



GAIDAR  
INSTITUTE  
FOR ECONOMIC  
POLICY

# 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 *March* to *August* of 2019, which were performed using time series models developed as a result of research conducted by the Gaidar Institute over the past few years<sup>1</sup>. 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<sup>2</sup>, 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.<sup>3</sup>

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 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.

<sup>1</sup> 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. Kiblitckaya, *Qualitative Properties of Different Approaches to Forecasting of Social and Economic Indices of the Russian Federation*. Moscow, IET, 2010.

<sup>2</sup> Ibid.

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

The 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<sup>1</sup> that the use of series of business surveys as explanatory variables<sup>2</sup> 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 choose a model for the CPI, which included 9<sup>th</sup>, 12<sup>th</sup> and 13<sup>th</sup> lags of the four principal components, as well as 1<sup>st</sup> and 12<sup>th</sup> lags of the variable itself, and a model for the PPI, which included 8<sup>th</sup>, 9<sup>th</sup> and 12<sup>th</sup> lags of the four principal components, as well as 1<sup>st</sup>, 3<sup>rd</sup> and 12<sup>th</sup> lags of the variable itself.

All calculations were performed using the Eviews econometric package.

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<sup>1</sup> 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.

<sup>2</sup> 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<sup>1</sup> (%)

	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	ARIMA	BS	Rosstat	NRU HSE	BS	Rosstat	NRU HSE	BS	Rosstat	NRU HSE	BS	Rosstat	NRU HSE	BS	Rosstat	NRU HSE	BS	Rosstat	NRU HSE	BS	Rosstat	NRU HSE	BS
Mar 19	2.1	2.4	2.2	3.4	2.7	3.2	1.6	3.2	3.2	-4.3	-5.9	1.8	1.8	-0.2	1.6	-2.6	2.7	2.7	-2.6	2.7	2.7	5.2	5.2	-2.9
Apr 19	1.6	3.1	3.2	2.8	2.2	2.4	1.0	2.4	2.4	-0.1	-0.6	3.2	3.8	1.2	1.7	-2.0	-0.4	-0.4	-2.0	-0.4	-0.4	-6.2	-6.2	-9.4
May 19	1.8	1.7	1.1	2.9	2.6	1.3	0.4	1.3	1.3	1.9	1.3	3.5	2.5	-0.6	0.0	-4.9	1.4	1.4	-4.9	1.4	1.4	-7.6	-7.6	-1.3
Jun 19	2.6	2.2	2.2	1.5	1.7	2.8	1.7	2.8	2.9	2.7	2.7	3.6	3.6	-0.8	-1.0	13.0	1.9	1.9	13.0	1.9	1.9	-3.1	-3.1	4.5
Jul 19	2.0	3.1	3.2	0.6	1.6	3.5	1.6	3.5	1.8	3.2	3.2	3.1	3.1	-1.3	-1.6	-0.5	1.5	1.5	-0.5	1.5	1.5	5.8	5.8	2.5
Aug 19	1.9	2.7	2.0	-0.9	1.4	3.3	1.3	3.3	2.1	3.0	3.0	2.7	1.9	0.7	2.4	0.4	1.8	1.8	0.4	1.8	1.8	0.1	0.1	-7.6
For reference: actual growth in 2018 on the respective month of 2017																								
Mar 18	2.8	2.0	2.0	2.4	1.4	2.2	2.2	0.7	8.8	10.6	2.8	2.3	2.3	1.7	1.4	8.6	0.4	0.4	8.6	0.4	0.4	-1.2	-1.2	-8.5
Apr 18	3.9	2.2	2.2	2.5	1.7	5.3	5.3	2.9	0.5	-0.3	5.2	3.5	3.5	-0.2	-3.7	2.4	7.7	7.7	2.4	7.7	7.7	-5.6	-5.6	-3.8
May 18	3.7	2.2	2.2	1.3	0.6	5.4	5.4	3.6	-0.7	-1.7	3.9	3.2	3.2	5.4	3.1	11.7	4.4	4.4	11.7	4.4	4.4	-6.2	-6.2	-13.0
Jun 18	2.2	3.1	3.1	2.8	2.5	2.2	2.2	3.5	1.7	2.0	5.0	3.4	3.4	2.5	2.5	-14.2	1.7	1.7	-14.2	1.7	1.7	7.0	7.0	5.6
Jul 18	3.9	4.7	4.7	3.2	3.3	4.6	4.6	5.8	1.8	2.2	5.2	1.9	1.9	2.6	1.9	3.3	2.5	2.5	3.3	2.5	2.5	4.2	4.2	6.6
Aug 18	2.7	2.5	2.5	4.5	3.0	2.2	2.2	2.4	0.1	0.4	6.1	1.2	1.2	-0.4	-2.7	-5.2	1.5	1.5	-5.2	1.5	1.5	13.3	13.3	-1.5

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.

<sup>1</sup> 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 March to August 2019, the series of monthly data of the indices of industrial production released by the Federal State Statistics Service (Rosstat) from January 2002 December 2018, as well as the series of the base indices of industrial production released by the National Research University Higher School of Economics (NRU HSE<sup>1</sup>) over the period from January 2010 to January 2019 were used (the corrected value of January 2010 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 Rosstat average<sup>2</sup> growth of the industrial production index posted 2.1% for March-August 2019 against the same period of the previous year for the industry as a whole. As for the NRU HSE industrial production index, the indicator constitutes 2.3%.

In March-August 2019, the average monthly gain of the Rosstat and the NRU HSE industrial production indexes for mining and quarrying amount to 1.7% and 2.0%, respectively.

The average increment of the industrial production index in manufacturing industry according to Rosstat for March-August 2019 amounts to 1.3% compared to the same period of the previous year and the NRU HSE industrial production index in manufacturing industry comes to 1.8%. The monthly production of food products is forecast to grow in average by 3.0% and 2.8% for the Rosstat and NRU HSE indexes, respectively. The production of coke and petroleum products is forecast to grow on average by (-0.2%) and 0.5% for the Rosstat and NRU HSE indexes, respectively. The average monthly change in the industrial production index for primary metals and fabricated metal products for March-August 2019 computed by Rosstat and the NRU HSE constitute 0.6% and 1.5%, respectively. Manufacturing of machinery and equipment is forecast to increase by (-1.0%) and (-2.4%) for the Rosstat and the NRU HSE indexes, respectively.

The average gain of the industrial production index for electricity, gas, and steam supply; for air conditioning computed by Rosstat for February-July 2019 in comparison with the same period of the previous year constitutes 0.7%; the same indicator for the NRU HSE industrial production index comes to 0.6% per month.

**Retail Sales**

This section (Table 2) presents forecasts of monthly retail sales made on the basis of monthly Rosstat data over January 1999 – January 2019.

As seen from Table 2, the average forecast increment of the monthly trade turnover for March to August 2019 against the corresponding period of 2018 will amount to around 4.8%.

The average monthly real trade turnover is forecast to grow at around 1.0% for March-August 2019 against the same period of 2018.

