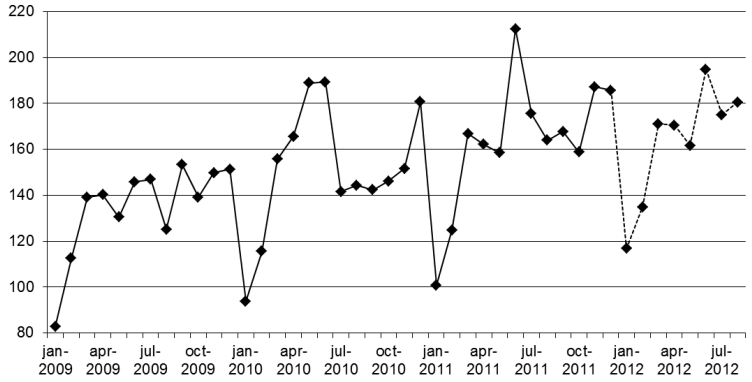

Fig. 8b. The CEC–NRU HSE index of industrial production as regards production of machines and equipment (% of January 1995)

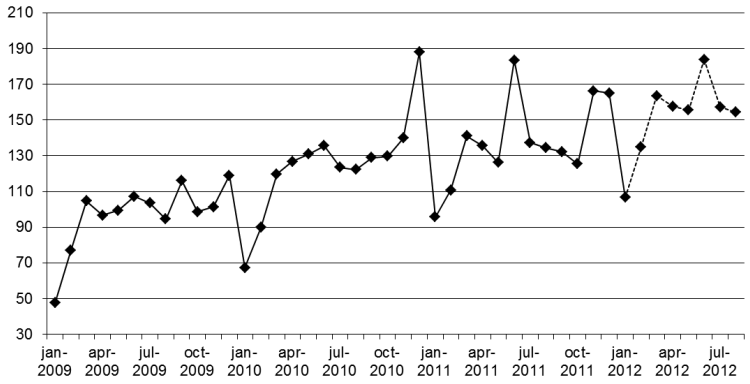

Fig. 9. The volume of retail sales (billion Rb)

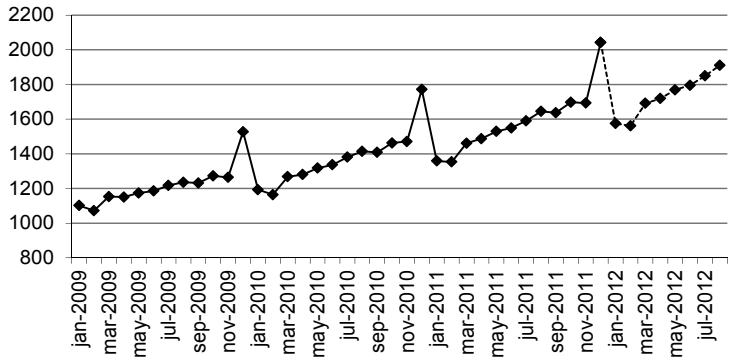

Fig. 9a. The real turnover of the retail trade (% of the respective period of last year)

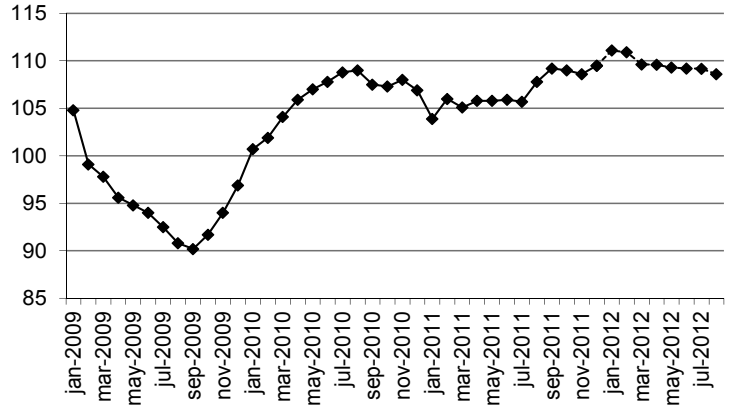

Fig. 10. Investments in capital assets (billion Rb)

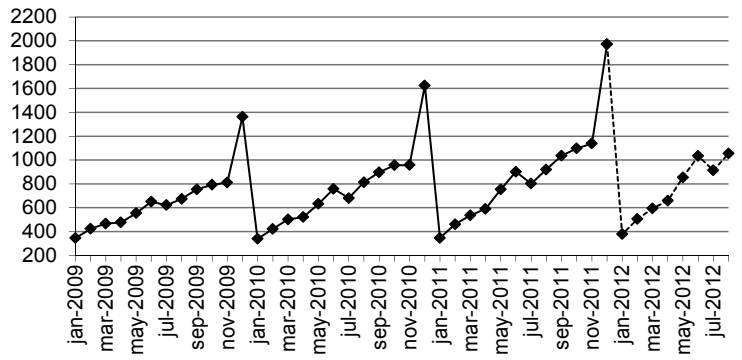

Fig. 10a. Real investments in capital assets (% of the respective period of the previous year)

