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9'2016

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

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INTRODUCTION TO ALL THE ISSUES

This paper presents calculations of various economic indicators for the Russian Federation in the period from October 2016 to March 2017, which were performed using time series models developed as a result of research conducted by the Gaidar Institute over the past few years[1]. A method of forecasting falls within the group of *formal* or *statistical* methods. In other words, the calculated values neither express the *opinion* nor *expert evaluation* of the researcher, rather they are calculations of future values for a specific economic indicator, which were performed using formal ARIMA models (*p*, *d*, *q*) given a prevailing trend and its, in some cases, significant changes. The presented forecasts are of inertial nature, because respective models rely upon the dynamics of the data registered prior to the moment of forecasting and depend too heavily on the trends, which are typical of the time series in the period immediately preceding the time horizon to be forecast. The foregoing calculations of future values of economic indicators for the Russian Federation can be used in making decisions on economic policy, provided that the general trends, which were seen prior to forecasting for each specific indicator, remain the same, i.e. prevailing long-term trends will see no serious shocks or changes in the future.

Despite that there is a great deal of data available on the period preceding the crisis of 1998, models of forecasting were analyzed and constructed using only the time horizon which followed August 1998. This can be explained by the findings of previous studies[2] which concluded, among other key inferences, that the quality of forecasts was deteriorated in most of the cases when the data on the pre-crisis period was used. Additionally, it currently seems incorrect to use even shorter series (following the crisis of 2008), because statistical characteristics of models based on such a short time horizon are very poor.

Models for the economic indicators in question were evaluated using standard methods of time series analysis. Initially, the correlograms of the studied series and their first differences were analyzed in order to determine the maximum number of delayed values to be included into the specifications of a model. Then, the results of analyzed correlograms served as the basis for testing all the series for weak stationarity (or stationarity around the trend) using the Dickey–Fuller test. In some cases, the series were tested for stationarity around the segmented trend using Perron and Zivot–Andrews tests for endogenous structural changes[3].

The series were broken down into weak stationary, stationary near the trend, stationary near the trend with structural change or difference stationary, and then models, which corresponded to each type (regarding the levels and including, if necessary, the trend or segmented trend or differences), were evaluated. The Akaike and Schwartz information criteria, the properties of models' residuals (lack of autocorrelation, homoscedasticity and normality) and the quality of the in-sample-forecasts based on these models were used to choose the best model. Forecast values were calculated for the best of the models constructed for each economic indicator.

Additionally, the Bulletin presents future monthly values of the CPI, which were calculated using models developed at the Gaidar Institute, and volumes of imports/exports from/to all countries, which were calculated using structural models (SM). The forecast values based on the structural models may, in some cases, produce better results than ARIMA-models do, because structural

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1 See, for example, R.M. Entov, S.M. Drobyshevsky, V.P. Nosko, A.D. Yudin. *The Econometric Analysis of the Time Series of the Main Macroeconomic Indices.* Moscow, IET, 2001; R.M. Entov, V.P. Nosko, A.D. Yudin, P.A. Kadochnikov, S.S. Ponomarenko. *Problems of Forecasting of Some Macroeconomic Indices.* Moscow, 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.* Moscow, 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.* Moscow, 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.

models are constructed by adding information of the dynamics of exogenous variables. Besides, the use of structural forecasts in making aggregated forecasts (i.e. forecasts obtained as average value from several models) may help make forecast values more accurate.

The dynamics of the Consumer Price Index was modeled using theoretical assumptions arising from the monetary theory. The following was used as explanatory variables: money supply, output volume, the dynamics of the ruble-dollar exchange rate, which reflects the dynamics of alternative cost of money-keeping. The model for the Consumer Price Index also included the price index in the electric power industry, because the dynamics of manufacturers' costs relies heavily on this indicator.

The baseline indicator to be noted is the real exchange rate, which can influence the value of exports and imports, and its fluctuations can result in changes to the relative value of domestically-produced and imported goods, though the influence of this indicator turns out to be insignificant in econometric models. Global prices of exported resources, particularly crude oil prices, are most significant factors, which determine the dynamics of exports: a higher price leads to greater exports of goods. The level of personal income in the economy (labor costs) was used to describe the relative competitive power of Russian goods. Fictitious variables D12 and D01 – equal to one in December and January and zero in other periods – were added so that seasonal fluctuations were factored in. The dynamics of imports is effected by personal and corporate incomes whose increase triggers higher demand for all goods including imported ones. The real disposable cash income reflects the personal income; the Industrial Production Index reflects the corporate income.

The forecast values of foreign exchange rates were also calculated using structural models of their dependence on global crude oil prices.

The forecast values of explanatory variables, which are required for forecasting on the basis of structural models, were calculated using ARIMA-models (p, d, q).

The paper also presents calculations of the values of the Industrial Production Index, the Producer Price Index and the Total Unemployment Index, which were calculated using the results of business surveys conducted by the Gaidar Institute. Empirical studies show[1] that the use of series of business surveys as explanatory variables[2] in forecasting models can make forecasting more accurate on the average. Future values of these indicators were calculated using ADL-models (seasonal autoregressive delays were added).

The Consumer Price Index and the Producer Price Index are also forecast using large datasets (factor models – FM). The construction of factor models relies basically on the evaluation of the principal components of a large dataset of socio-economic indicators (112 indicators in this case). The lags of these principal components and the lags of the explanatory variable are used as explanatory variables in these models. A quality analysis of the forecasts obtained for different configurations of the factor models was used to chose a model for the CPI, which included 9th, 12th and 13th lags of the four principal components, as well as 1st and 12th lags of the variable itself, and a model for the PPI, which included 8th, 9th and 12th lags of the four principal components, as well as 1st, 3rd and 12th lags of the variable itself.

All calculations were performed using the Eviews econometric package.

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

2   Used as explanatory variables were the following series of the business surveys: 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

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

| | Index of industrial production | | | | IIP for mining | | IIP for manufacturing | | IIP for utilities (electricity, water, and gas) | | IIP for food products | | IIP for coke and petroleum | | IIP for primary metals and fabricated metal products | | IIP for machinery | |
| | Rosstat | | NRU HSE | | | | | | | | | | | | | | | |
	ARIMA	BS	ARIMA	BS	Rosstat	NRU HSE	Rosstat	NRU HSE	Rosstat	NRU HSE	Rosstat	NRU HSE	Rosstat	NRU HSE	Rosstat	NRU HSE	Rosstat	NRU HSE
Expected growth on the respective month of the previous year																		
Oct 16	-0.4	-0.1	0.7	0.3	-2.2	1.5	-0.9	1.0	0.7	0.0	0.9	2.0	-0.7	2.0	-4.7	-1.9	-5.3	-5.5
Nov 16	0.1	1.8	2.0	1.9	-0.4	2.2	-0.3	1.2	1.2	-0.1	1.9	2.2	-3.5	-0.5	-0.8	0.4	1.3	-3.5
Dec 16	-0.7	0.1	2.6	0.3	0.1	2.4	0.6	1.3	4.3	6.0	1.4	3.3	-4.6	-3.0	3.4	1.2	-5.3	1.8
Jan 17	2.1	2.1	0.8	2.2	1.2	1.5	0.3	0.0	-2.4	-1.7	3.3	3.3	-1.7	0.5	4.8	6.1	12.6	12.7
Feb 17	0.9	0.5	0.2	0.5	-1.1	-2.0	0.2	-1.9	1.0	7.1	3.0	1.7	1.5	-1.3	3.2	2.4	17.9	14.2
Mar 17	0.8	2.0	-0.5	2.2	-0.1	-0.8	1.8	-0.2	2.6	5.2	2.6	2.1	-1.2	0.5	4.2	3.8	11.5	-2.6
For reference: actual growth in 2015/2016 on the respective month of 2014/2015																		
Oct 15	-3.6		-2.4		1.4	2.4	-5.9	-5.0	-3.6	-3.1	1.5	0.6	-5.1	-5.8	-6.9	-4.0	-5.9	-7.3
Nov 15	-3.5		-1.7		-0.1	1.7	-5.3	-3.3	-3.5	-2.7	2.4	1.3	-1.8	-3.8	-6.5	-4.0	-5.8	9.5
Dec 15	-4.5		-2.9		0.1	1.3	-6.1	-4.2	-6.3	-6.4	3.1	1.0	1.9	-0.6	-13.3	-6.5	-10.9	-11.7
Jan 16	-2.7		-1.1		0.4	0.8	-5.6	-4.5	2.5	4.6	2.0	3.0	-3.2	-6.8	-6.5	-7.4	2.2	-10.3
Feb 16	1.0		1.9		5.8	6.4	-1.0	-0.1	0.0	-0.9	4.5	4.9	-1.9	-4.1	-1.4	0.3	1.0	-9.5
Mar 16	-0.5		1.3		4.2	4.9	-2.8	-0.4	-0.8	-0.6	2.5	3.6	-9.3	-3.4	0.3	-2.7	13.1	4.0

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

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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 making forecast for 3Q of 2016 – 1Q of 2017, the series of monthly data of the indices of industrial production released by the Federal State Statistics Service (Rosstat) from January 2002 to July 2016, as well as the series of the base indices of industrial production released by the National Research University Higher School of Economics (NRU HSE[1]) over the period from January 1999 to August 2016 were used (the value of January 2000 was equal to 100%). The forecast values of the series were calculated on the basis of ARIMA-class models. The forecast values of the Rosstat and the NRU HSE indices of industrial production are calculated using business surveys (BS) as well. The obtained results are shown in Table 1.

As seen from *Table 1*, the average[2] growth of the index of industrial production computed by the NRU HSE in October 2016 – March 2017 against the same period of the previous year amounts to 1.1% on industry as a whole. For the index of industrial production computed by Rosstat, this indicator constitutes 0.8%. As of end-2016, the forecast annual increment of the index of industrial production computed by Rosstat will amount to 0.3%, and the index of industrial production computed by the NRU HSE – 1.5%. The average monthly values of the index of industrial production for mining computed by Rosstat and the NRU HSE in October 2016 – March 2017 will come to (-0.4%) and 0.8%, respectively. In production of coke and petroleum products growth is forecast at (-1.7%) and (-0.3%) for Rosstat and the NRU HSE indices, respectively.

In October 2016 – March 2017 in comparison with the same period of last year, the average growth of the NRU HSE index of industrial production in manufacturing comes to 0.2% and the Rosstat index at 0.3%. The average monthly values of the Rosstat and the NRU HSE index for industrial production of food products constitute 2.2% and 2.4%, respectively. The average monthly values of the index of industrial production for primary metals and fabricated metal products in October 2016 – March 2017 computed by Rosstat and the NRU HSE constitute 1.7% and 2.0%, respectively. In manufacture of machinery and equipment, the average increase is forecast at 5.5% and 2.8% for the Rosstat and the NRU HSE indices, respectively.

The average growth of the index of industrial production for utilities (electricity, gas and water) computed by Rosstat for October 2016 – March 2017 in comparison with the same period of the previous year constitutes 1.2%; the same indicator for the NRU HSE index comes to 2.8%.

The Rosstat indices of industrial production across various types of economic activity in 2016 on average will remain on hold, the NRU HSE indices of industrial production will grow by 1.8%.

Retail Sales

This section (Table 2) presents forecasts of monthly retail sales made on the basis of monthly Rosstat data over January 1999 – August 2016.

Table 2

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

Forecast value according to ARIMA-model		
	Retail sales, billion RUR (in brackets – growth on the respective month of the previous year, %)	Real retail sales (as % of the respective period of the previous year)
Oct 16	2,472.9 (3.6)	96.2
Nov 16	3,120.9 (7.7)	97.0
Dec 16	2,136.7 (0.5)	96.1
Jan 17	2,104.2 (0.3)	95.5
Feb 17	2,299.6 (3.6)	95.9
Mar 17	2,462.8 (3.3)	95.6
For reference: actual values in the same months of 2015/2016		
Oct 15	2,385.2	88.7
Nov 15	2,387.3	87.8
Dec 15	2,898.1	85.9
Jan 16	2,126.2	93.6
Feb 16	2,098.6	95.3
Mar 16	2,220.3	93.8

Note. The series of retail sales and real retail sales over January 1999 – August 2016.