Table 2  
Calculations of forecast values of the retail sales and the real retail sales

Forecast value according to ARIMA-model		
	Retail sales, billion RUB (in brackets – growth on the respective month of the previous year, %)	Real retail sales (as % of the respective period of the previous year)
Mar 19	2609.1 (5.8)	101.3
Apr 19	2591.6 (5.3)	101.3
May 19	2635.8 (4.9)	101.1
Jun 19	2683.9 (4.6)	100.9
Jul 19	2764.7 (4.2)	100.5
Aug 19	2859.4 (4.0)	100.8
For reference: actual values in the same months of 2017–2018		
Mar 18	2466.5	102.2
Apr 18	2460.7	102.9
May 18	2512.6	102.6
Jun 18	2566.8	103.3
Jul 18	2652.4	102.8
Aug 18	2748.8	102.8

Note: the series of retail sales and real retail sales over January 1999 – January 2019.

<sup>1</sup> The indices in question are calculated by E.A. Baranov and V.A. Bessonov.

<sup>2</sup> Average growth of industrial production indexes is the average value of these indexes for six months under review.

Table 3

## Calculations of forecast values of foreign trade turnover with countries outside the CIS

	Exports to all countries			Imports from all countries			Exports to countries outside the CIS			Imports from countries outside the CIS						
	Forecast values (billion USD a month)		%age of actual data in the respective month of the previous year	Forecast values (billion USD a month)		%age of actual data in the respective month of the previous year	Forecast values (billion USD a month)		%age of actual data in the respective month of the previous year	Forecast values (billion USD a month)		%age of actual data in the respective month of the previous year				
	ARIMA	SM	ARIMA	SM	ARIMA	SM	ARIMA	SM	ARIMA	SM	ARIMA	SM				
Mar 19	40.8	41.9	111	114	22.0	23.0	102	106	34.2	36.4	107	114	20.3	20.3	105	105
Apr 19	39.3	43.3	109	120	21.7	22.7	103	108	33.9	34.9	109	112	19.2	19.5	103	104
May 19	40.4	42.9	111	118	22.4	21.8	105	102	34.6	35.5	109	111	19.8	20.1	104	106
Jun 19	41.9	42.6	116	117	22.6	23.6	107	112	37.0	37.9	117	120	19.6	20.2	105	108
Jul 19	40.7	43.3	118	126	23.1	23.3	109	110	36.4	35.4	122	119	20.6	20.7	108	109
Aug 19	40.6	43.4	108	116	22.8	23.7	105	109	36.8	35.7	112	109	20.0	20.4	103	105
For reference: actual values in respective months of 2017-2018 (billion USD)																
Mar 18	36.6		21.6			31.8			19.3							
Apr 18	36.0		21.0			31.2			18.7							
May 18	36.5		21.3			31.8			19.0							
Jun 18	36.3		21.1			31.6			18.7							
Jul 18	34.4		21.2			29.8			19.0							
Aug 18	37.6		21.7			32.8			19.5							

Note: over the period from January 1999 to January 2019, the series of exports, imports, exports to the countries outside the CIS and imports 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.

Table 4  
Calculations of forecast values of price indices

	Producer price indexes:																		
	The consumer price index (ARIMA)	The consumer price index (SM)	The consumer price index (FM)	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)																		
Mar 19	100.7	100.4	100.6	100.2	100.0	100.2	105.6	100.6	100.6	100.6	100.6	100.5	100.7	101.4	100.6	100.4	100.3	100.3	100.3
Apr 19	100.7	100.3	100.6	102.7	100.8	100.6	104.2	101.1	99.4	100.8	100.7	100.4	101.9	101.4	100.8	100.0	100.3	100.8	100.8
May 19	100.6	100.3	100.5	102.3	101.4	100.6	101.0	101.8	100.3	100.7	100.5	100.3	100.8	101.7	101.2	100.1	100.3	100.3	101.0
Jun 19	100.7	100.4	100.5	102.0	102.1	100.6	101.5	100.8	99.4	100.6	100.5	100.3	100.5	102.1	101.0	99.6	100.3	100.3	100.9
Jul 19	100.6	100.2	100.5	100.0	101.2	100.6	100.0	99.8	100.7	101.1	100.7	99.9	100.6	101.9	101.3	100.9	100.3	100.3	100.5
Aug 19	100.1	100.1	100.4	101.0	98.7	100.6	100.0	100.2	102.2	100.7	100.4	100.6	100.6	102.0	101.0	100.2	100.3	100.3	99.9
	Forecast values (% of December 2017/2018)																		
Mar 19	102.8	101.8	102.1	100.6	102.1	96.1	97.4	101.2	102.0	101.4	102.6	101.7	102.8	97.7	99.6	100.3	102.2	101.3	101.3
Apr 19	103.5	102.1	102.7	103.4	103.1	96.7	101.5	102.3	101.4	102.2	103.4	102.2	104.7	99.1	100.4	100.3	102.6	102.2	102.2
May 19	104.2	102.4	103.2	105.7	101.1	97.3	102.5	104.1	101.7	102.9	103.9	102.5	105.6	100.8	101.6	100.4	102.9	103.2	103.2
Jun 19	104.9	102.8	103.8	107.9	102.2	97.9	104.1	105.0	101.0	103.6	104.4	102.8	106.0	102.9	102.6	100.0	103.2	104.1	104.1
Jul 19	105.5	103.0	104.3	107.9	103.1	98.4	104.1	104.8	101.7	104.7	105.1	102.7	106.7	104.9	103.9	100.9	103.5	104.7	104.7
Aug 19	105.6	103.1	104.8	109.0	102.0	99.0	104.1	104.9	104.0	105.4	105.5	103.3	107.3	107.0	105.0	101.1	103.8	104.6	104.6
	For reference: actual values in the same periods of 2017/2018 (% of December 2016/2017)																		
Mar 18		100.8			100.2		98.9	101.0	99.4	99.4	100.9	103.4	102.3	96.7	102.5	103.8	103.3	101.2	101.2
Apr 18		101.2			101.4		99.7	102.8	98.2	99.7	102.4	104.2	103.3	103.1	103.2	105.4	105.6	101.6	101.6
May 18		101.6			105.3		107.0	106.2	99.6	100.7	103.9	105.4	105.0	116.3	104.4	109.1	106.4	100.7	100.7
Jun 18		102.1			108.9		119.1	107.8	98.3	102.1	104.5	107.2	105.6	120.5	106.6	110.5	107.2	100.5	100.5
Jul 18		102.4			109.3		118.8	108.2	99.1	103.0	103.7	108.1	107.2	119.8	107.6	110.4	108.9	101.4	101.4
Aug 18		102.4			109.5		116.7	109.0	101.4	103.5	103.6	109.1	109.8	121.5	110.2	109.8	110.5	102.8	102.8

Note: over the period from January 1999 to December 2018, 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.

## 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 January 2019 on the basis of the data released by the Central Bank of Russia.<sup>1</sup> The results of calculations are shown in Table 3.

Export, import, export outside the CIS and import from the countries outside the CIS are forecast to grow on average at 15.3%, 6.6%, 13.3%, and 5.3%, respectively for March-August 2019 against the same period of 2018. The average forecast surplus volume of the trade balance with all countries for March-August 2019 will amount to \$114.3bn, which reflects an increase of 27.8% on the same period of 2018.