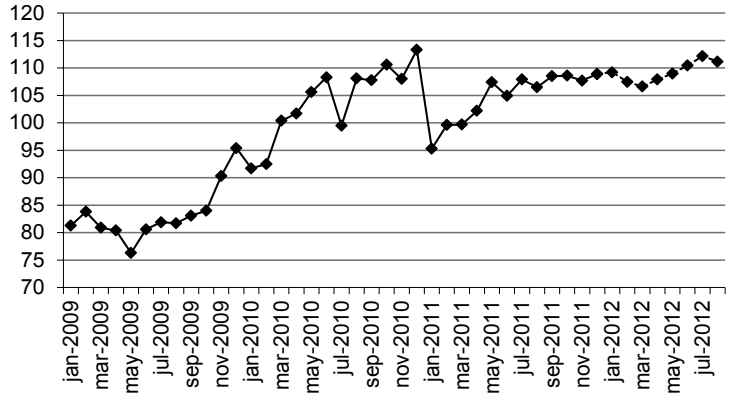

Fig.11. Export to all the countries (billion USD)

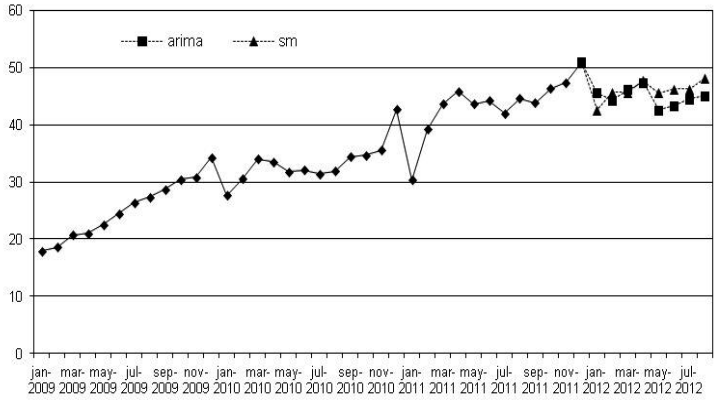

Fig. 12. Export to countries outside the CIS (billion USD)

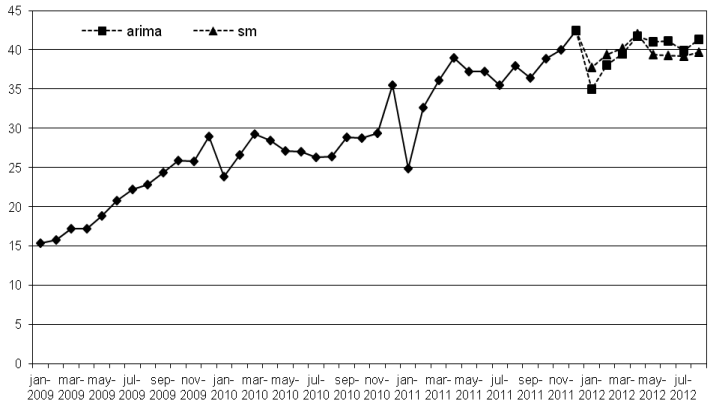

Fig. 13. Import from all the countries (billion USD)

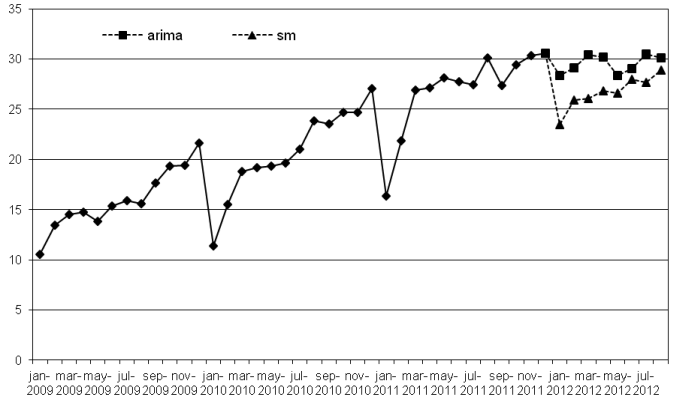

Fig. 14. Import from countries outside the CIS (billion USD)

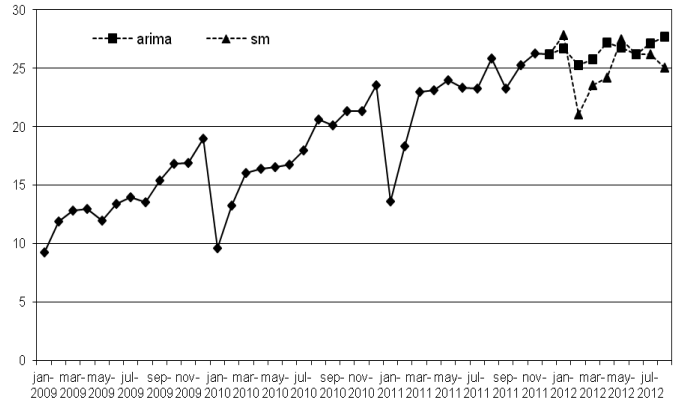

Fig. 15. Consumer price index as % of December of the previous year

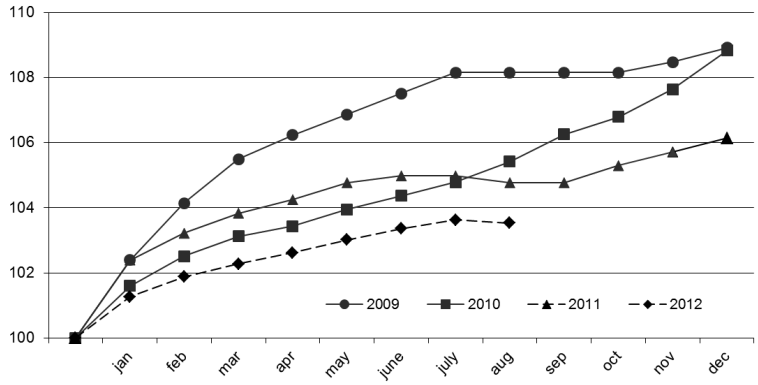

Fig. 15a. Consumer price index as % of December of the preceding year (SM)