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

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

Table 3

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

Month	Export to all countries Forecast values (billion USD a month)		Export to all countries Percentage of actual data in the respective month of the previous year		Import from all countries Forecast values (billion USD a month)		Import from all countries Percentage of actual data in the respective month of the previous year		Export to countries outside the CIS Forecast values (billion USD a month)		Export to countries outside the CIS Percentage of actual data in the respective month of the previous year		Import from countries outside the CIS Forecast values (billion USD a month)		Import from countries outside the CIS 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
Oct 16	22.7	26.0	84	96	17.1	18.6	101	110	21.3	22.0	94	97	13.9	13.4	92	89
Nov 16	22.2	26.8	87	106	15.9	16.1	97	98	19.9	21.5	93	100	14.8	14.8	101	101
Dec 16	23.9	24.8	83	86	18.8	18.5	108	106	23.3	22.4	95	91	16.3	17.7	104	113
Jan 17	19.5	18.5	114	108	10.3	10.5	105	107	15.4	16.5	104	111	8.1	7.5	92	85
Feb 17	22.1	20.3	110	101	12.9	14.1	100	109	18.7	19.4	108	112	13.4	11.5	115	99
Mar 17	23.0	24.9	99	107	14.6	15.7	95	102	19.6	18.0	98	90	12.2	14.0	89	102
For reference: actual values in respective months of 2015/2016 (billion USD)																
Oct 15	27.0				16.9				22.7				24.0			
Nov 15	25.4				16.5				21.5				20.5			
Dec 15	28.7				17.4				24.5				22.1			
Jan 16	17.1				9.8				14.8				10.7			
Feb 16	20.1				12.9				17.3				13.9			
Mar 16	23.3				15.3				20.0				15.3			

Note. Over the period from January 1999 to August 2016, the series of 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.

As seen from *Table 2*, the average forecast growth of nominal volumes of monthly trade turnover amounts to around 3.1% for October 2016 – March 2017 against the corresponding period of 2015–2016.

The average forecast decrease of the monthly real trade turnover for the period from October 2016 – March 2017 against the same period of 2015–2016 constitutes 4.0%.

At an annual rate, forecast growth of the nominal index of retail trade turnover in 2016 will come to 5.0%, and in real terms will decrease by 5.1%.

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 over the period from September 1998 to August 2016 on the basis of the data released by the Central Bank of Russia[1]. The results of calculations are shown in Table 3.

The average forecast decrease of exports, exports outside the CIS and imports from the countries outside the CIS for October 2016 – March 2017 against the same period of 2015–2016 will amount to 2.9%, 1.5%, and 1.0%, respectively. Import indicator from all countries will be growing at an average rate of 3.0%. The average forecast surplus volume of the trade balance with all countries for 2016 will constitute $84.2bn, which corresponds to a decrease by 43.3% on the same period of 2015.

DYNAMICS OF PRICES

The Consumer Price Index and Producer Price Index

This section presents calculations of forecast values of the consumer price index and producer price index (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 data released by Rosstat over the period from January 1999 to July 2016[2]. Table 4 presents the results of model calculations of forecast values over October 2016 and March 2017 in accordance with ARIMA models, structural models (SM) and models computed with the help of business surveys (BS).

The forecast average monthly growth of the consumer price index in October 2016 – March 2017 will come to 0.7%. The price growth of industrial goods for this period is forecast at an average monthly rate of 0.4%. Annual growth of the consumer price index on average across three models will come to 6.1%. The same indicator for the producer price index is forecast at 6.1%.

For the producer price indices computed by Rosstat from October 2016 – March 2017 the following average monthly growth rates are forecast: for mining and quarrying (-1.9%), manufacturing 0.7%, utilities (electricity, water, and gas) 0.9%, food products 0.8%, textile and sewing industry 0.5%, wood products 0.5%, pulp and paper industry 0.5%, coke and refined petroleum 1.1%, for chemical industry 0.1%, for basic metals and fabricated metal 0.3%, for machinery and equipment 1.0%, and for transport equipment and manufacturing 0.6%.

Annual growth of the producer price indices across types of economic activity will average 7.4%. By end-2016, maximum annual growth is forecast in the production of basic metals and fabricated metal (17.1%), and the minimum – in chemical production (-2.4%).

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1 The data on the foreign trade turnover is calculated by the CBR in accordance with the methods for making of the balance of payment in prices of the exporter-country (FOB) in billion USD.
2 Structural models were evaluated in the period from October 1998.

Table 4

CALCULATIONS OF FORECAST VALUES OF PRICE INDICES

	The consumer price index (ARIMA)	The consumer price index (SM)	The consumer price index (FM)	Producer price indices:														
				for industrial goods (ARIMA)	for industrial goods (BS)	for industrial goods (FM)	for mining and quarrying	for manufacturing	for utilities (electricity, water, and gas)	for food products	for textile and sewing industry	for wood products	for pulp and paper industry	for coke and refined petroleum	for chemical industry	for basic metals and fabricated metal	for machinery and equipment	for transport equipment manufacturing
Forecast values (% of the previous month)																		
Oct 16	100.6	100.7	100.5	100.7	101.0	100.4	102.0	101.1	101.5	100.6	100.4	100.0	100.2	101.4	99.9	100.8	100.5	101.2
Nov 16	100.5	100.5	100.7	99.3	99.3	100.9	95.5	100.5	100.7	100.6	100.6	100.0	100.4	100.9	99.9	101.0	101.0	100.2
Dec 16	100.5	100.5	100.7	100.1	99.8	99.8	98.6	100.2	100.2	100.8	100.2	100.4	100.2	101.2	100.0	100.9	101.0	100.8
Jan 17	101.3	100.7	101.8	99.9	99.7	100	98.7	101.0	100.4	100.7	100.7	100.7	101.5	101.1	100.1	99.8	101.3	100.5
Feb 17	100.6	100.5	100.8	100.2	100.1	101.5	91.9	100.6	102.5	101.2	100.6	101.0	100.4	100.7	100.2	99.1	101.6	100.0
Mar 17	100.6	100.4	100.8	101.4	100.6	101.8	102.2	100.5	100.4	101.2	100.6	100.7	100.2	101.0	100.3	100.2	100.7	100.6
Forecast values (% of December 2015/2016)																		
Oct 16	105.1	104.8	104.8	106.3	106.0	106.8	109.0	108.2	104.0	106.3	107.3	102.9	108.6	108.7	97.6	115.0	108.9	105.7
Nov 16	105.6	105.3	105.5	105.6	105.3	107.7	104.1	108.8	104.8	107.0	107.9	102.9	109.0	109.7	97.5	116.1	110.0	106.0
Dec 16	106.1	105.9	106.3	105.7	105.1	107.5	102.6	109.0	105.0	107.9	108.1	103.3	109.3	111.1	97.6	117.1	111.0	106.8
Jan 17	101.3	100.7	101.8	99.9	99.7	100.0	98.7	101.0	100.4	100.7	100.7	100.7	101.5	101.1	100.1	99.8	101.3	100.5
Feb 17	102.0	101.2	102.6	100.1	99.8	101.5	90.7	101.6	102.9	101.9	101.4	101.7	101.9	101.9	100.3	99.0	103.0	100.5
Mar 17	102.6	101.6	103.4	101.6	100.4	103.3	92.7	102.1	103.3	103.1	102.0	102.4	102.2	102.9	100.5	99.2	103.7	101.2
For reference: actual values in the same periods of 2015/2016 (% of December 2014/2015)																		
Oct 15		111.4			114.0		120.0	113.5	107.9	112.1	112.9	109.2	116.9	113.3	119.9	114.7	113.0	116.6
Nov 15		112.3			113.2		118.0	112.7	109.2	113.2	113.6	109.3	118.2	108.7	119.5	113.1	113.5	115.9
Dec 15		113.2			110.8		109.8	111.2	109.4	113.9	113.6	109.3	119.0	100.9	118.2	111.9	114.0	116.3
Jan 16		101.0			98.6		95.6	99.4	99.3	100.8	102.0	100.5	101.2	92.6	100.2	99.7	103.3	99.9
Feb 16		101.6			97.0		83.8	100.6	100.5	101.3	103.3	100.2	106.1	92.7	101.9	102.3	104.0	101.0
Mar 16		102.1			100.0		94.3	101.9	100.3	101.4	104.6	101.3	106.9	97.2	101.5	102.7	105.2	101.5

Note. Over the period from January 1999 to July 2016, the series of the chain producer price index for machinery are identified as a stationary process around the trend with two endogenous structural changes. The series of other chain price indices are stationary at levels.

The Cost of the Monthly per Capita Minimum Food Basket

This section presents calculations of forecast values of the cost of the monthly per capita minimum food basket over October 2016 and March 2017. The forecasts were made based on time series with use the Rosstat data over the period from January 2000 to August 2016. The results are shown in Table 5.

As can be seen from *Table 5*, cost growth of the minimum set of food products is forecast compared to the corresponding period of the previous year. Herewith, forecast cost of the minimum set of food products constitutes around RUR 3,678.0. The forecast cost growth of the minimum set of food products will average around 2.6% compared to the level of the corresponding period of the previous year. Annual growth of the cost of the minimum set of food products in 2016 will constitute 2.0%.

Indices of Freight Rates

This section presents calculations of forecast values of freight rate indices on cargo carriage[1], made on the basis of time-series models evaluated on the Rosstat data over the period from September 1998 to August 2016. Table 6 shows the results of model calculations of forecast values in October 2016 – March 2017. It should be noted that some of the indices under review (for instance, the pipeline rate index) 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 rates 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 results for October 2016 – March 2017, the composite freight rate index will decrease on average 0.1% per month. As a result, its annual growth in 2016 will come to 12.0%.

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1 The paper presents a review of the composite freight rate index on freight transport and the truckload freight rate index, as well as the pipeline rate index. The composite freight rate index is computed on the basis of the freight rate indices by individual types of transport: rail, pipeline, shipping, domestic water-borne, and truckload freight and air service (for more detailed information, pls. refer, for instance, to: Prices in Russia. The Official Publication of Goskomstat of RF, 1998).

Table 5

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

Forecast values according to ARIMA-model (RUR)	
Oct 16	3,654.0
Nov 16	3,646.4
Dec 16	3,660.9
Jan 17	3,690.0
Feb 17	3,703.1
Mar 17	3,733.3
For reference: actual values in the same months of 2015/2016 (billion RUR)	
Oct 15	3,516.5
Nov 15	3,547.2
Dec 15	3,589.9
Jan 16	3,627.1
Feb 16	3,649.8
Mar 16	3,655.3
Expected growth on the respective month of the previous year (%)	
Oct 16	3.9
Nov 16	2.8
Dec 16	2.0
Jan 17	1.7
Feb 17	1.5
Mar 17	2.1

Note. The series of the cost of the monthly per capita minimum food basket over the period from January 2000 to August 2016 are stationary in the first-order differences.

Table 6

CALCULATIONS OF FORECAST VALUES OF INDICES OF FREIGHT RATES

Period	The composite freight rate index	The index of truckload freight rate	The index of pipeline rate
Forecast values according to ARIMA-models (% of the previous month)			
Oct 16	100.1	100.1	99.7
Nov 16	100.1	100.0	101.1
Dec 16	100.1	100.0	100.7
Jan 17	100.1	101.7	100.8
Feb 17	100.1	100.0	100.7
Mar 17	100.0	99.9	100.7
Forecast values according to ARIMA-models (% of December of the previous year)			
Oct 16	111.8	101.4	111.1
Nov 16	111.9	101.4	110.7
Dec 16	112.0	101.4	111.9
Jan 17	100.1	101.7	100.8
Feb 17	100.1	101.7	101.5
Mar 17	100.2	101.6	102.2
For reference: actual values in the same period of 2015/2016 (% of the previous month)			
Oct 15	94.5	99.6	89.6
Nov 15	100.2	100.2	100.2
Dec 15	100.6	101.9	100.5
Jan 16	100.7	102.2	93.7
Feb 16	99.8	100.1	99.8
Mar 16	99.5	99.0	99.6

Note. Over the period from September 1998 to August 2016, the series of the freight rates index were identified as stationary ones; the other series were identified as stationary ones over the period from September 1998 to August 2016, too; fictitious variables for taking into account particularly dramatic fluctuations were used in respect of all the series.

The index of truckload freight rate will grow at a monthly average rate of 0.3% in the course of given six months. Its annual growth is forecast at 1.4% in 2016.

Pipeline transport index will be growing in the course of next six months at a monthly average rate of 0.6%. As a result, its annual growth will amount to 11.9% in 2016.

World Prices of Natural Resources

This section presents calculations of such average monthly values of Brent crude prices (US$ per barrel), the aluminum prices (US$ per ton), the gold prices ($ per ounce), the copper prices (US$ per ton) and the nickel prices (US$ per ton) over October 2016 and March 2017 as were received on the basis of nonlinear models of time series evaluated on the basis of the IMF data over the period from January 1980 to August 2016.