## 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 December 2018<sup>2</sup>. Table 4 presents the results of model calculations of forecast values over March and August 2019 in accordance with ARIMA models, structural models (SM) and models computed with the help of business surveys (BS).

The consumer price index is forecast to grow at an average monthly rate of 0.5% for March-August 2019. The industrial producer price increment for the period under review is forecast to average 0.9% per month.

The producer price indexes are forecast to grow at average monthly rate for March–August 2019: for mining and quarrying 2.1%, manufacturing 0.7%, utilities (electricity, gas, and steam) 0.4%, food products 0.7%, textile and sewing industry 0.6%, wood products 0.3%, pulp and paper industry 0.8%, coke and refined petroleum 1.8%, for chemical industry 1.0%, for basic metals and fabricated metal 0.2%, for machinery and equipment 0.3%, and for motor vehicles manufacture 0.6%.

### 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 March and August of 2019. The forecasts were made on the basis of time series with use the Rosstat data over the period from January 2000 to January 2019. The results are shown in Table 5.

Table 5  
The forecast of the cost of the monthly per capita minimum food basket

Forecast values according to ARIMA-model (RUB)	
Mar 19	4127.0
Apr 19	4142.5
May 19	4142.6
Jun 19	4154.6
Jul 19	4167.3
Aug 19	4168.5
For reference: actual values in the same months of 2017–2018 (billion RUB)	
Mar 18	3895.1
Apr 18	3947.8
May 18	3969.9
Jun 18	4060.3
Jul 18	4040.9
Aug 18	3943.3
Expected growth on the respective month of the previous year (%)	
Mar 19	6.0
Apr 19	4.9
May 19	4.4
Jun 19	2.3
Jul 19	3.1
Aug 19	5.7

Note: the series of the cost of the monthly per capita minimum food basket over the period from January 2000 to January 2019 are stationary in the first-order differences.

<sup>1</sup> 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.

<sup>2</sup> Structural models were evaluated in the period from October 1998.



As can be seen from *Table 5*, the minimum set of food products' cost is forecast to grow compared to the corresponding period of the previous year. At the same time, the minimum set of food products is forecast to average RUB 4,150.4. The minimum set of food products cost is forecast to grow on average at around 4.4% against the same period of the previous year.

**Indices of Freight Rates**

*This section presents calculations of forecast values of freight rate indices on cargo carriage<sup>1</sup>, made on the basis of time-series models evaluated on the Rosstat data over the period from September 1998 to December 2018. Table 6 shows the results of model calculations of forecast values in March-August of 2019. 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 March-August 2019, the composite index of transport tariffs will be growing at average monthly rate 1.4%. In April 2019, the seasonal increment of this index is projected at 3.9 p.p. and in July 2019 – 3.5 p.p.

The index of motor freight tariffs will decrease in the course of given six months at an average monthly rate of 0.2%. The index of pipeline tariffs will also be growing at an average monthly rate of 2.4%. In April 2019, the seasonal growth of the index is expected at 7.1 p.p.

**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 March to August of 2019 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 January 2019.*

The crude oil price is forecast to average around \$75.0 per barrel, which is below its corresponding year-earlier indexes on average by 0.85%. The aluminum prices are forecast to average around \$1,905 per ton and their average forecast slide constitutes around 11% compared to the same level of last year. The gold price is forecast to average \$1,345 per ounce. The copper price is forecast to average \$6,350 per ton,

*Table 6*  
Calculations of forecast values of indices of freight rates

	The composite freight rate index	The index of motor load freight rate	The index of pipeline rate
Forecast values according to ARIMA-models (% of the previous month)			
Mar 19	100.3	99.8	101.7
Apr 19	103.9	99.8	107.1
May 19	100.2	99.8	101.4
Jun 19	100.2	99.8	99.9
Jul 19	103.5	99.8	101.6
Aug 19	100.2	99.8	103.0
Forecast values according to ARIMA-models (% of December of the previous year)			
Mar 19	100.8	101.3	95.6
Apr 19	104.7	101.1	102.4
May 19	105.0	100.9	103.8
Jun 19	105.2	100.6	103.7
Jul 19	108.9	100.4	105.4
Aug 19	109.1	100.2	108.5
For reference: actual values in the same period of 2017–2018 (% of the previous month)			
Mar 18	100.1	100.1	100.1
Apr 18	105.5	100.1	113.5
May 18	100.2	100.0	100.1
Jun 18	100.1	100.0	100.1
Jul 18	103.7	100.0	108.2
Aug 18	100.2	100.1	100.3

*Note:* over the period from September 1998 to December 2018, the series of the freight rates index were identified as stationary ones; the other series were identified as stationary ones over the period from November 1998 to December 2018, too; fictitious variables for taking into account particularly dramatic fluctuations were used in respect of all the series.

<sup>1</sup> The paper presents a review of the composite freight rate index on freight transport and the motor load 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 motor load freight and air service (for more detailed information, pls. refer, for instance, to: *Prices in Russia*. The Official Publication of Goskomstat of RF, 1998).

## MODEL CALCULATIONS OF SHORT-TERM FORECASTS...

and prices for nickel – around \$13,656 per ton. The average forecast price increase for gold constitutes around 5.0 %, the average gain of copper prices—around 3%, and average slide off nickel prices – 2% against the corresponding level of last year.

Table 7

### Calculations of forecast values of world prices on natural resources

	Brent oil (\$ per barrel)	Aluminum (\$ per ton)	Gold (\$ per ounce)	Copper (\$ per ton)	Nickel (\$ per ton)
Forecast values					
Mar 19	70.18	1887	1317	6274	13333
Apr 19	77.59	1888	1324	6302	13393
May 19	75.02	1916	1340	6342	13675
Jun 19	74.29	1909	1355	6367	13727
Jul 19	76.00	1910	1362	6394	13935
Aug 19	76.83	1922	1370	6420	13873
Expected growth on the respective month of the previous year (%)					
Mar 19	-0.1	-5.9	-0.5	-6.9	-0.4
Apr 19	3.2	-16.1	-0.8	-7.6	-2.1
May 19	-3.3	-16.4	2.8	-7.1	-10.6
Jun 19	-6.5	-10.4	5.8	-3.8	-8.2
Jul 19	2.4	-8.3	10.0	1.1	-1.0
Aug 19	-0.8	-9.3	14.0	7.2	8.3
For reference: actual values in the same period of 2017–2018					
Mar 18	70.27	2005	1325	6739	13380
Apr 18	75.17	2249	1335	6821	13675
May 18	77.59	2292	1303	6828	15293
Jun 18	79.44	2132	1282	6620	14950
Jul 18	74.25	2083	1239	6323	14075
Aug 18	77.42	2120	1201	5986	12815

Note: over the period from January 1980 to January 2019, the series of prices of crude oil, nickel, gold, copper, and aluminum are series of DS type.

## MONETARY INDICES

The future values of the monetary base (in the narrow definition: cash funds and the Fund of Mandatory Reserves (FMR) and  $M_2$  monetary aggregate over the period from March to August of 2019 were received on the basis of models of time-series of respective indices calculated by the CBR<sup>1</sup> over the period from October 1998 to February 2019. 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 March–August 2019, the monetary base will be growing at an average monthly rate of 0.7%. The monetary index  $M_2$  will not be changing on average.