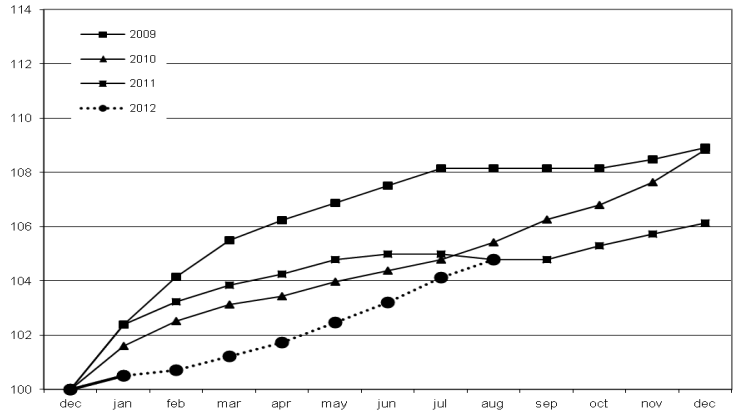

Fig.16. Producer price index (industrial goods), % of December of the previous year

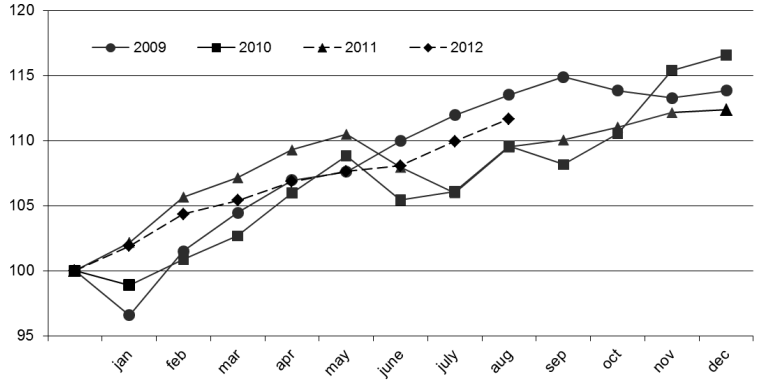

Fig. 17. Price index as regards production of primary products, % of December of the previous year

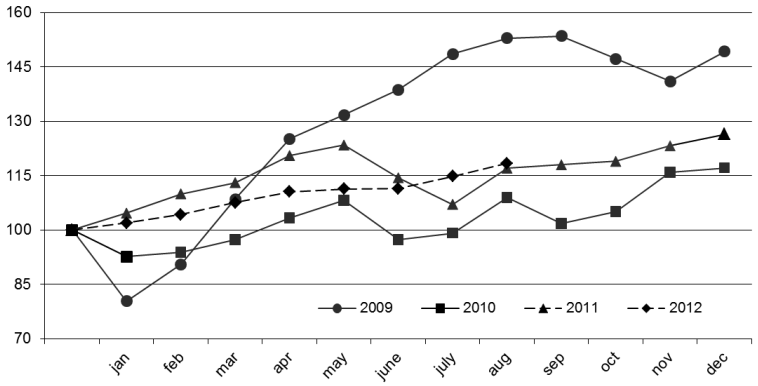

Fig. 18. Price index as regards manufacturing industries, % of December of the previous year

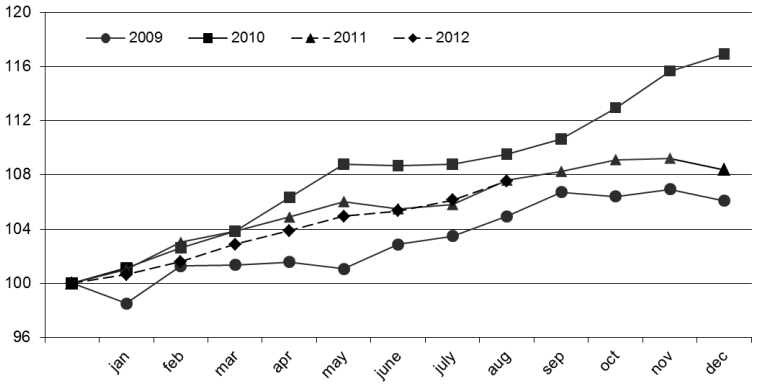

Fig. 19. Price index as regards production and distribution of power, gas and water, % of December of the previous year

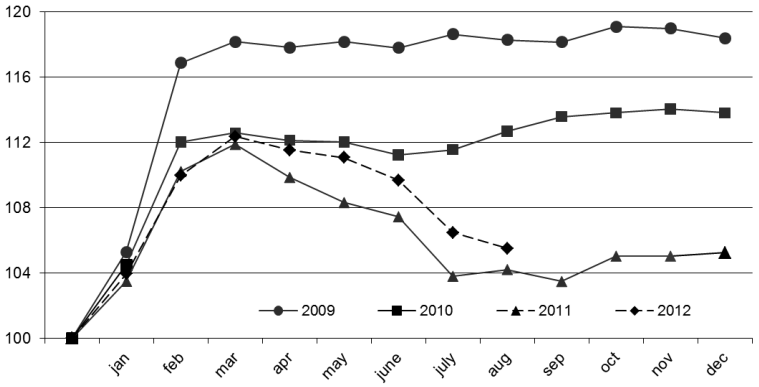

Fig. 20. Price index as regards production of food products, % of December of the previous year