Table 7

CALCULATIONS OF FORECAST VALUES OF WORLD PRICES ON NATURAL RESOURCES

Month	Brent oil ($ per barrel)	Aluminum ($ per ton)	Gold ($ per ounce)	Copper ($ per ton)	Nickel ($ per ton)
Forecast values					
Oct 16	45.48	1,666	1,354	4,745	10,555
Nov 16	47.01	1,663	1,376	4,749	10,671
Dec 16	53.16	1,658	1,391	4,755	10,717
Jan 17	49.68	1,658	1,402	4,771	10,888
Feb 17	45.10	1,653	1,409	4,791	10,901
Mar 17	46.38	1,647	1,424	4,815	10,935
Expected growth on the respective month of the previous year (%)					
Oct 15	-5.5	9.8	16.8	-9.0	2.3
Nov 15	5.8	13.3	26.7	-1.1	15.4
Dec 15	40.9	10.7	30.2	2.5	23.1
Jan 16	61.3	11.9	27.7	6.7	28.0
Feb 16	35.9	7.9	17.4	4.2	31.4
Mar 16	18.7	7.6	14.3	-2.8	25.4
For reference: actual values in the same period of 2015/2016					
Oct 15	48.12	1,516	1,159	5,216	10,317
Nov 15	44.42	1,468	1,086	4,800	9,244
Dec 15	37.72	1,497	1,068	4,639	8,708
Jan 16	30.8	1,481	1,097	4,472	8,507
Feb 16	33.2	1,531	1,200	4,599	8,299
Mar 16	39.07	1,531	1,246	4,954	8,717

Note. Over the period from January 1980 to August 2016, the series of prices of crude oil, nickel, gold, copper and aluminum are series of DS type.

The average forecast of crude oil price amounts to around $47.8 per barrel, which is above its corresponding year-earlier indices on average by 26.2%. Aluminum prices are forecast at around $1,657.0 per ton and their average forecast growth constitutes around 10.0% compared to the same level last year. Forecast for gold prices constitute around $1,392.0 per ounce. Forecast average copper prices constitute around $4,771 per ton and of nickel prices – around $10,777 per ton. Average forecast price growth on gold constitutes around 22%, average reduction of copper prices – about 0.1%, average reduction of nickel prices – 21% compared to the corresponding level of last year.

By end-2016, forecast growth of prices on crude oil, aluminum, gold, copper and nickel against end-2015 according to the forecast will come to 40.9%, 10.7%, 30.2%, 2.5%, and 23.1% respectively.

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 over the period from October 2016 to

March 2017 were received on the basis of models of time-series of respective indices calculated by the CBR[1] over the period from October 1998 to September (August – for M2 time series) 2016. Table 8 presents the results of calculations of forecast values and actual values of those indices in the same period of previous year. It is to be noted that due to the fact that the monetary base is an instrument of the CBR policy, forecasts of the monetary base on the basis of time-series models are to a certain extent notional as the future value of that index is determined to a great extent by decisions of the CBR, rather than the inherent specifics of the series.

In October 2016 – March 2017, the monetary base will be growing at an average monthly rate of 0.8%, and the monetary indicator M2 – at an average monthly rate of 0.9%. In 2016, annual growth of the indicator M2 is forecast at the level of 12.5%, and the monetary base – 8.6%.

INTERNATIONAL RESERVES

This section presents the outputs of the statistical estimation of such future values of the international reserves of the Russian Federation[2] 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 released by the CBR over the period from October 1998 to September 2016. That index is forecast without taking into account a decrease in the amount of reserves due to foreign debt payment 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.

Subsequent to the forecast results in October 2016 – March 2017, the international reserves will be growing by an average monthly rate of 0.4%. As a result, annual growth of the international reserves in 2016 will come to 9.7%.

Table 8

THE FORECAST OF M_2 AND THE MONETARY BASE

Period	The Monetary base		M_2	
	Billion RUR	Growth on the previous month, %	Billion RUR	Growth on the previous month, %
Oct 16	8,506	-0.1	36,988	0.5
Nov 16	8,669	1.9	37,154	0.4
Dec 16	8,629	-0.5	37,477	0.9
Jan 17	9,134	5.8	38,549	2.9
Feb 17	8,755	-4.1	38,714	0.4
Mar 17	8,921	1.9	38,879	0.4
For reference: actual value in the respective months of 2015/2016 (growth on the previous month, %)				
Oct 15	-1.6		-0.2	
Nov 15	0.2		-0.3	
Dec 15	-0.1		1.4	
Jan 16	10.1		7.5	
Feb 16	-6.3		-2.7	
Mar 16	1.0		0.8	

Note. Over the period from October 1998 to September (August) 2016, 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.

Table 9

THE FORECAST OF THE INTERNATIONAL RESERVES OF THE RUSSIAN FEDERATION

Period	Forecast values according to ARIMA–model	
	Billion USD	Growth on the previous month, %
Oct 16	397.9	0.7
Nov 16	398.9	0.2
Dec 16	400.1	0.3
Jan 17	402.0	0.5
Feb 17	403.9	0.5
Mar 17	405.6	0.4
For reference: actual values in the same period of 2015/2016		
Oct 15	371.3	1.3
Nov 15	369.6	-0.4
Dec 15	364.7	-1.3
Jan 16	368.4	1.0
Feb 16	371.6	0.9
Mar 16	380.5	2.4

Note. Over the period from October 1998 to September 2016, the series of the gold and foreign exchange reserves of the Russian Federation were identified as stationary series in difference.

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1 The data on the specific month is given in accordance with the methods of the CBR as of the beginning of the following month.
2 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 prospective values of the foreign exchange rates (RUR per USD and USD per euro) were made on the basis of assessment of the time series models (ARIMA) and structural models (SM) of the relevant indicators released by the Central Bank of Russia as of the last date of each month over the periods from October 1998 to September 2016 and from January 1999 to September 2016[1], respectively.

USD/RUR average exchange rate in the intervening period is forecast on average along two models in the amount of RUR 62.20 for USD. Forecast by end-2016 average (along two models) indicator will total Rb 62.18 for USD.

Euro/USD average exchange rate is forecast at USD 1.13 per 1 euro. By end-2016, the indicator is forecast at USD 1.14 per 1 euro along two models.

THE LIVING STANDARD INDICES

This section (Table 12) presents calculations of forecast values of indices of real wages, real disposable income and real income[2] as were received on the basis of the model of time series of respective indices computed by Rosstat and taken over the period from January 1999 to August 2016. The above indices depend to a certain extent on the centralized decisions on raising of wages and salaries to public sector workers, as well as those on raising of pensions, scholarships and allowances; such a situation introduces some changes in the dynamics of the indices under review. As a result, the future values of the indices of real wages and real disposable income calculated on the basis of the series which last observations are either considerably higher or lower than the previous ones due to such a raising may differ greatly from those which are implemented in reality.

According to the results presented in *Table 11*, the expected average monthly fall of the real disposable cash income will constitute 3.4% per month

Table 10

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

Period	The USD/RUR exchange rate (RUR per USD)		The EUR/USD exchange rate (USD per EUR)	
	ARIMA	SM	ARIMA	SM
Oct 16	62.08	61.92	1.12	1.13
Nov 16	61.88	61.64	1.12	1.13
Dec 16	62.18	61.18	1.12	1.15
Jan 17	62.41	61.90	1.12	1.14
Feb 17	62.65	62.81	1.12	1.13
Mar 17	62.89	62.91	1.12	1.13
For reference: actual values in the similar period of 2015/2016				
Oct 15	64.37		1.10	
Nov 15	66.24		1.05	
Dec 15	72.88		1.09	
Jan 16	75.17		1.09	
Feb 16	75.09		1.09	
Mar 16	67.61		1.14	

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

Table 11

THE FORECAST OF THE LIVING STANDARD INDICES

Period	Real disposable cash income	Real cash income	Real accrued wages
Forecast values according to ARIMA-models (% of the respective month of 2015/2016)			
Oct 16	95.1	95.3	99.2
Nov 16	96.7	97.1	100.8
Dec 16	95.4	95.5	100.2
Jan 17	98.3	98.1	99.6
Feb 17	97.2	97.6	96.6
Mar 17	96.7	97.3	98.2
For reference: actual values in the respective period of 2015/2016 (% of the same period of 2014/2015)			
Oct 15	93.2	93.2	89.5
Nov 15	93.7	93.5	89.6
Dec 15	99.1	98.5	91.6
Jan 16	94.2	95.0	96.4
Feb 16	95.7	95.3	100.6
Mar 16	98.7	98.0	101.5

Note. For calculating purposes, the series of the real disposable cash income, real cash income and real accrued wages in the base form were used (January 1999 was adopted as a base period). Over the period from January 1999 to July 2016 those series were attributed to the class of processes which are stationary in differences and have an explicit seasonal component.

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1 The authors use the IMF data over the period from January 1999 to August 2016. The data over the period from August and September 2016 was obtained from the foreign exchange rate statistics website: www.oanda.com

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

compared to the same period of last year; the real cash income – 3.2%, and the real accrued wages – 0.9% in comparison with the same period of the previous year.

By end-2016, forecast decrease of the real disposable cash income will amount to 5.3%; the real cash income – by 4.9%, and the level of the real wages – 0.2%.

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 the time series evaluated over the period from October 1998 to July 2016 on the basis of the monthly data released by Rosstat[1] were used. The unemployment was calculated on the basis of the models with results of the findings from business surveys,[2] too.

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

Table 12

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

Month	Employment (ARIMA)		Unemployment (ARIMA)			Unemployment (BS)		
	Million people	Growth on the respect-ive month of previous year (%)	Million people	Growth on the respective month of pre-vious year (%)	% of the index of the number of the gainfully employed popu-lation	Million people	Growth on the respect-ive month of previous year (%)	% of the index of the number of the gainfully employed population
Oct 16	72.8	0.5	4.2	-2.1	5.8	4.1	-3.9	5.6
Nov 16	72.6	0.6	4.3	-2.7	5.9	4.2	-3.7	5.8
Dec 16	72.4	0.1	4.4	-0.5	6.0	4.3	-1.9	5.9
Jan 17	72.0	0.9	4.5	3.3	6.3	4.3	-1.9	6.0
Feb 17	72.0	0.7	4.6	4.8	6.4	4.4	-0.6	6.1
Mar 17	72.2	0.8	4.5	-1.3	6.3	4.4	-4.3	6.1
For reference: actual values in the same periods of 2015/2016 (million people)								
Oct 15	72.5		4.3					
Nov 15	72.2		4.4					
Dec 15	72.3		4.4					
Jan 16	71.3		4.4					
Feb 16	71.5		4.4					
Mar 16	71.6		4.6					

Note. Over the period from October 1998 to July 2016, the series of employment is a stochastic process which is stationary around the trend. The series of unemployment is a stochastic process with the first order integration. Both indices include seasonal component.

According to ARIMA-model forecast (*Table 12*), in October 2016 – March 2017, growth of the number of employed in the economy on average will constitute 0.6% per month against the corresponding period of the previous year. Forecast by end-2016 indicator of the number of employed in the economy constitutes 72.4 mn persons.

The average fall of the total number of jobless is forecast at 1.2% per month against the corresponding period last year. Average number of jobless by end-2016 is forecast at 4.4 mn persons.

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1   The index is computed in accordance with the methods of the International Labor Organization (ILO) and is given as of the month-end.
2   The model is evaluated over the period from January 1999 to July 2016.
3   For example, deemed as such a difference may be a simultaneous decrease both in the employment and the unemployment. However, it is to be noted that in principle such a situation is possible provided that there is a simultaneous decrease in the number of the economically active population.