Table 8

### The forecast of $M_2$ and the monetary base

	The Monetary base		$M_2$	
	Billion RUB	Growth on the previous month. %	Billion RUB	Growth on the previous month. %
Mar 19	10294	1.7	46094	0.8
Apr 19	10281	-0.1	45703	-0.8
May 19	10431	1.5	46093	0.9
Jun 19	10423	-0.1	45703	-0.8
Jul 19	10573	1.4	46093	0.9
Aug 19	10567	-0.1	45702	-0.8
For reference: actual value in the respective months of 2017–2018 (growth on the previous month, %)				
Mar 18		1.8		1.1
Apr 18		1.2		0.8
May 18		4.0		1.8
Jun 18		-0.3		0.3
Jul 18		2.1		2.0
Aug 18		1.0		-0.5

Note: over the period from October 1998 to February of 2019, 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.

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

## INTERNATIONAL RESERVES

### INTERNATIONAL RESERVES

This section presents the outputs of the statistical estimation of such future values of the international reserves of the Russian Federation<sup>1</sup> 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 January of 2019. 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 for March-August 2019, the international reserves will be growing at an average monthly rate of 0.6%.

### FOREIGN EXCHANGE RATES

The model calculations of prospective values of the foreign exchange rates (RUB 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 January 2019 and from February 1999 to February 2019<sup>2</sup>, respectively.

In March-August 2019, USD/RUB average exchange rate is forecast in the amount of RUB 65.29 for USD by two models. Over the period under review, Euro/USD exchange rate is forecast during the forecast period at USD 1.16 per 1 euro.

### THE LIVING STANDARD INDEXES

This section (Table 12) presents calculations of forecast values of indices of real wages, real disposable income and real income<sup>3</sup> as were received on the basis of the model

Table 9

#### The forecast of the international reserves of the Russian Federation

	Forecast values according to ARIMA-model	
	Billion USD	Growth on the previous month, %
Mar 19	478.3	1.0
Apr 19	481.5	0.7
May 19	483.6	0.4
Jun 19	485.9	0.5
Jul 19	488.4	0.5
Aug 19	490.9	0.5
For reference: actual values in the same period of 2017–2018		
Mar 18	453.6	1.3
Apr 18	458.0	1.0
May 18	459.9	0.4
Jun 18	456.6	-0.7
Jul 18	456.7	0.0
Aug 18	458.0	0.3

Note: over the period from October 1998 to January 2019, the series of the gold and foreign exchange reserves of the Russian Federation were identified as stationary series in difference.

Table 10

#### Forecasts of the USD/RUB and EUR/USD exchange rates

	The USD/RUB exchange rate (RUB per USD)		The EUR/USD exchange rate (USD per EUR)	
	ARIMA	SM	ARIMA	SM
Mar 19	65.25	64.38	1.14	1.16
Apr 19	65.77	63.88	1.14	1.18
May 19	65.89	64.41	1.14	1.18
Jun 19	66.15	64.85	1.14	1.18
Jul 19	66.36	64.87	1.14	1.18
Aug 19	66.59	65.04	1.14	1.18
For reference: actual values in the similar period of 2017–2018				
Mar 18	57.26		1.23	
Apr 18	62.00		1.21	
May 18	62.59		1.18	
Jun 18	62.76		1.17	
Jul 18	62.78		1.18	
Aug 18	68.08		1.16	

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

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

<sup>2</sup> The authors use the IMF data regarding Euro/USD over the period from January 1999 to January 2019 and regarding USD/RUR over the period from October 1998 to February 2019. Data regarding Euro/USD for February 2019 were taken from the exchange rate statistics site [www.oanda.com](http://www.oanda.com).

<sup>3</sup> *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).

of time series of respective indices computed by Rosstat and taken over the period from January 1999 to January 2019. 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 average monthly decline of the real disposable cash income is forecast at the rate of 0.9% compared to the previous year; the real the real cash income down 0.5%. The forecast average monthly gain of the accrued wages will amount to 2.5%.

Table 11  
The forecast of the living standard indexes

	Real disposable cash income	Real cash income	Real accrued wages
Forecast values according to ARIMA-models (% of the respective month of 2017–2018)			
Mar 19	96.5	97.3	100.9
Apr 19	98.5	99.2	101.5
May 19	99.2	99.4	102.2
Jun 19	99.0	99.4	102.8
Jul 19	99.9	100.2	103.4
Aug 19	101.6	101.3	103.9
For reference: actual values in the respective period of 2017–2018 (% of the same period of 2016–2017)			
Mar 18	103.8	104.1	108.7
Apr 18	104.8	104.9	107.6
May 18	99.4	100.7	107.6
Jun 18	99.8	100.6	107.2
Jul 18	101.5	102.1	107.5
Aug 18	97.7	98.9	106.8

Note: for calculating purposes the series of the real disposable cash income, real cash income and real accrued wages in the base form were used (January 1999 was adopted as a base period). Over the period from January 1999 to January 2019, those series were attributed to the class of processes, which are stationary in differences and have an explicit seasonal component.

## EMPLOYMENT AND UNEMPLOYMENT

For the purpose of calculation of the future values of the employment (of the number the gainfully employed population) and the unemployment (the total number of the unemployed), models of the time series evaluated over the period from October 1998 to December 2018 on the basis of the monthly data released by Rosstat<sup>1</sup> were used. The unemployment was calculated on the basis of the models with results of the findings from business surveys<sup>2</sup> too.

It is to be noted that feasible logical inconsistencies<sup>3</sup> 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.

<sup>1</sup> The index is computed in accordance with the methods of the International Labor Organization (ILO) and is given as of the month-end.

<sup>2</sup> The model is evaluated over the period from January 1999 to December 2018.

<sup>3</sup> 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.

## EMPLOYMENT AND UNEMPLOYMENT

Table 12

Calculation of forecast values of the indices the employment and the unemployment

	Employment (ARIMA)		Unemployment (ARIMA)			Unemployment (BS)		
	Million people	Growth on the respective month of previous year (%)	Million people	Growth on the respective month of previous year (%)	% of the index of the number of the gainfully employed population	Million people	Growth on the respective month of previous year (%)	% of the index of the number of the gainfully employed population
Mar 19	72.1	-0.2	3.7	-2.7	5.1	3.7	-2.6	5.1
Apr 19	72.2	-0.1	3.6	-1.6	5.0	3.7	0.0	5.1
May 19	72.6	0.1	3.5	-3.0	4.8	3.6	0.4	5.0
Jun 19	72.7	0.3	3.4	-1.8	4.7	3.6	2.9	5.0
Jul 19	72.9	0.2	3.5	-2.9	4.8	3.7	2.5	5.1
Aug 19	73.3	-0.1	3.4	-2.4	4.7	3.6	4.2	4.9
For reference: actual values in the same periods of 2017–2018 (million people)								
Mar 18	72.3		3.8					
Apr 18	72.3		3.7					
May 18	72.5		3.6					
Jun 18	72.5		3.5					
Jul 18	72.7		3.6					
Aug 18	73.4		3.5					

Note: over the period from October 1998 to December 2018, 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 March–August 2019, the increase of the number of employed in the economy will average 0.0% per month against the corresponding period of the previous year.