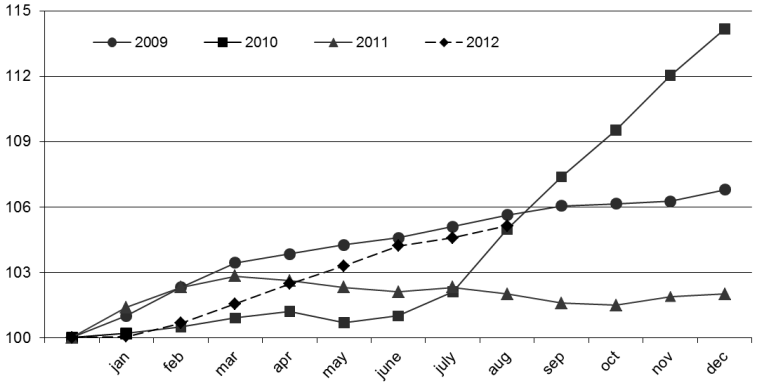

Fig. 21. Price index as regards textile and sewing industry, % of December of the previous year

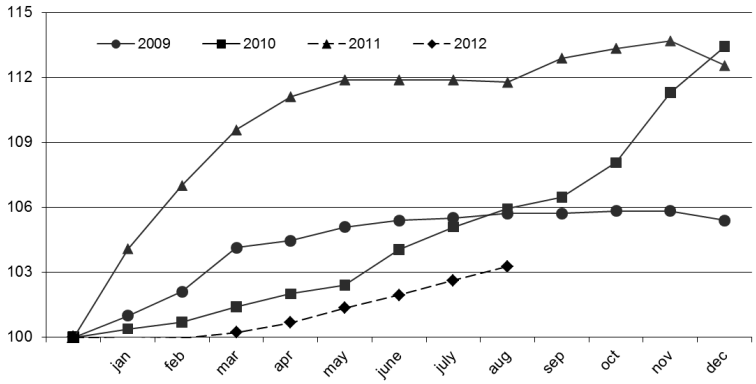

Fig. 22. Price index as regards woodworking and production of wood products, % of December of the previous year

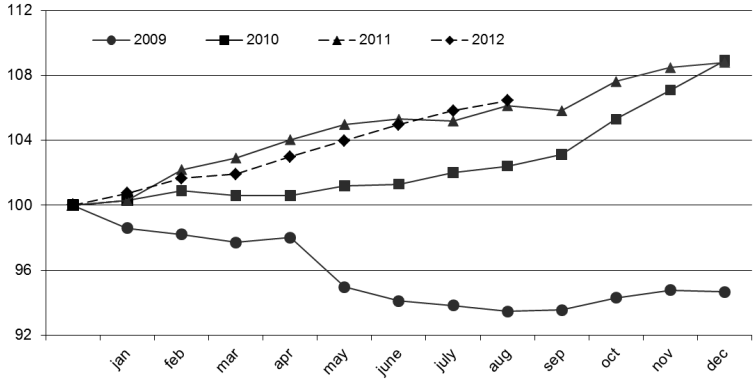

Fig. 23. Price index as regards pulp and paper industry, % of December of the previous year

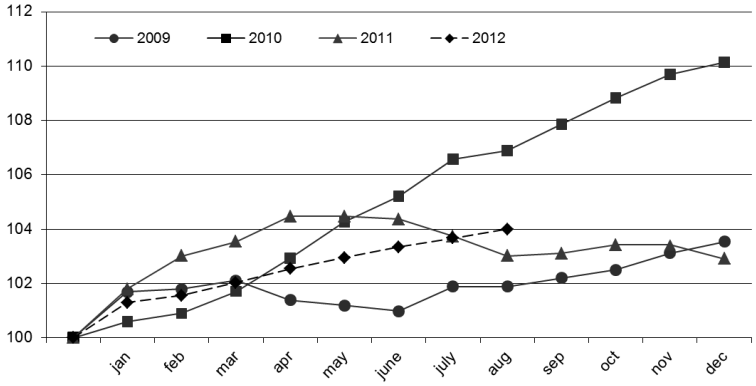

Fig. 24. Price index as regards production of charred coal and oil products, % of December of the previous year

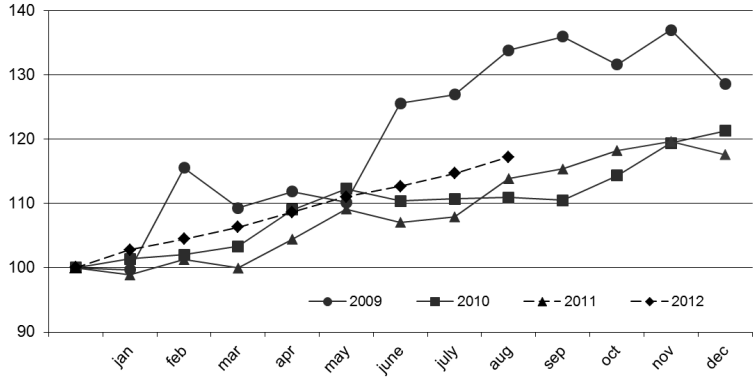

Fig. 25. Price index as regards chemical industry, % of December of the previous year