ANNEX

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

Fig. 1a. The Rosstat industrial production index (ARIMA-model)
(% of December 2001)
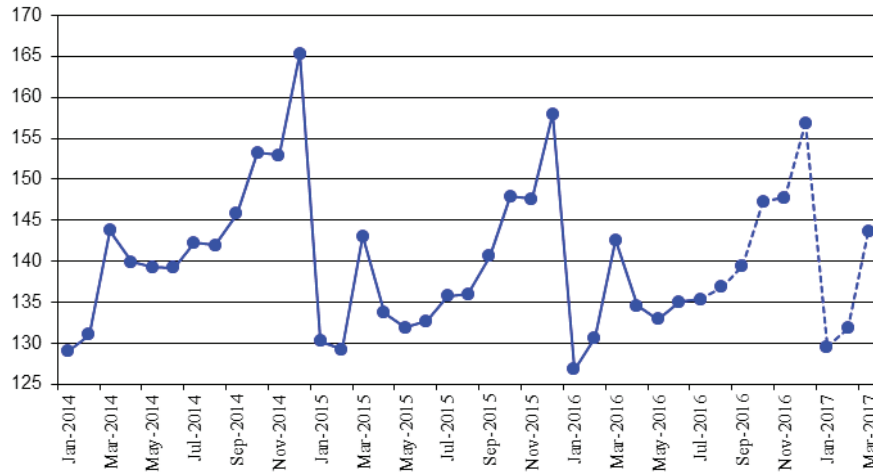
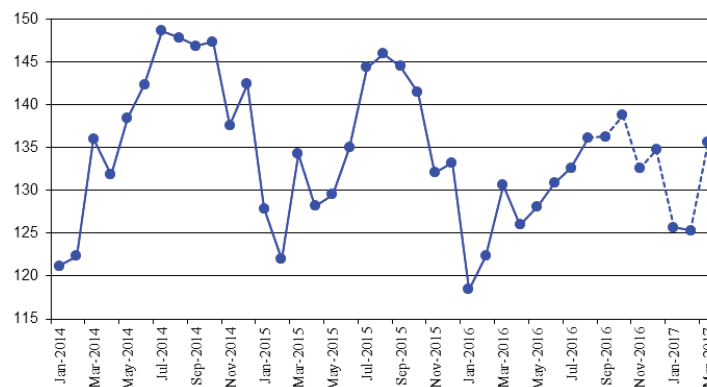*Fig. 1b. The NRU HSE industrial production index (ARIMA-model)*
(% of January 2005)
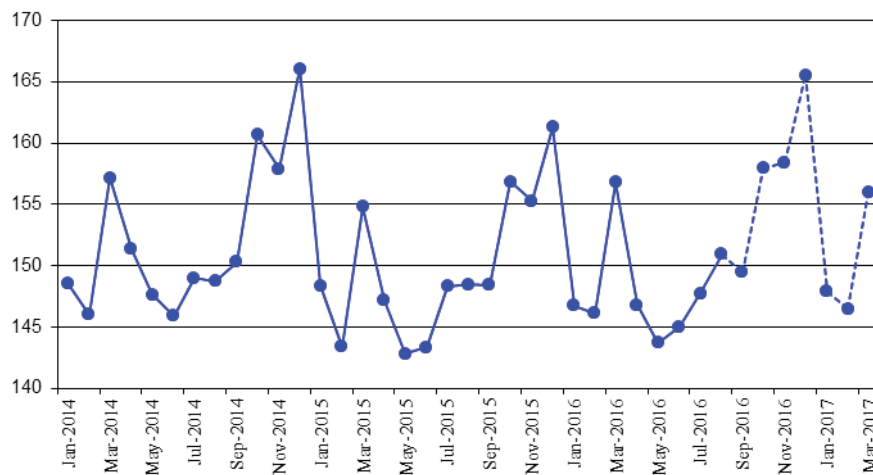
Fig. 2a. The Rosstat industrial production index for mining
(% of December 2001)
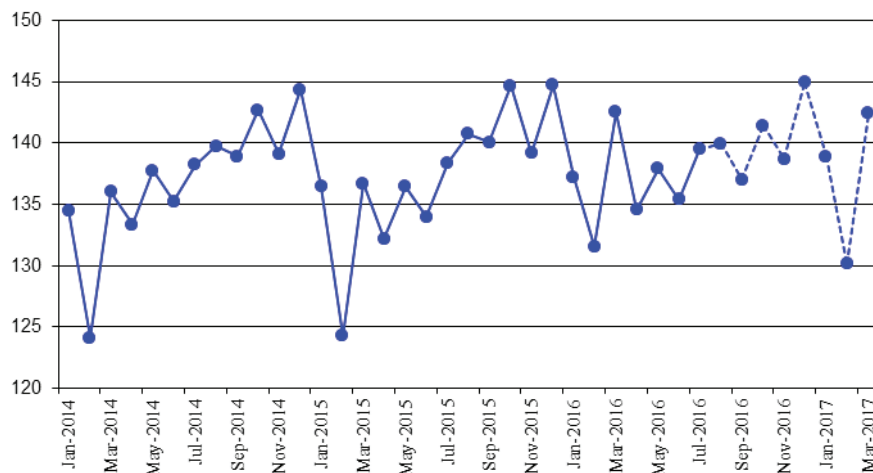
*Fig. 2b. The NRU HSE industrial production index for mining
(% of January 2005)*
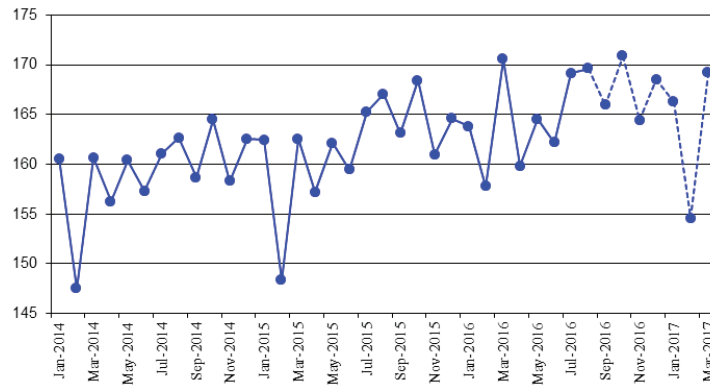
*Fig. 3a. The Rosstat industrial production index for manufacturing
(% of December 2001)*
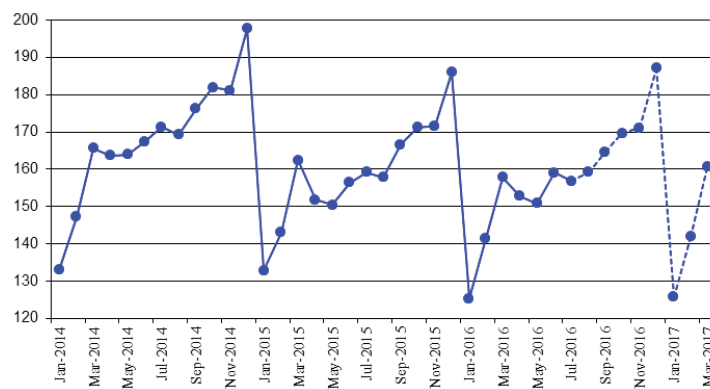
*Fig. 3b. The NRU HSE industrial production index for manufacturing
(% of January 2005)*
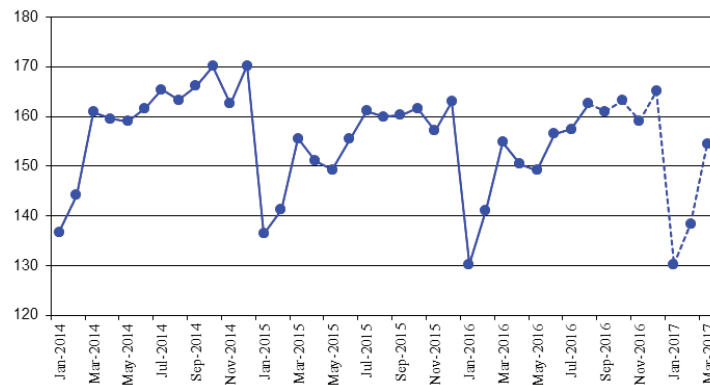
*Fig. 4a. The Rosstat industrial production index for utilities (electricity, water, and gas)
(as a percentage of that in December 2001)*
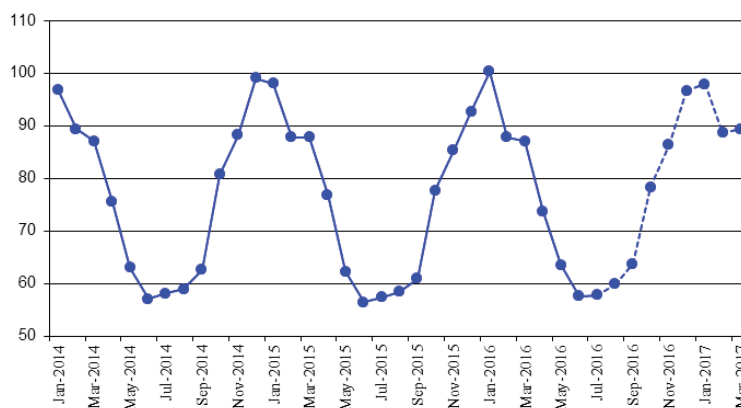
*Fig. 4b. The NRU HSE industrial production index for utilities (electricity, water, and gas)
(as a percentage of that in January 2005)*
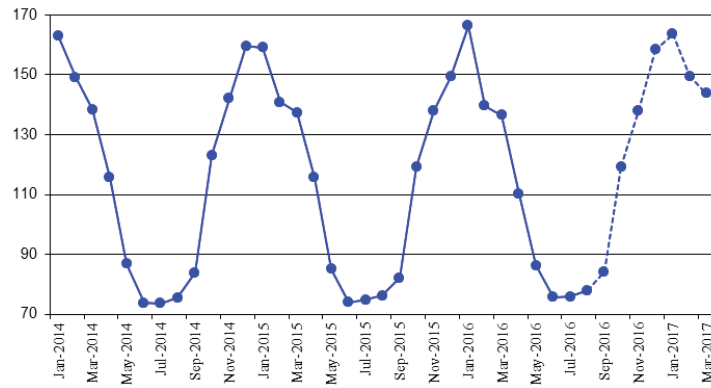
*Fig. 5a. The Rosstat industrial production index for food products
(as a percentage of that in December 2001)*
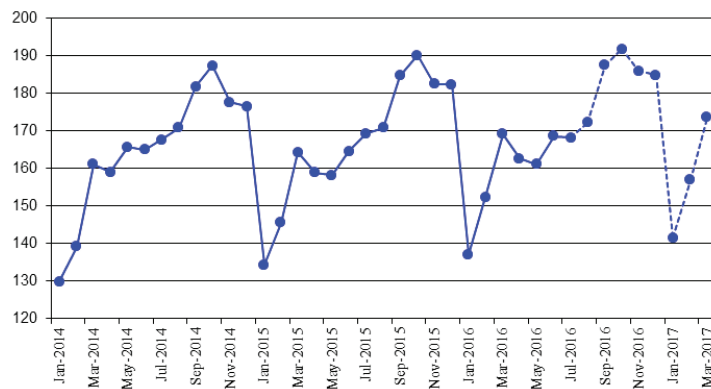
*Fig. 5b. The NRU HSE industrial production index for food products
(as a percentage of that in January 2005)*
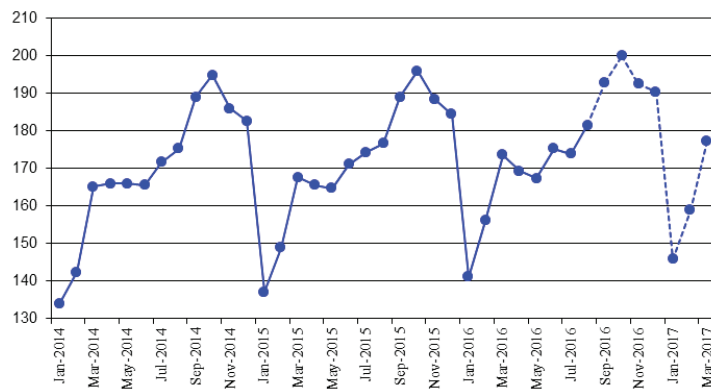
*Fig. 6a. The Rosstat industrial production index for coke and petroleum
(as a percentage of that in December 2001)*
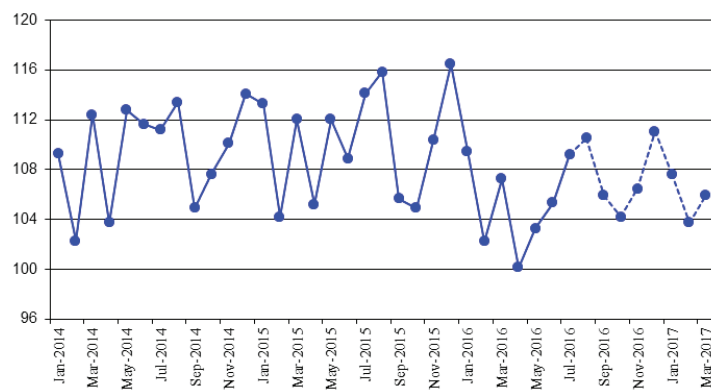
*Fig. 6b. The NRU HSE industrial production index for petroleum and coke
(as a percentage of that in January 2005)*
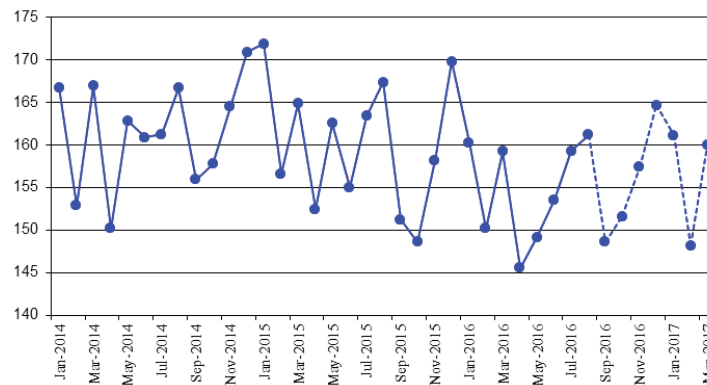
*Fig.7a. The Rosstat industrial production index for primary metals and fabricated metal products
(as a percentage of that in December 2001)*
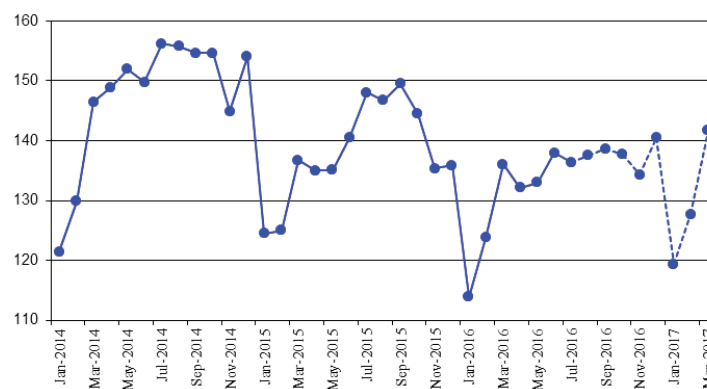
*Fig. 7b. The NRU HSE industrial production index for primary metals and fabricated metal products
(as a percentage of that in January 2005)*