The decrease of the total number of jobless is forecast to average 0.6% per month against the same period of last year.

**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)

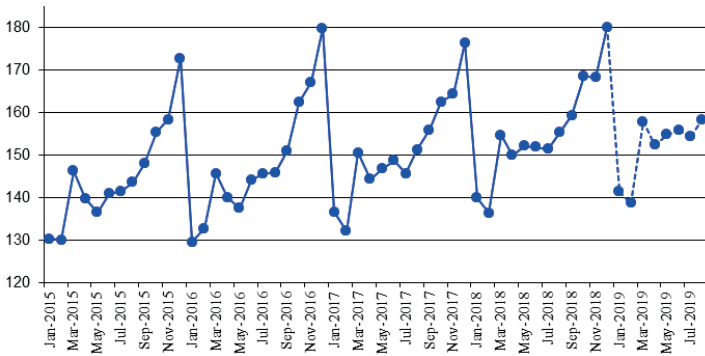


Fig. 1b. The NRU HSE industrial production index (ARIMA-model) (% of January 2010)

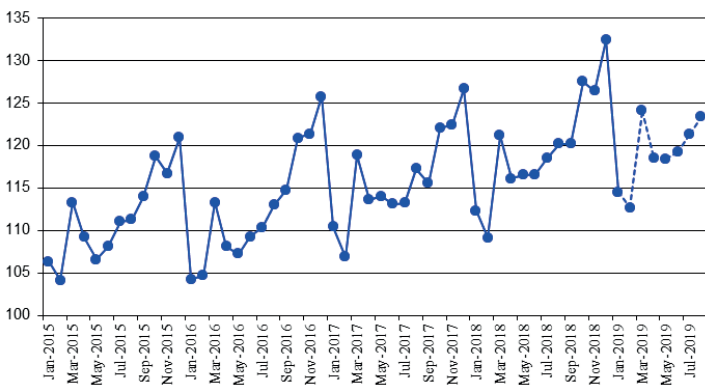


Fig. 2a. The Rosstat industrial production index for mining (% of December 2001)

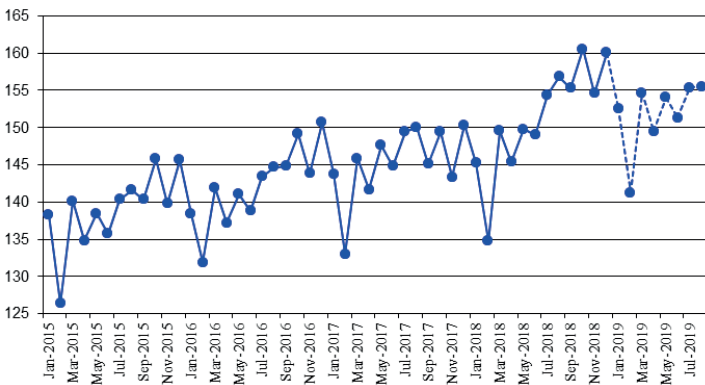


Fig. 2b. The NRU HSE industrial production index for mining (% of January 2010)

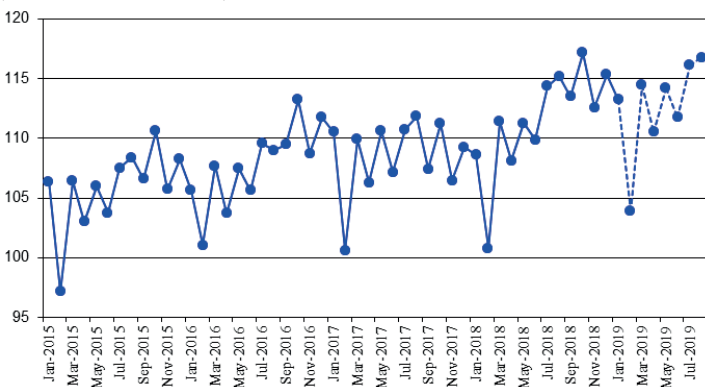


Fig. 3a. The Rosstat industrial production index for manufacturing (% of December 2001)

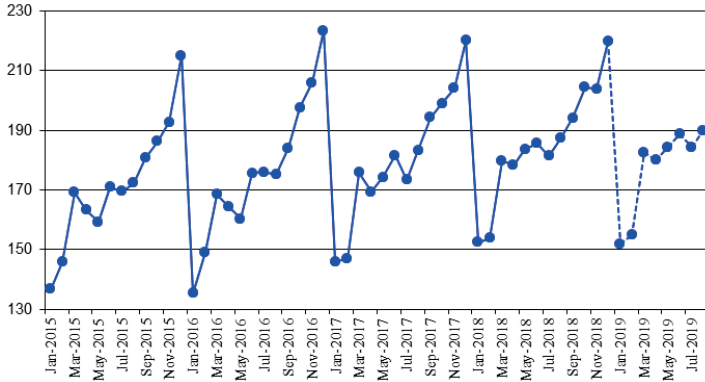


Fig. 3b. The NRU HSE industrial production index for manufacturing (% of January 2010)

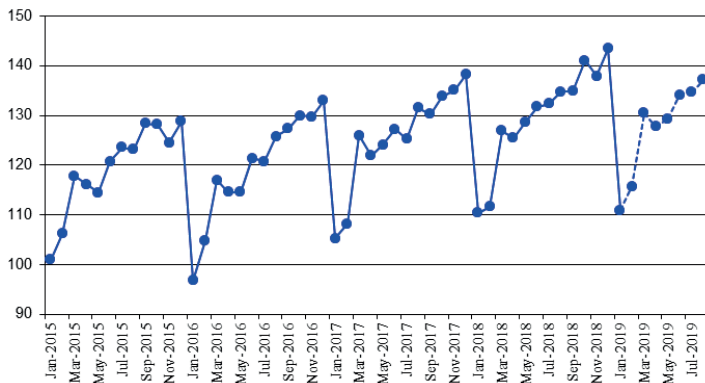


Fig. 4a. The Rosstat industrial production index for utilities (electricity, water, and gas) (as a percentage of that in December 2001)