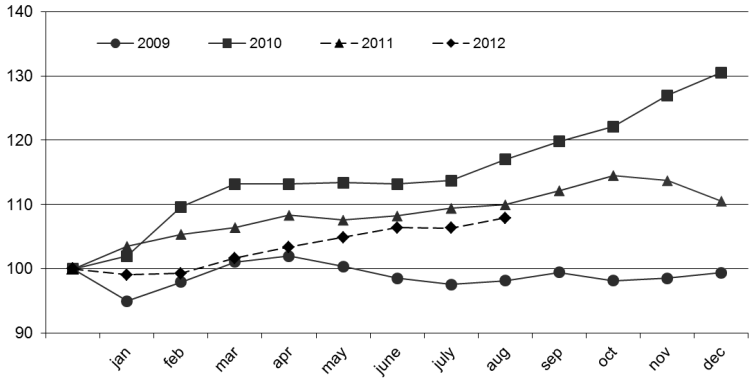

Fig.26. Price index as regards iron and steel industry and production of finished metal goods, % of December of the previous year

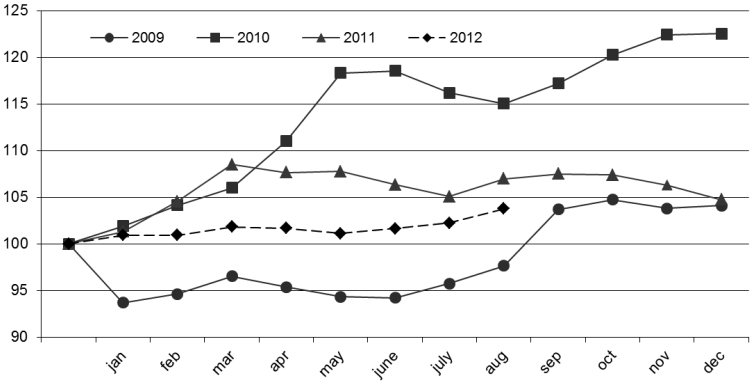

Fig.27. Price index as regards production of machines and equipment, % of December of the previous year

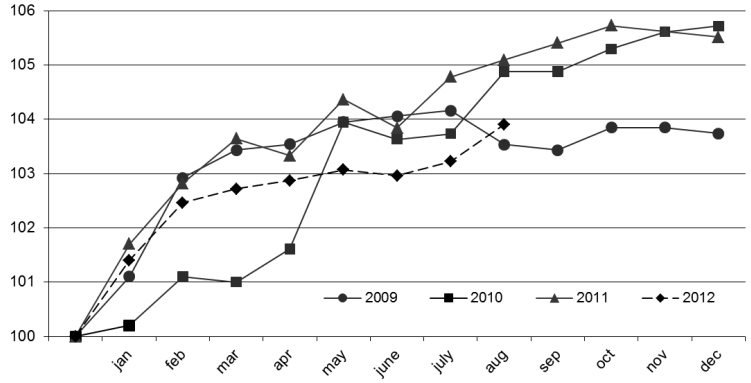

Fig.28. Price index as regards production of transportation vehicles and equipment, % of December of the previous year

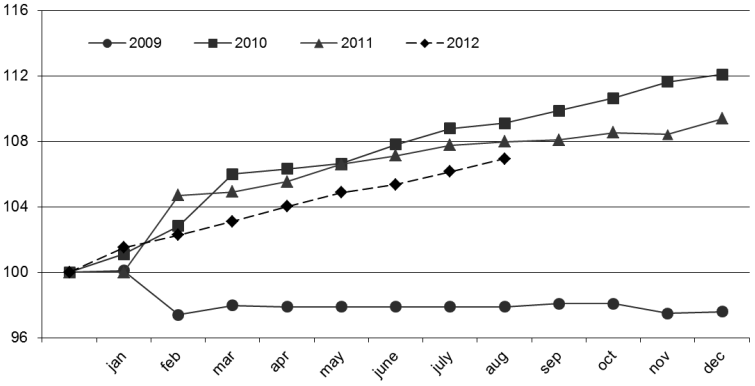

Fig. 29. The cost of the minimum package of food products per person a month (Rb)

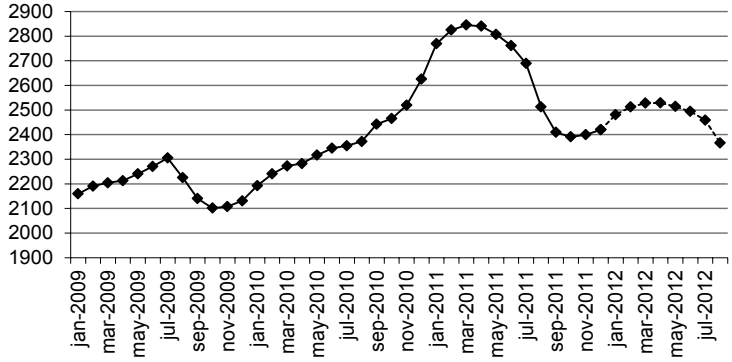

Fig. 30. The composite index of transportation tariffs (for each year as % of the previous month)

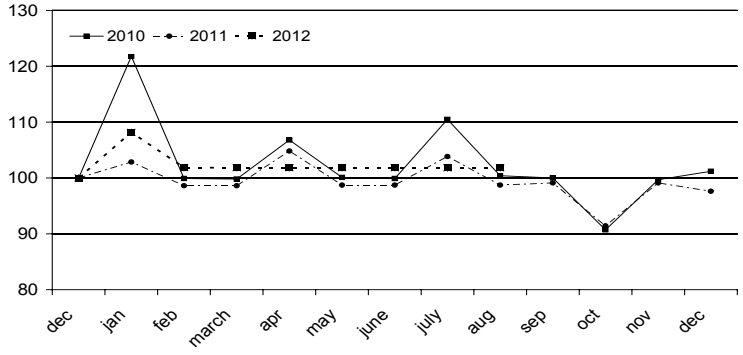

Fig. 31. Index of tariffs on motor cargo carriage (for each year as % of the previous month)