*Fig. 8a. The Rosstat industrial production index for machinery
(as a percentage of that in December 2001)*
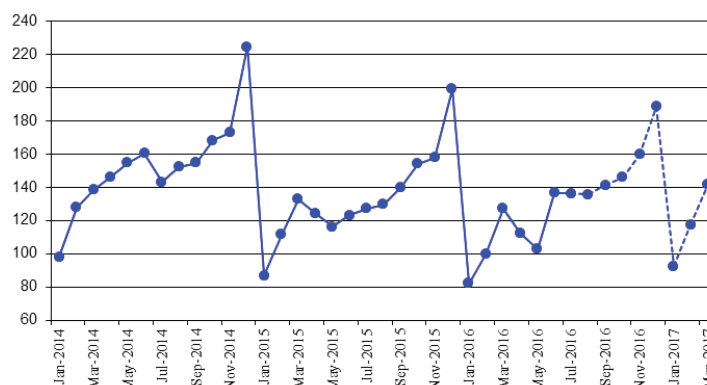
*Fig. 8b. The NRU HSE industrial production index for machinery
(as a percentage of that in January 2005)*
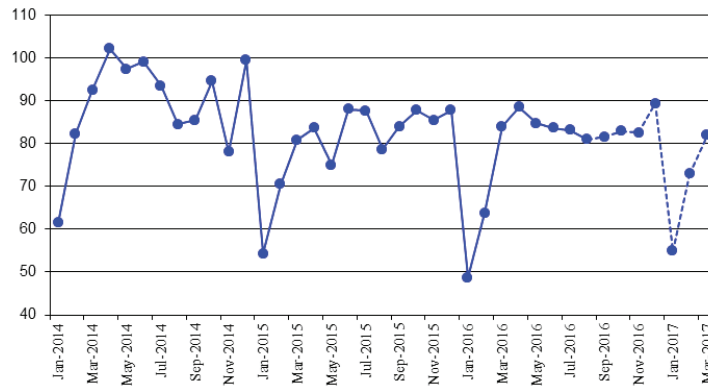
Fig. 9. The volume of retail sales (billion RUR)
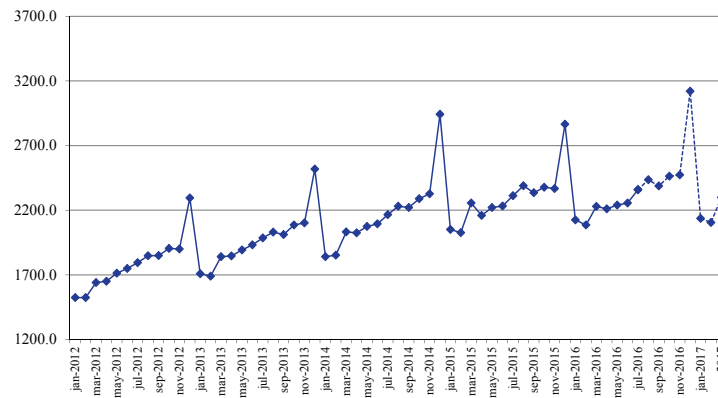
*Fig. 9a. The real volume of retail sales
(as a percentage of that in the same period of the previous year)*
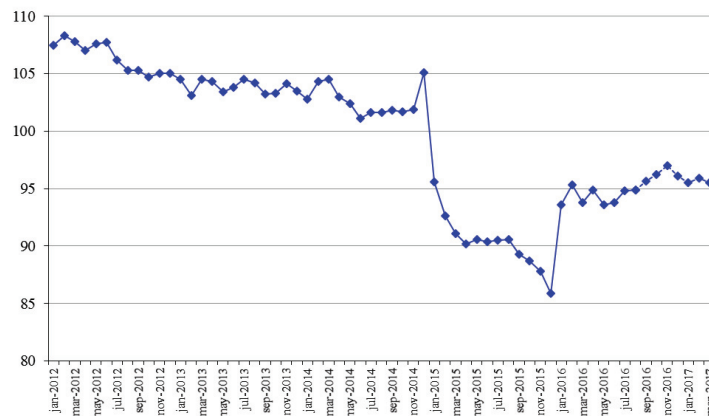
Fig.10. Export to all countries (billion USD)
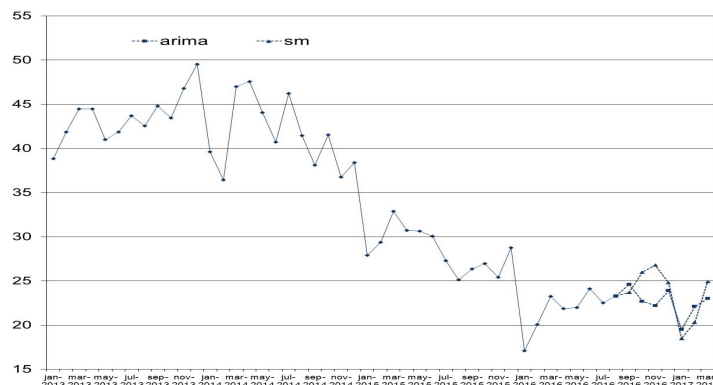
Fig. 11. Export to countries outside the CIS (billion USD)
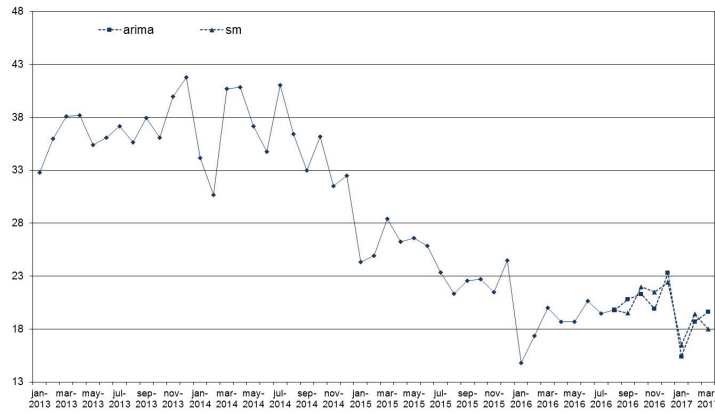
Fig. 12. Import from all countries (billion USD)
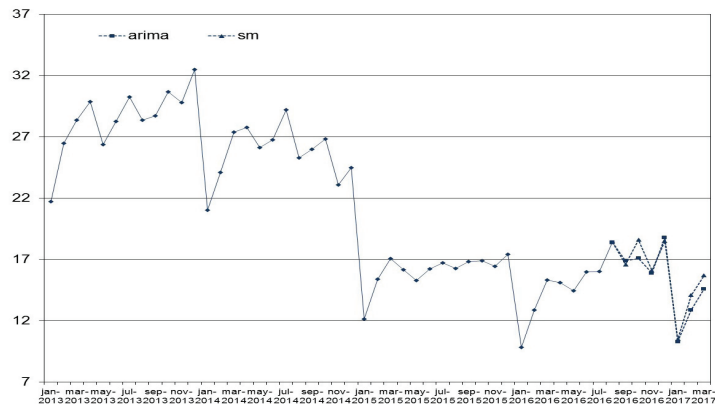
Fig. 13. Import from countries outside the CIS (billion USD)
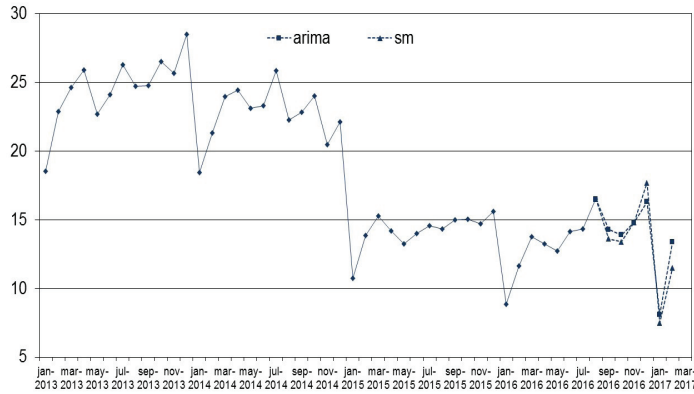
Fig. 14. The consumer price index
(as a percentage of that in December of the previous year)
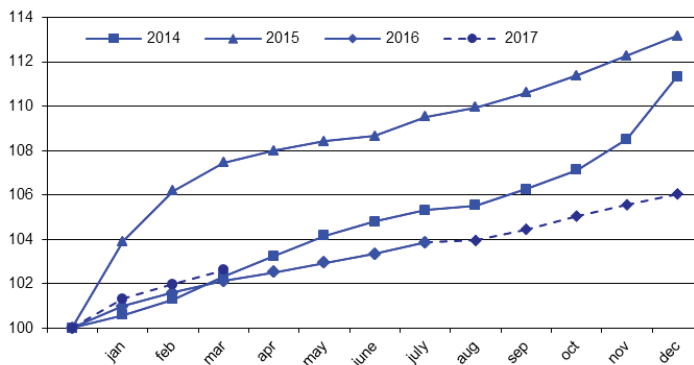
Fig. 14a. The consumer price index
(as a percentage of that in December of the previous year) (SM)
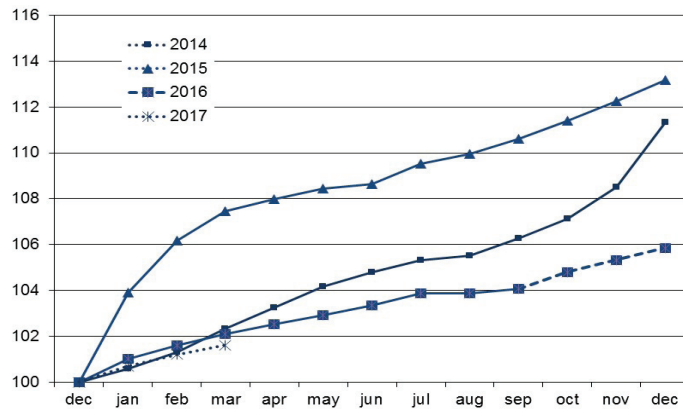
Fig.15. The producer price index for industrial goods
(as a percentage of that in December of the previous year)
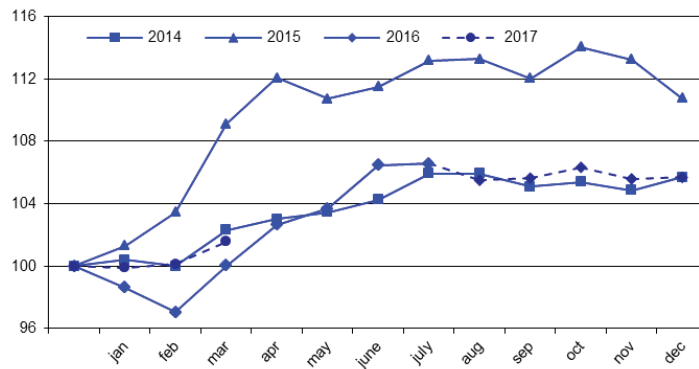
Fig. 16. The price index for mining
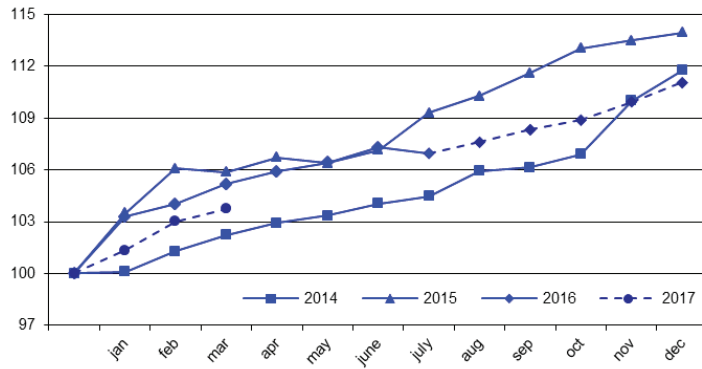*(as a percentage of that in December of the previous year)*
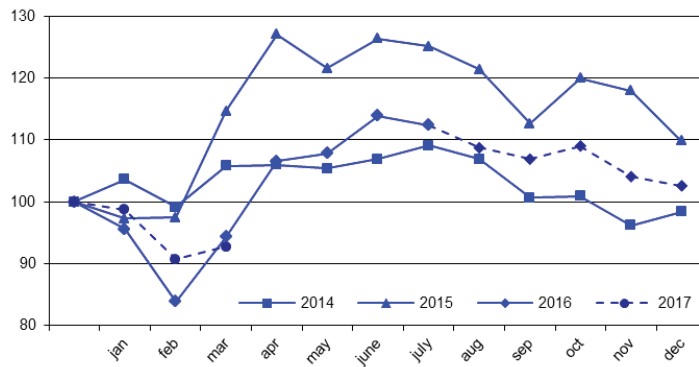
Fig. 17. The price index for manufacturing
(as a percentage of that in December of the previous year)
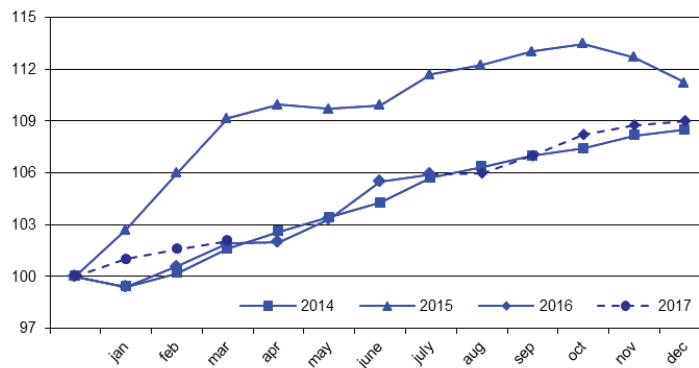
Fig. 18. The price index for utilities (electricity, water, and gas)
(as a percentage of that in December of the previous year)
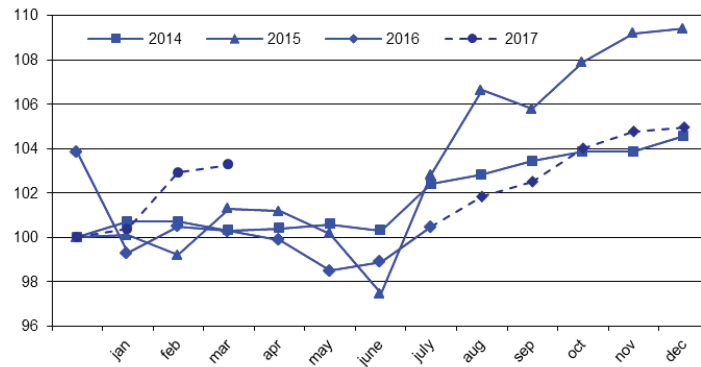
Fig. 19. The price index for food products
(as a percentage of that in December of the previous year)
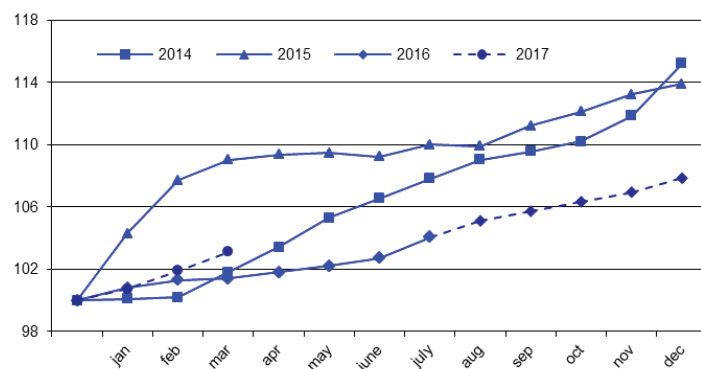
Fig. 20. The price index for the textile and sewing industry
(as a percentage of that in December of the previous year)
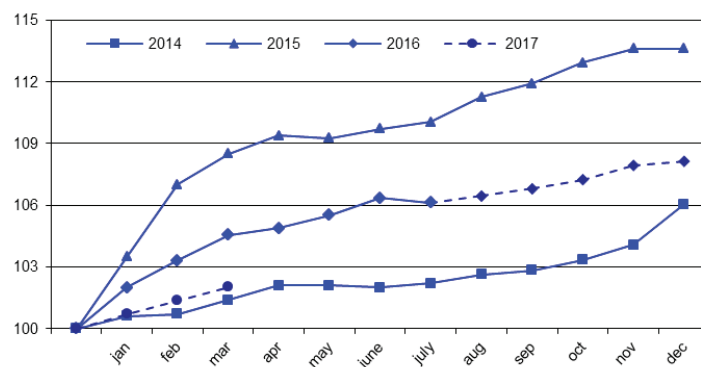
Fig. 21. The price index for wood products
(as a percentage of that in December of the previous year)
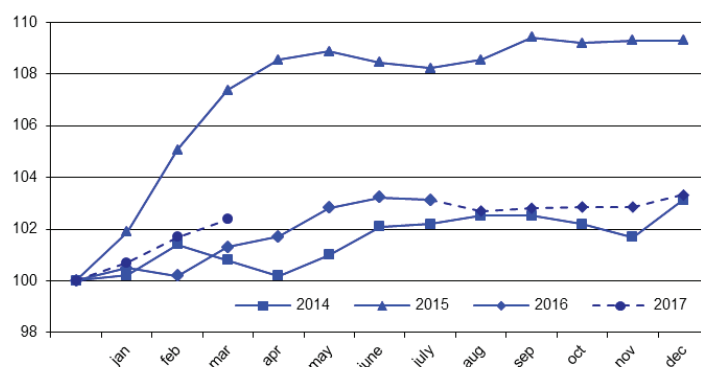
Fig. 22. The price index for the pulp and paper industry
(as a percentage of that in December of the previous year)
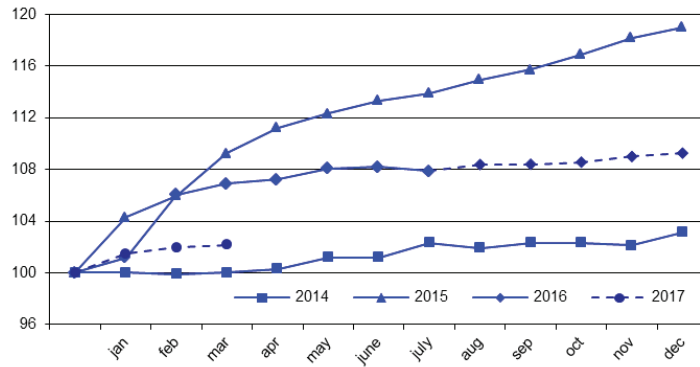
Fig. 23. The price index for coke and petroleum
(as a percentage of that in December of the previous year)
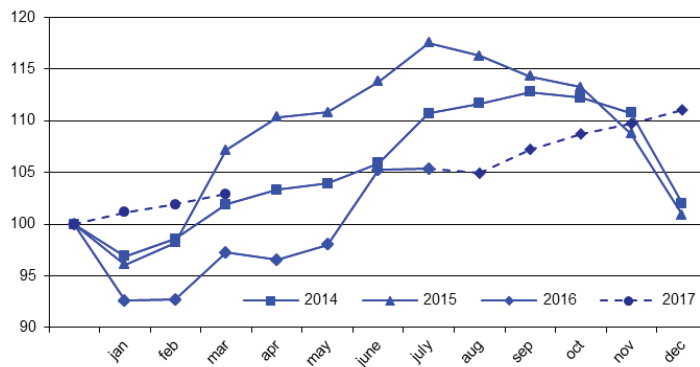
Fig. 24. The price index for the chemical industry
(as a percentage of that in December of the previous year)
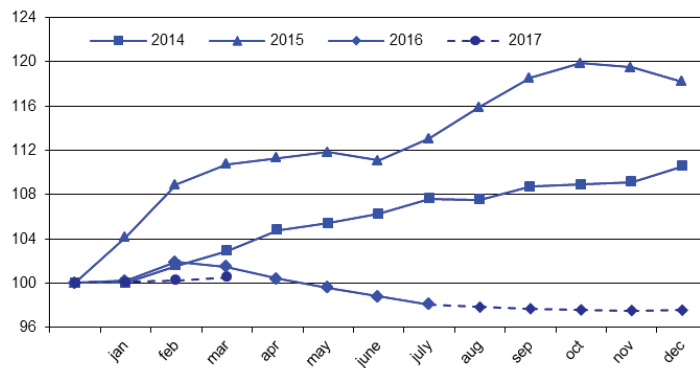
Fig.25. The price index for primary metals and fabricated metal products
(as a percentage of that in December of the previous year)
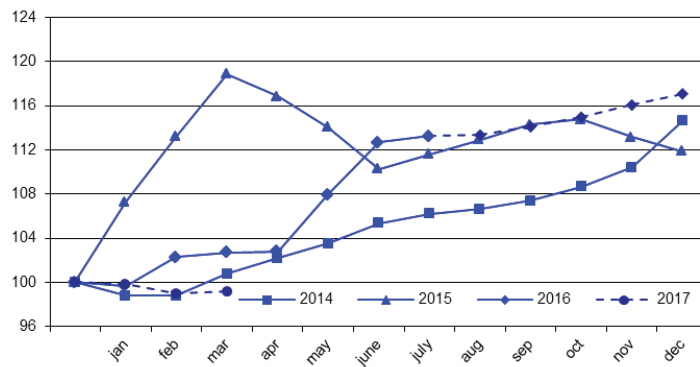
Fig.26. The price index for machinery (as a percentage of that in December of the previous year)