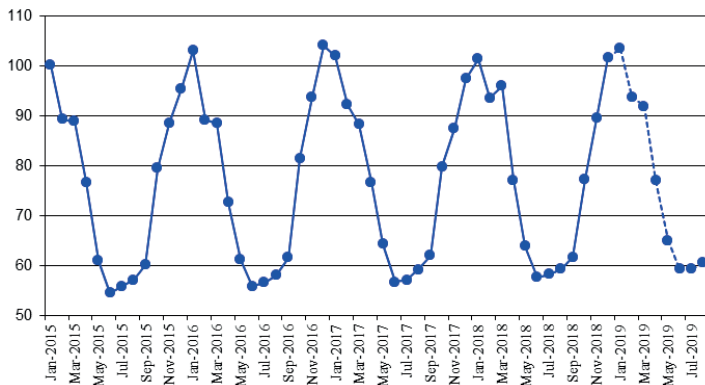
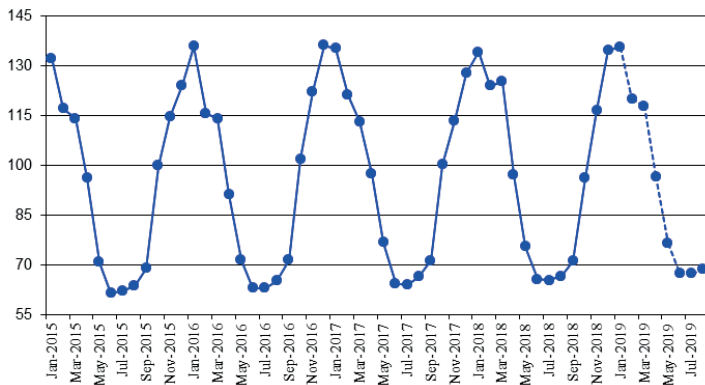


Fig. 4b. The NRU HSE industrial production index for utilities (electricity, water, and gas) (as a percentage of that in January 2010)



MODEL CALCULATIONS OF SHORT-TERM FORECASTS...

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

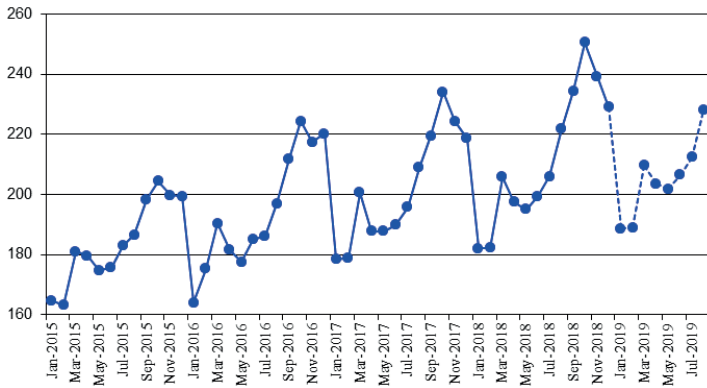


Fig. 5b. The NRU HSE industrial production index for food products (as a percentage of that in January 2010)

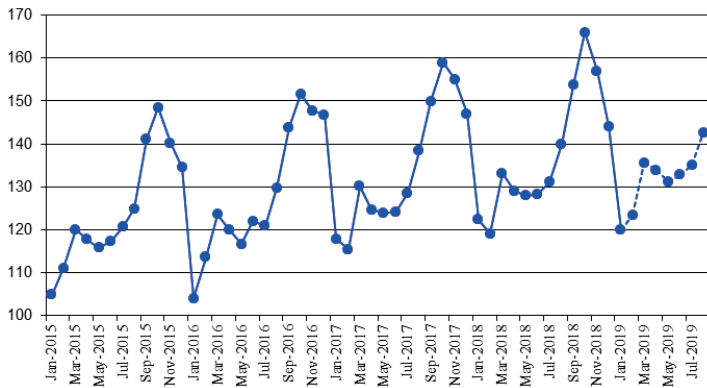


Fig. 6a. The Rosstat industrial production index for coke and petroleum (as a percentage of that in December 2001)

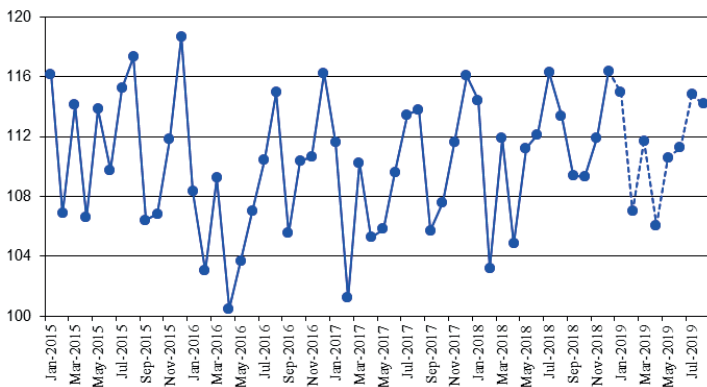


Fig. 6b. The NRU HSE industrial production index for petroleum and coke (as a percentage of that in January 2010)

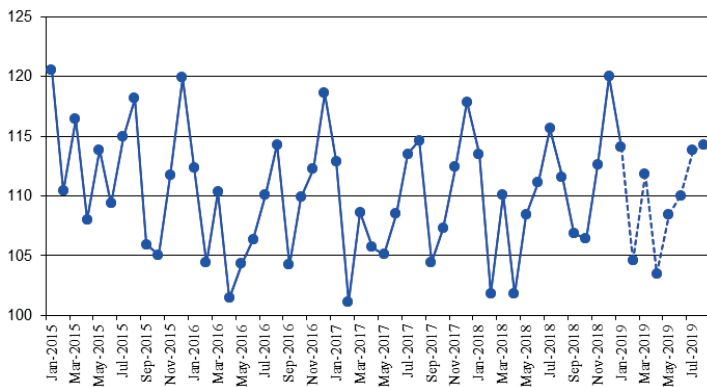




Fig.7a. The Rosstat industrial production index for primary metals and fabricated metal products (as a percentage of that in December 2001)

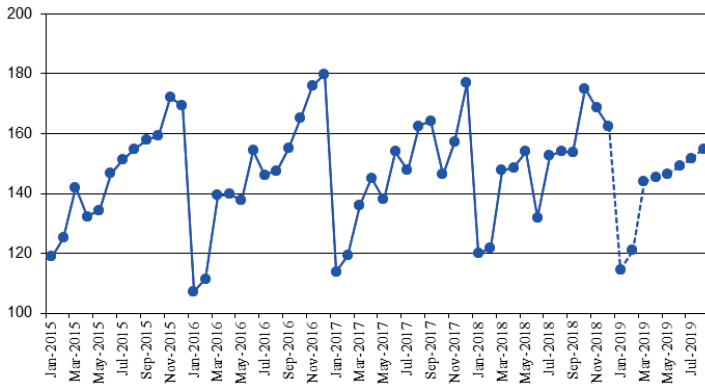


Fig. 7b. The NRU HSE industrial production index for primary metals and fabricated metal products (as a percentage of that in January 2010)

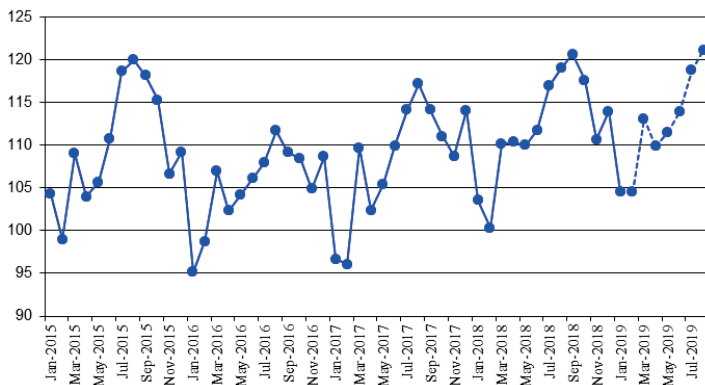


Fig. 8a. The Rosstat industrial production index for machinery (as a percentage of that in December 2001)