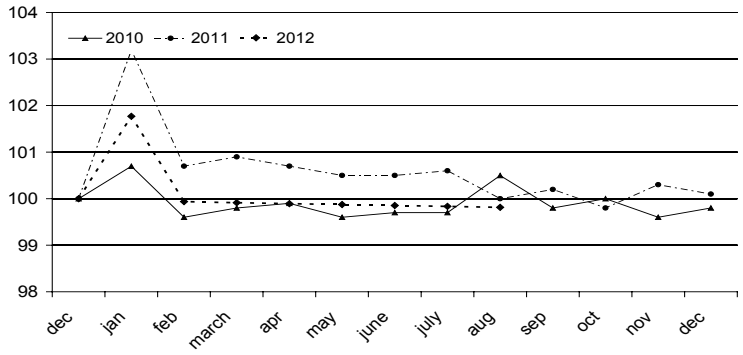

Fig. 32. Index of tariffs on pipeline transportation (for each year as % of the previous month)

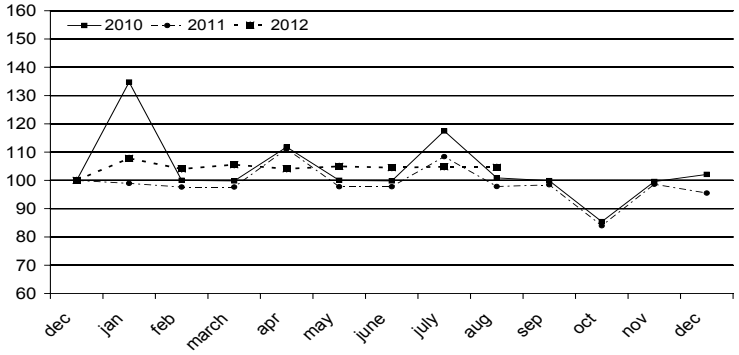

Fig. 33. Prices on Brent oil ($ a barrel)

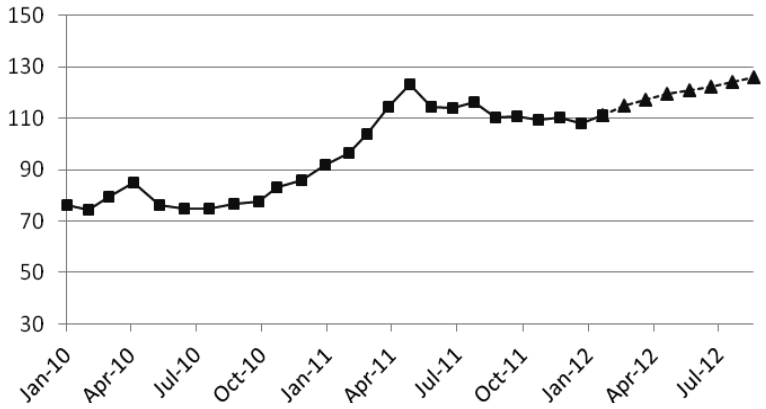

Fig. 34. Prices on aluminum ($ per ton)

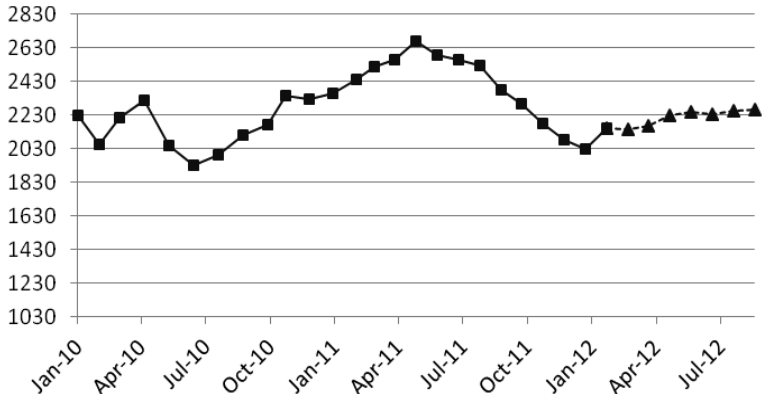

Fig. 35. Prices on gold ($ per ounce)

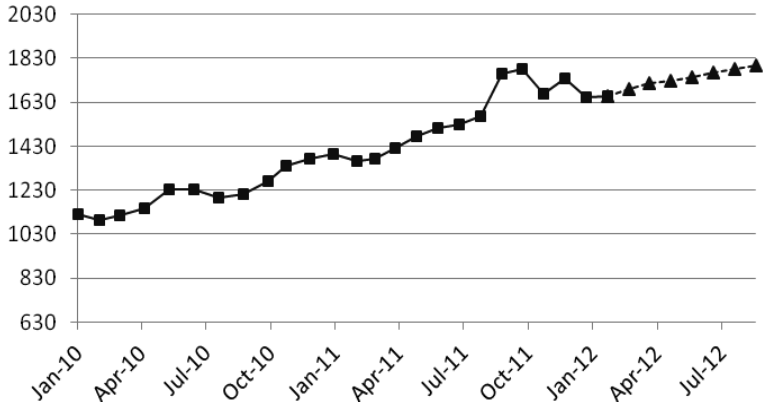

Fig. 36. Price on nickel ($ per ton)