Fig.27. The price index for transport equipment manufacturing (as a percentage of that in December of the previous year)
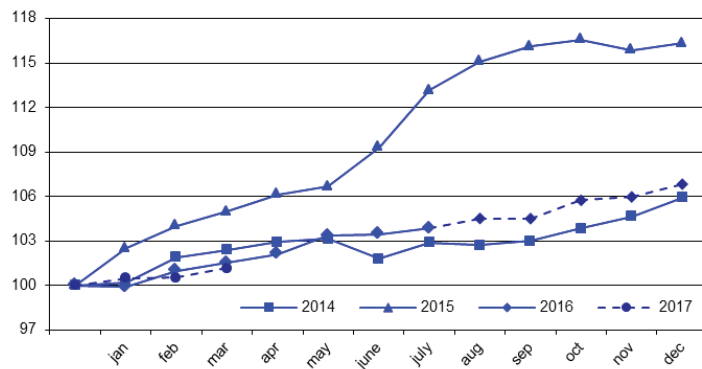
Fig. 28. The cost of the monthly per capita minimum food basket (RUR)
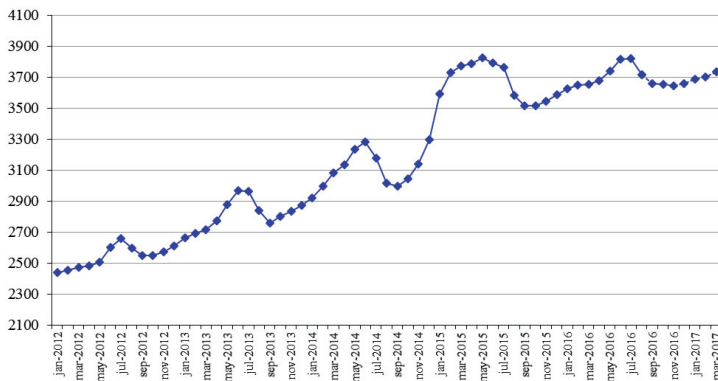
Fig. 29. The composite index of transport tariffs (for each year, as a percentage of that in the previous month)
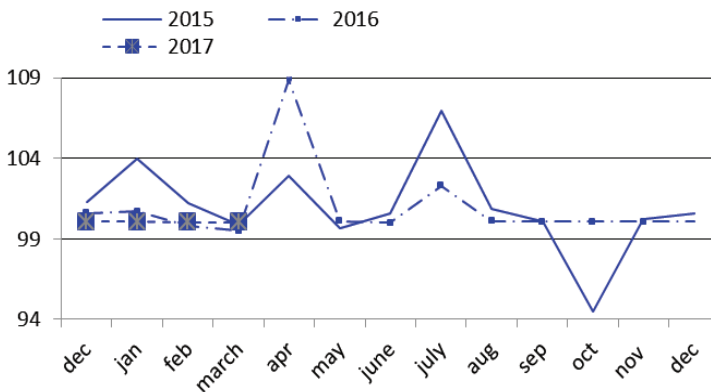
Fig. 30. The index of motor freight tariffs
(for each year, as a percentage of that in the previous month)
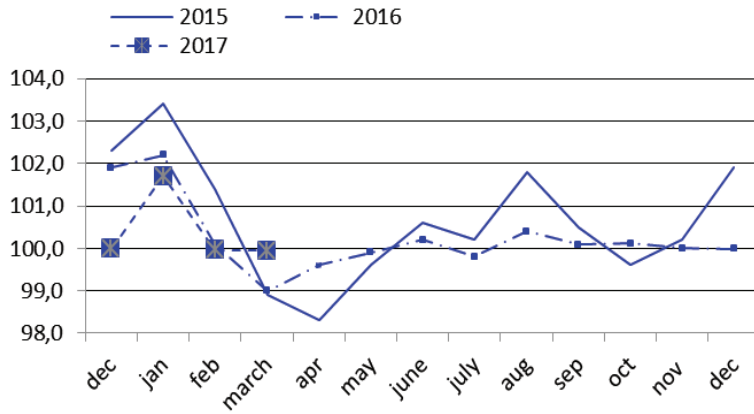
Fig. 31. The index of pipeline tariffs
(for each year, as a percentage of that in the previous month)
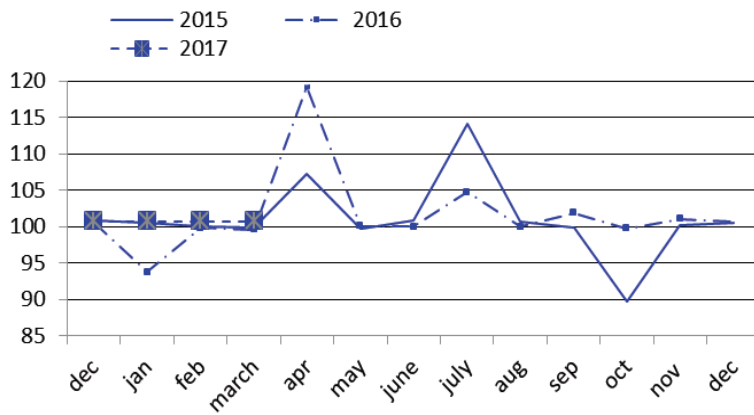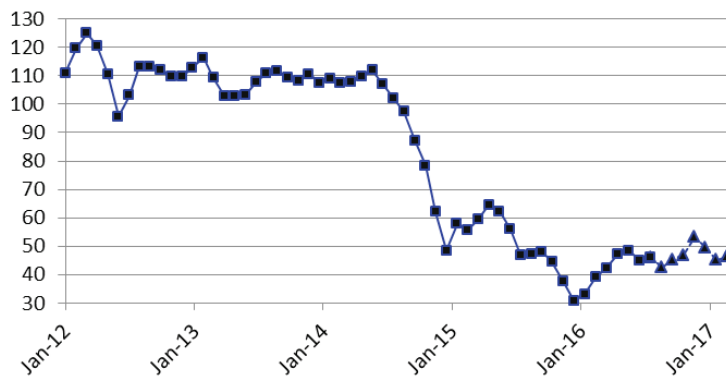