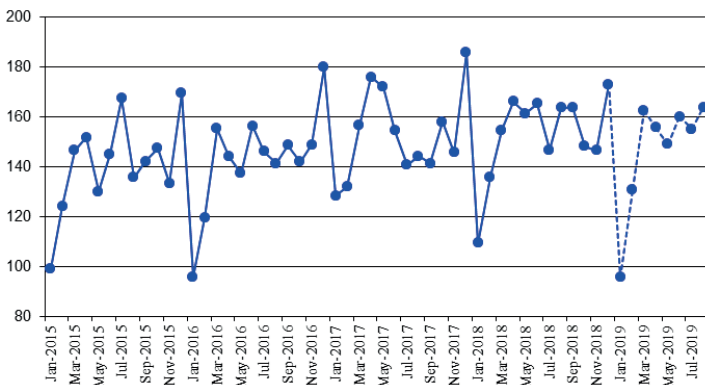
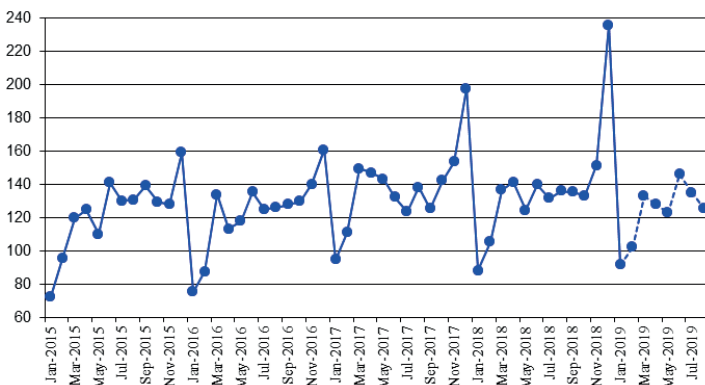


Fig. 8b. The NRU HSE industrial production index for machinery (as a percentage of that in January 2010)



# MODEL CALCULATIONS OF SHORT-TERM FORECASTS...

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

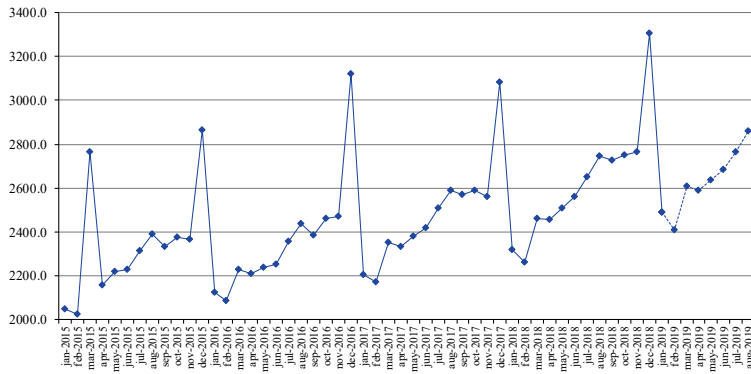


Fig. 9a. The real volume of retail sales (as a percentage of that in the same period of the previous year)

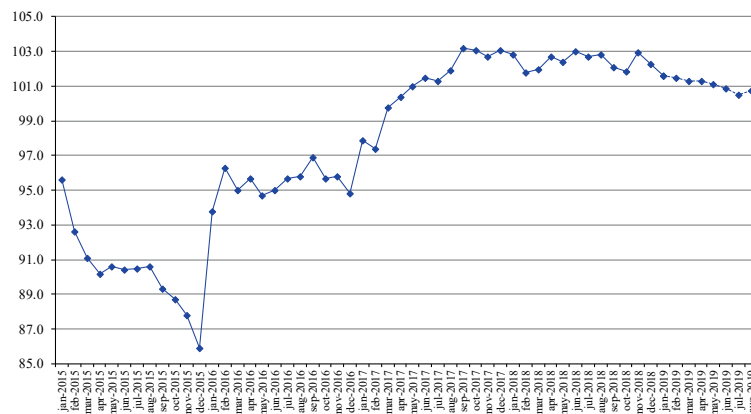


Fig.10. Export to all countries (billion USD)

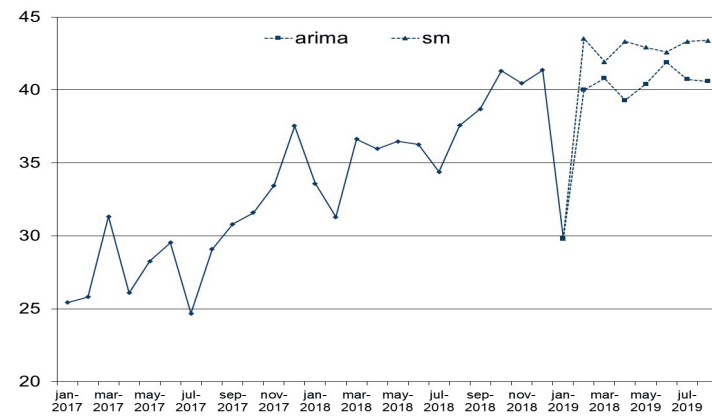


Fig. 11. Export to countries outside the CIS (billion USD)

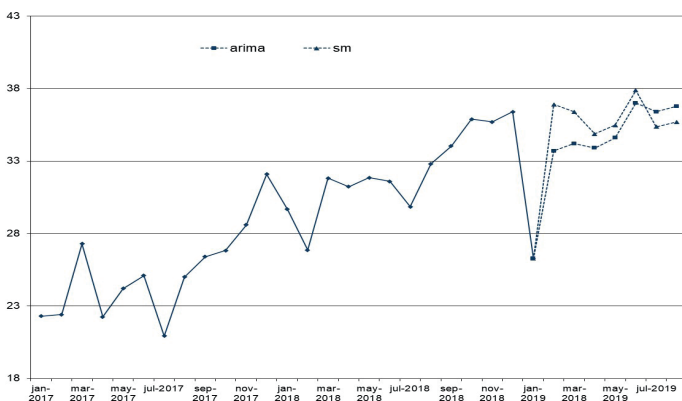


Fig. 12. Import from all countries (billion USD)

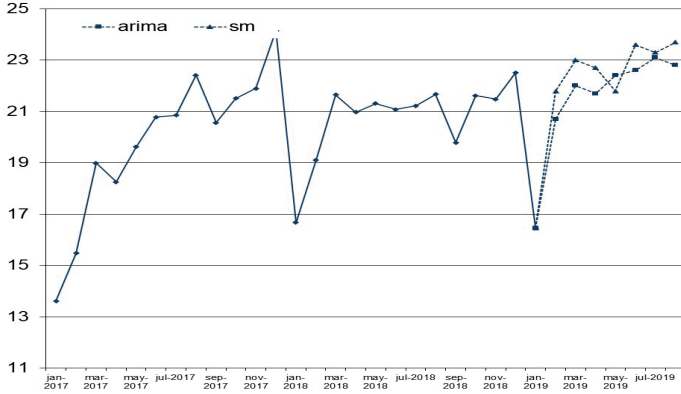


Fig. 13. Import from countries outside the CIS (billion USD)