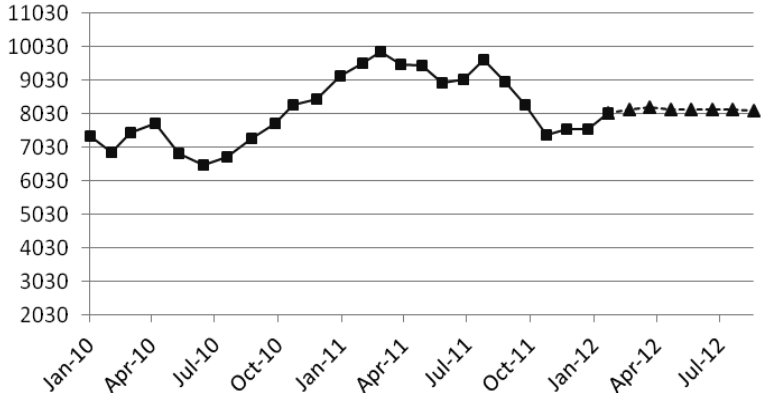

Fig. 37. Prices on copper ($ per ton)

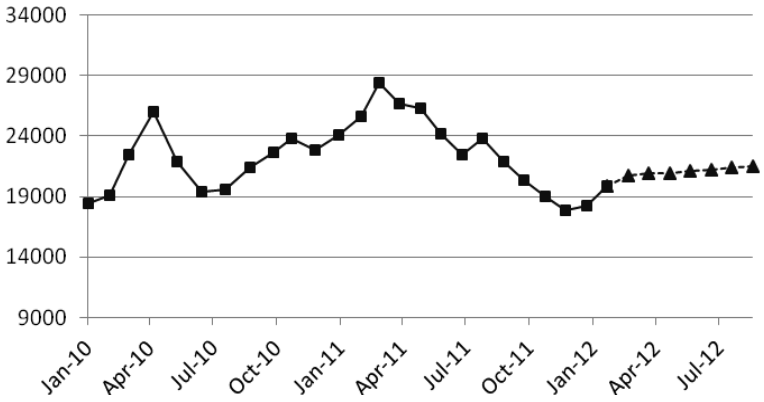

Fig. 38. Monetary base, million Rb

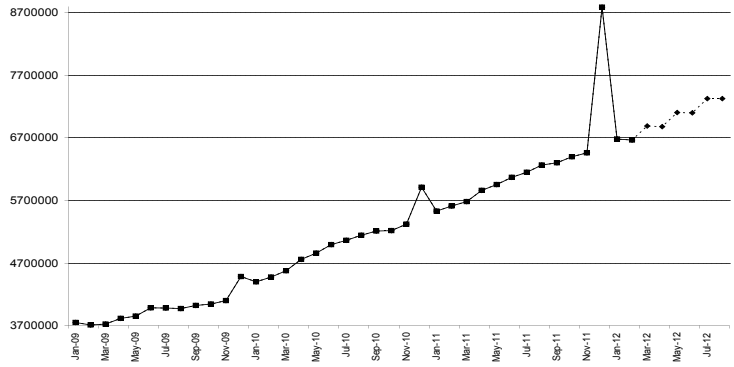

Fig. 39. M2, billion Rb

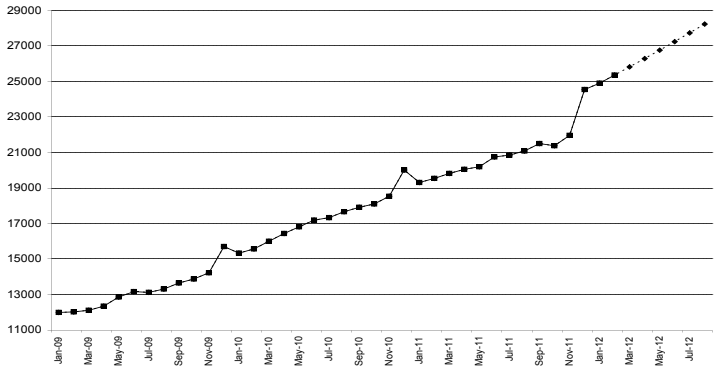

Fig. 40. Gold and foreign exchange reserves of the Russian Federation, million USD