Fig. 32. The Brent oil price ($ per barrel)
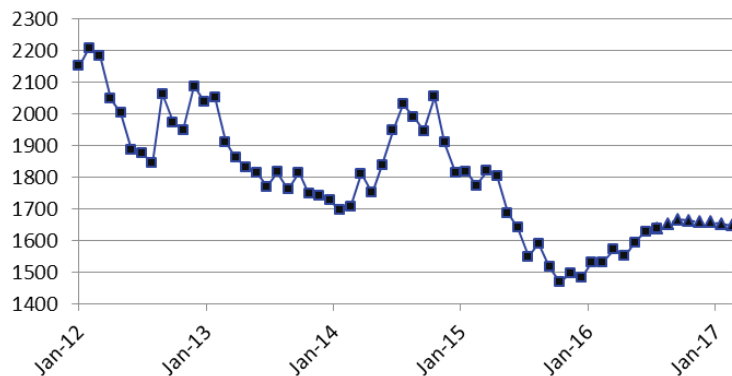

Fig. 33. The aluminum price ($ per ton)

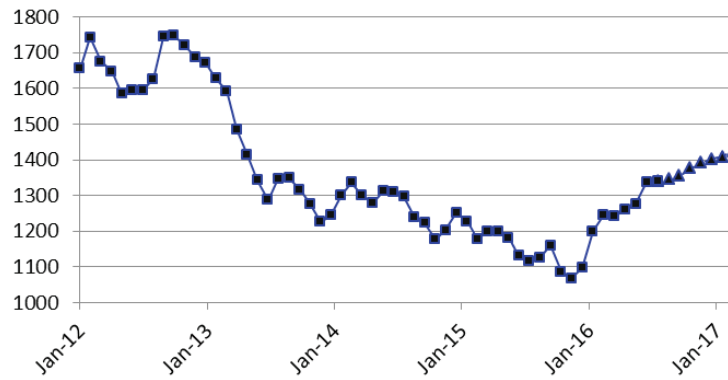*Fig. 34. The gold price ($ per ounce)*

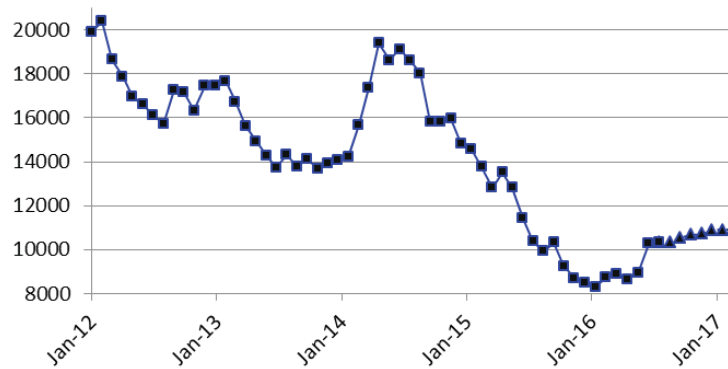*Fig. 35. The nickel price ($ per ton)*
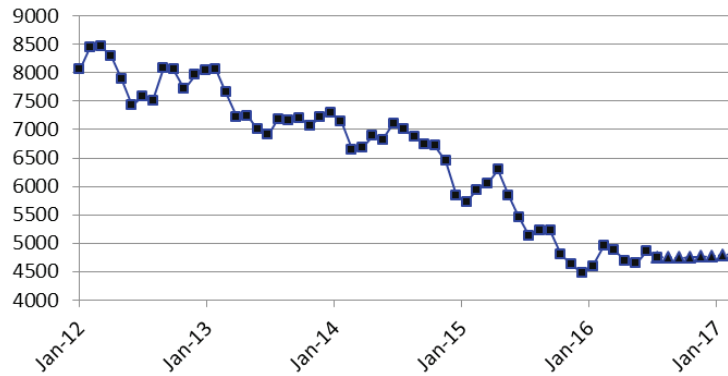

Fig. 36. The copper price ($ per ton)
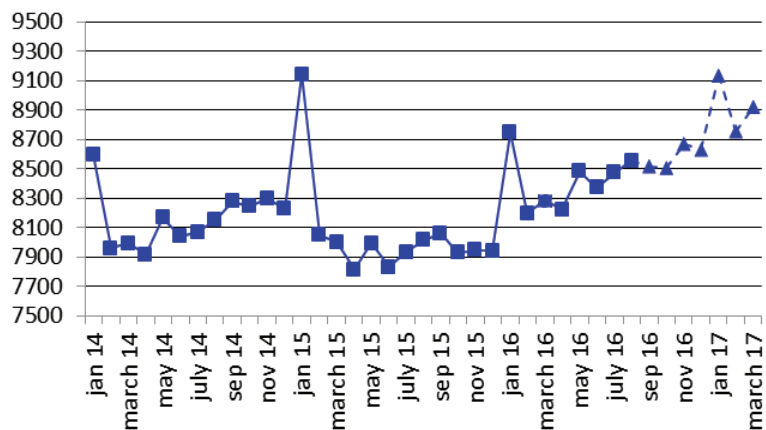

Fig. 37. The monetary base, billion RUR
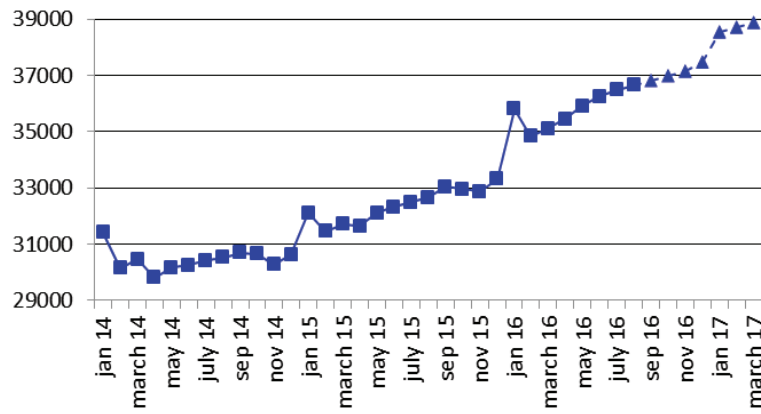
Fig. 38. M$_2$, billion RUR

Fig. 39. The international reserves
of the Russian Federation, million USD

Fig. 40. The RUR/USD exchange rate
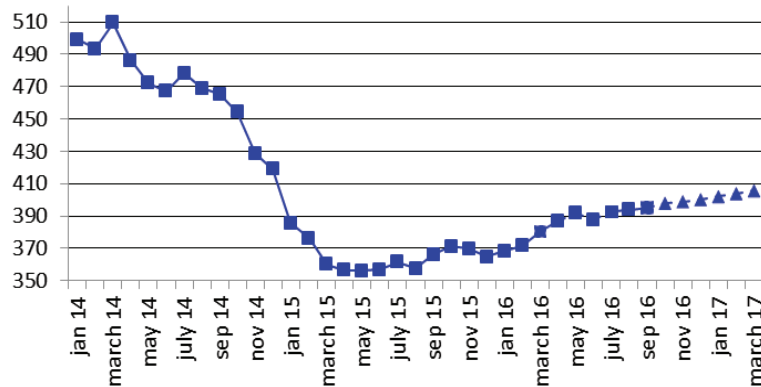

Fig. 41. The USD/EUR exchange rate
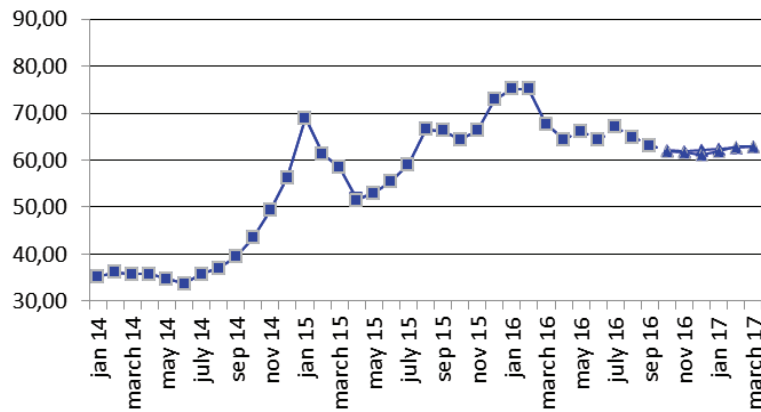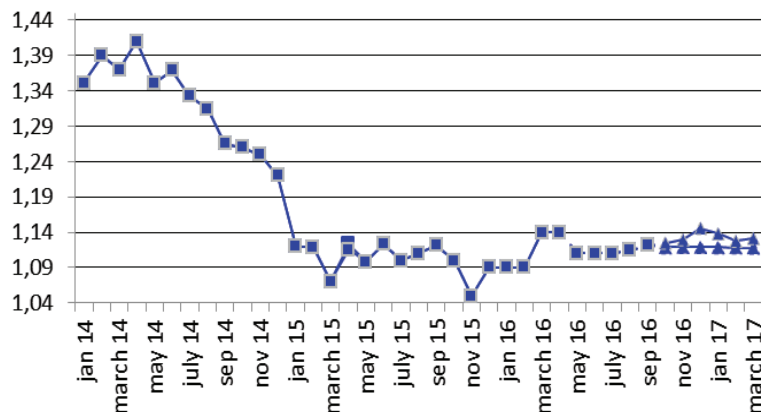
Fig. 42. Real disposable cash income
(as a percentage of that in the same period of the previous year)
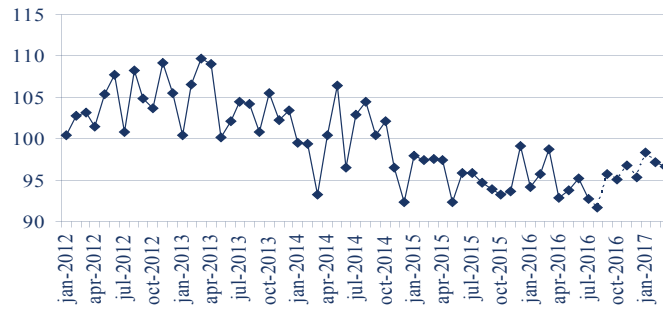

Fig. 43. Real cash income
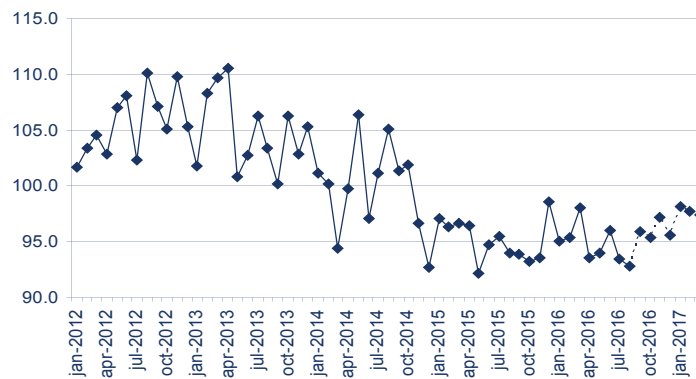*(as a percentage of that in the same period of the previous year)*

Fig. 44. Real accrued wages
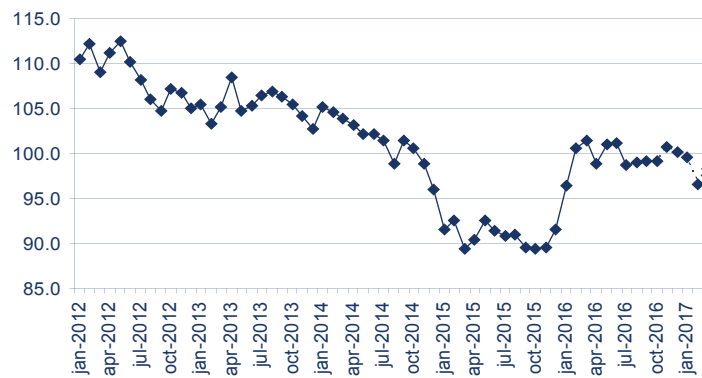*(as a percentage of those in the same period of the previous year)*
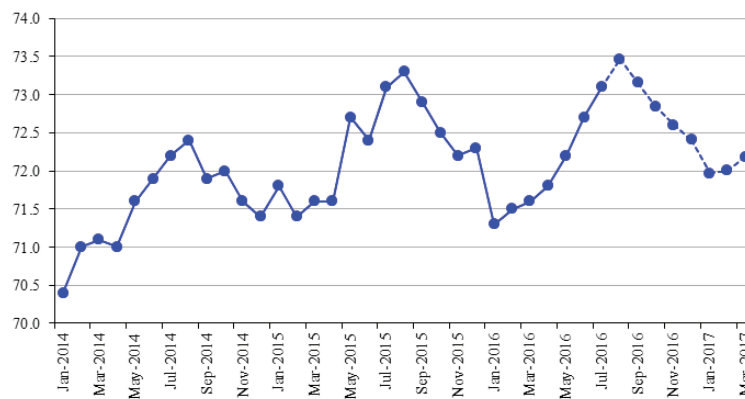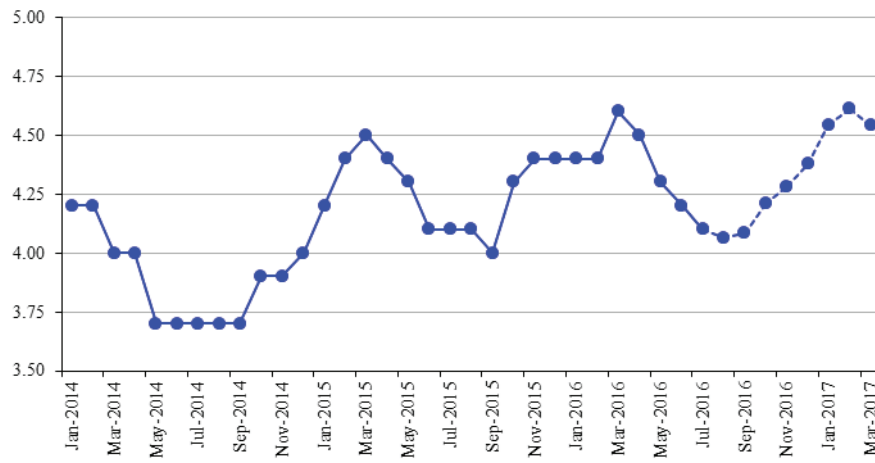

Fig. 45. Employment (million people)

Fig. 46. Unemployment (million people)

Model calculations of short-term forecasts of social and economic indices of the Russian Federation: September 2016

Index	July 2016	August 2016	September 2016	October 2016	November 2016	December 2016	January 2017	February 2017	March 2017
Rosstat IIIP (growth rate, %)*	-0.3	0.7	-0.1	-0.3	1.0	-0.3	2.1	0.7	1.4
HSE IIP (growth rate %)*	-0.4	1.7	1.0	0.5	2.0	1.5	1.5	0.4	0.9
Rosstat IIP for mining (growth rate, %)*	1.8	-0.6	-2.2	-2.2	-0.4	0.1	1.2	-1.1	-0.1
HSE IIP for mining (growth rate, %)*	2.3	1.5	1.8	1.5	2.2	2.4	1.5	-2.0	-0.8
Rosstat IIIP for manufacturing (growth rate, %)*	-1.5	0.9	-1.2	-0.9	-0.3	0.6	0.3	0.2	1.8
HSE IIP for manufacturing (growth rate, %)*	-2.3	1.7	0.4	1.0	1.2	1.3	0.0	-1.9	-0.2
Rosstat IIP for utilities (electricity, water, and gas) (growth rate, %)*	0.8	2.6	4.6	0.7	1.2	4.3	-2.4	1.0	2.6
HSE for utilities (electricity, water, and gas) (growth rate, %)*	1.4	2.2	2.4	0.0	-0.1	6.0	-1.7	7.1	5.2
Rosstat IIP for food products (growth rate, %)*	-0.1	0.7	1.5	0.9	1.9	1.4	3.3	3.0	2.6
HSE IIP for food products (growth rate, %)*	-0.2	2.7	2.0	2.0	2.2	3.3	3.3	1.7	2.1
Rosstat IIP for coke and petroleum (growth rate, %)*	-3.4	-4.6	0.3	-0.7	-3.5	-4.6	-1.7	1.5	-1.2
HSE for coke and petroleum (growth rate, %)*	-2.5	-3.7	-1.7	2.0	-0.5	-3.0	0.5	-1.3	0.5
Rosstat for primary metals and fabricated metal products (growth rate, %)*	-6.9	-6.3	-7.3	-4.7	-0.8	3.4	4.8	3.2	4.2
HSE IIP for primary metals and fabricated metal products (growth rate, %)*	-8.1	-6.7	-5.7	-1.9	0.4	1.2	6.1	2.4	3.8
Rosstat IIP for machinery (growth rate, %)*	10.9	4.6	1.1	-5.3	1.3	-5.3	12.6	17.9	11.5
HSE IIP for machinery (growth rate %)*	-5.2	3.0	-2.9	-5.5	-3.5	1.8	12.7	14.2	-2.6
Retail sales, trillion Rb	2.36	2.43	2.39	2.46	2.47	3.12	2.14	2.10	2.30
Real retail sales (growth rate, %)*	-5.2	-5.1	-3.6	-3.8	-3.0	-3.9	-4.5	-4.1	-4.4
Investments in capital assets, trillion Rb	22.5	23.3	24.2	24.4	24.5	24.4	19.0	21.2	24.0
Real investments in capital assets (growth rate, %)*	19.5	19.8	20.2	21.7	20.7	22.9	16.0	19.1	18.8
Export to all countries (billion $)	16.0	18.4	16.8	17.9	16.0	18.7	10.4	13.5	15.2
Export to countries outside the CIS (billion $)	14.3	16.5	14.0	13.7	14.8	17.0	7.8	12.5	13.1
Import from all countries (billion $)	0.5	0.0	0.2	0.6	0.6	0.6	1.3	0.6	0.6
Import from countries outside the CIS (billion $)	0.1	0.2	0.5	0.7	-0.2	-0.1	-0.1	0.6	1.3
CPI (growth rate, %)**	-1.3	-3.3	-1.7	2.0	-4.5	-1.4	-1.3	-8.1	2.2
PPI for industrial goods (growth rate, %)**	0.4	0.1	0.9	1.1	0.5	0.2	1.0	0.6	0.5
PPI for mining (growth rate, %)**	1.6	1.4	0.7	1.5	0.7	0.2	0.4	2.5	0.4
PPI for manufacturing (growth rate, %)**	1.3	1.0	0.6	0.6	0.6	0.8	0.7	1.2	1.2
PPI for utilities (electricity, water, and gas) (growth rate, %)**	-0.2	0.3	0.3	0.4	0.6	0.2	0.7	0.6	0.6
PPI for food products (growth rate, %)**	-0.1	-0.4	0.1	0.0	0.0	0.4	0.7	1.0	0.7
PPI for the textile and sewing industry (growth rate, %)**	-0.3	0.5	0.0	0.2	0.4	0.2	1.5	0.4	0.2
PPI for wood products (growth rate, %)**	0.1	-0.4	2.2	1.4	0.9	1.2	1.1	0.7	1.0
PPI for the pulp and paper industry (growth rate, %)**	-0.7	-0.2	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.3
PPI for coke and petroleum (growth rate, %)**	0.5	0.1	0.7	0.8	1.0	0.9	-0.2	-0.9	0.2
PPI for the chemical industry (growth rate, %)**	-0.3	0.6	0.7	0.5	1.0	1.0	1.3	1.6	0.7
PPI for primary metals and fabricated metal products (growth rate, %)**	0.4	0.6	0.0	1.2	0.2	0.8	0.5	0.0	0.6

Index	July 2016	August 2016	September 2016	October 2016	November 2016	December 2016	January 2017	February 2017	March 2017
PPI for machinery (growth rate, %)**	**3.82**	**3.72**	**3.65**	3.65	3.64	3.66	3.69	3.70	3.73
PPI for transport equipment manufacturing (growth rate, %)**	**-0.2**	**0.4**	**0.1**	0.1	0.0	0.0	1.7	0.0	-0.1
The cost of the monthly per capita minimum food basket (thousand Rb)	4.7	0.0	1.9	-0.3	1.1	0.7	0.8	0.7	0.7
The composite index of transportation tariffs (growth rate, %)**	**2.3**	**0.1**	**0.1**	0.1	0.1	0.1	0.1	0.1	0.0
The index of pipeline tariffs (growth rate, %)**	45.1	46.1	42.6	45.5	47.0	53.2	49.7	45.1	46.4
The index of motor freight tariffs (growth rate, %)**	**1.63**	**1.64**	**1.65**	1.67	1.66	1.66	1.66	1.65	1.65
The Brent oil price ($ a barrel)	1.34	1.34	1.35	1.35	1.38	1.39	1.40	1.41	1.42
The aluminum price (thousand $ a ton)	**4.86**	**4.75**	**4.75**	4.74	4.75	4.76	4.77	4.79	4.81
The gold price (thousand $ per ounce)	10.3	10.3	10.3	10.6	10.7	10.7	10.9	10.9	10.9
The nickel price (thousand $ a ton)	**8.47**	**8.56**	**8.52**	8.51	8.67	86.63	9.13	8.76	8.92
The copper price (thousand $ a ton)	36.5	36.7	36.8	37.0	37.2	37.5	38.5	38.7	38.9
The monetary base (trillion Rb)	**0.39**	**0.39**	**0.40**	0.40	0.40	0.40	0.40	0.40	0.41
M2 (trillion Rb)	**67.05**	**64.91**	**63.16**	62.00	61.76	61.68	62.16	62.73	62.90
Gold and foreign exchange reserves (billion $)	**1.11**	**1.11**	**1.12**	1.13	1.13	1.14	1.13	1.13	1.13
The RUR/USD exchange rate (rubles per one USD)	**-7.3**	**-8.3**	**-4.3**	-4.9	-3.3	-4.6	-1.7	-2.8	-3.3
The USD/EUR exchange rate (USD per one Euro)	**-6.6**	**-7.2**	**-4.1**	-4.7	-2.8	-4.5	-1.9	-2.3	-2.7
Real disposable cash income (growth rate, %)*	**-1.3**	**-1.0**	**-0.8**	-0.8	0.8	0.2	-0.4	-3.4	-1.8
Real cash income (growth rate, %)*	**73.1**	**73.5**	**73.2**	72.8	72.6	72.4	72.0	72.0	72.2
Real accrued wages (growth rate, %)*	**4.1**	**4.1**	**4.1**	4.2	4.3	4.4	4.4	4.5	4.5
Employment (million people)	**72.3**	**72.0**	**72.1**	72.3	72.4	72.9	72.7	73.0	73.2
Unemployment (million people)	4.4	4.6	3.1	4.5	4.4	4.2	4.2	4.3	9.1

Note. Actual values are printed in the bold type
* % of the respective month of the previous year;
** % of the previous month.