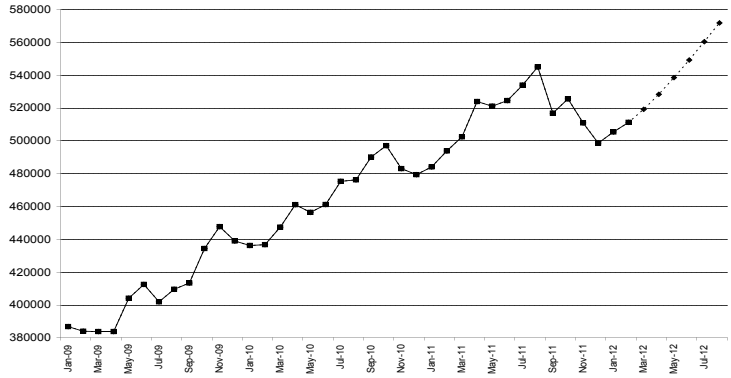

Fig. 41. The RUR/USD exchange rate

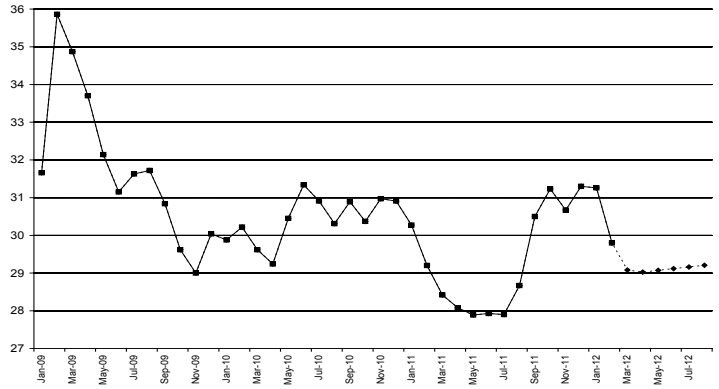

Fig. 42. The USD/EUR exchange rate

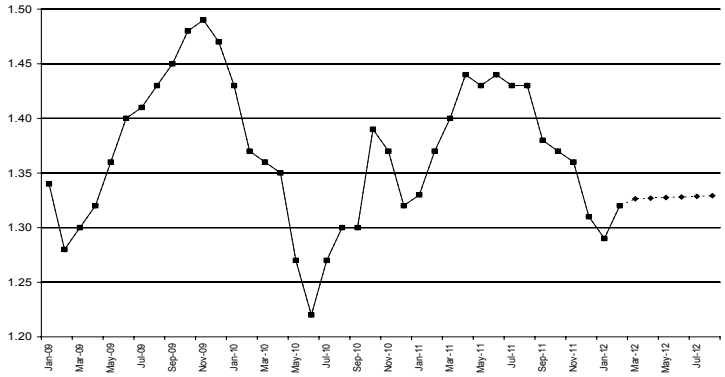

Fig. 43. Real disposable cash income (% of the respective period of the previous year)

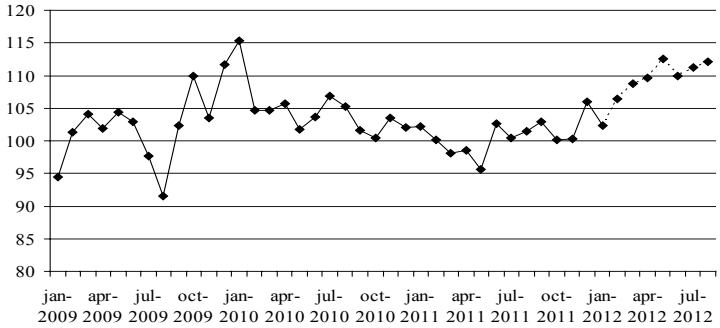

Fig. 44. Real cash income (% of the level of January 1999)

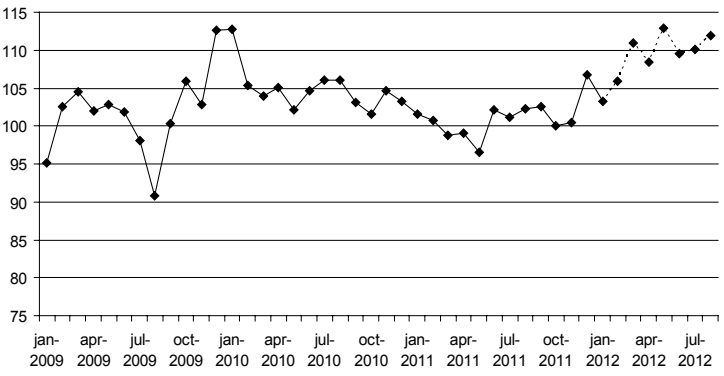

Fig. 45. Real accrued wages and salaries (% of the respective period of the previous year)

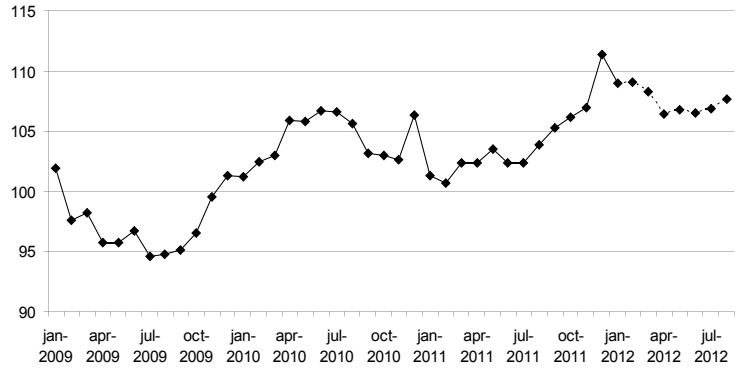

Fig. 46. Employment (million people)

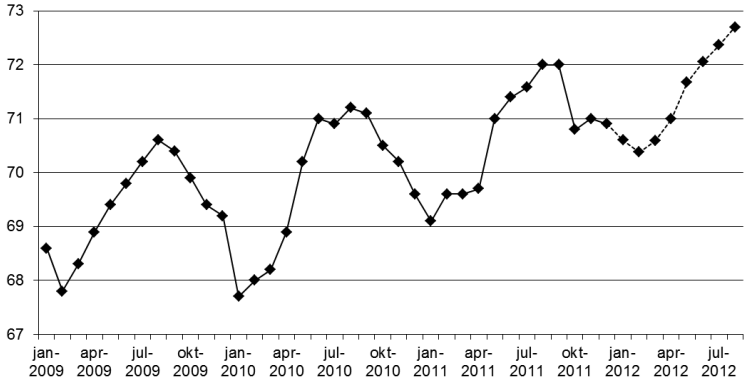

Fig. 47. Unemployment (million people)