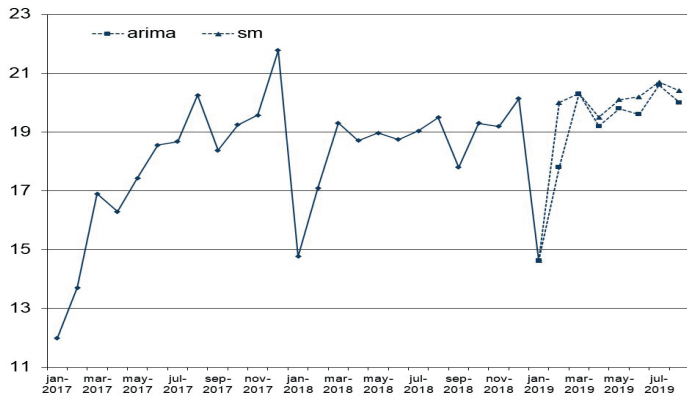


Fig. 14. The consumer price index (as a percentage of that in December of the previous year)

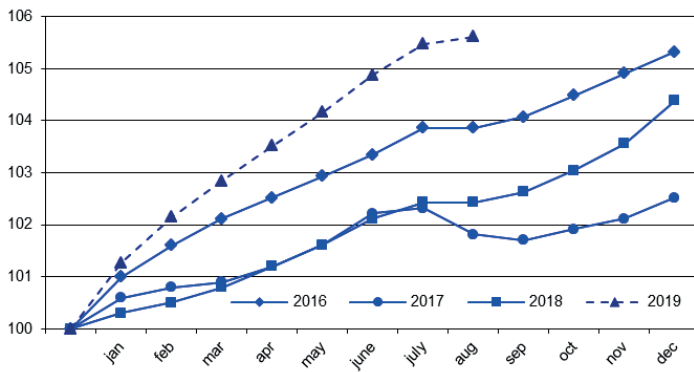
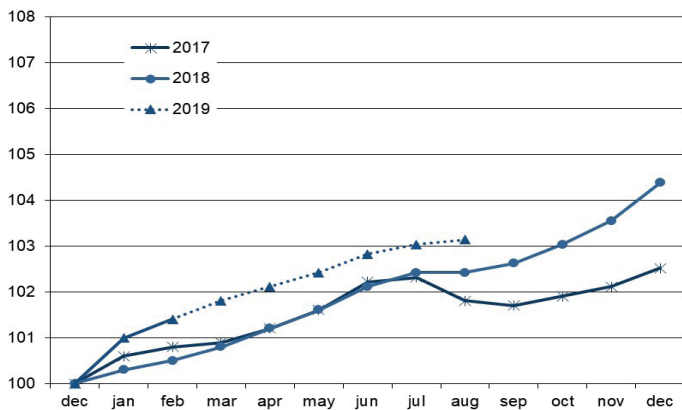


Fig. 14a. The consumer price index (as a percentage of that in December of the previous year) (SM)



MODEL CALCULATIONS OF SHORT-TERM FORECASTS...

Fig.15. The producer price index for industrial goods (as a percentage of that in December of the previous year)

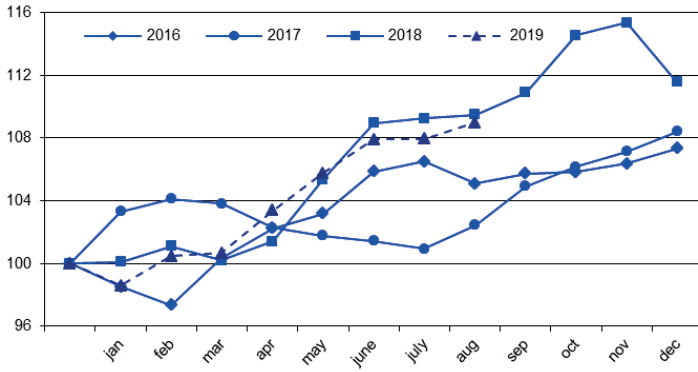


Fig. 16. The price index for mining (as a percentage of that in December of the previous year)

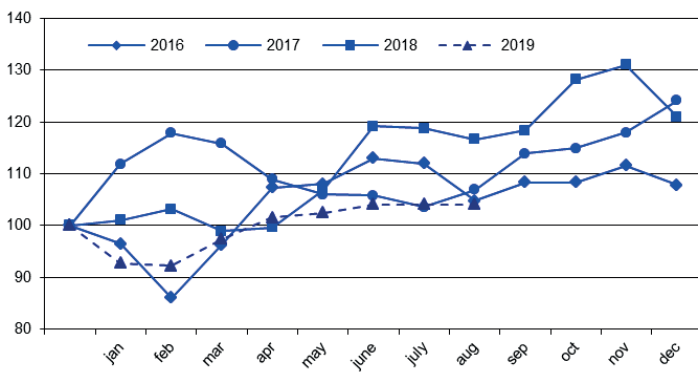


Fig. 17. The price index for manufacturing (as a percentage of that in December of the previous year)

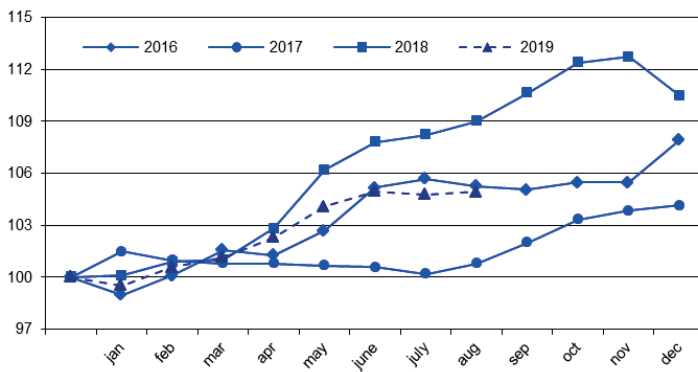


Fig. 18. The price index for utilities (electricity, water, and gas) (as a percentage of that in December of the previous year)

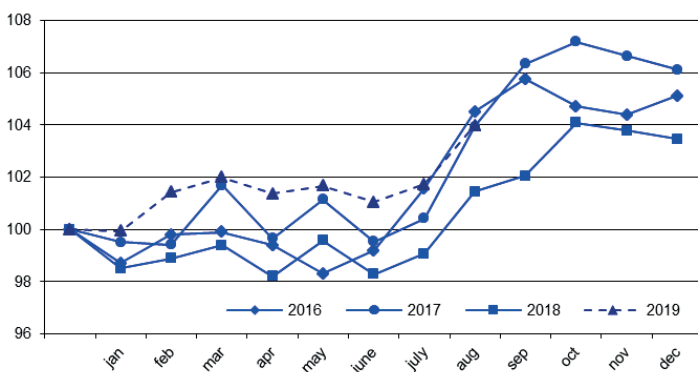


Fig. 19. The price index for food products (as a percentage of that in December of the previous year)

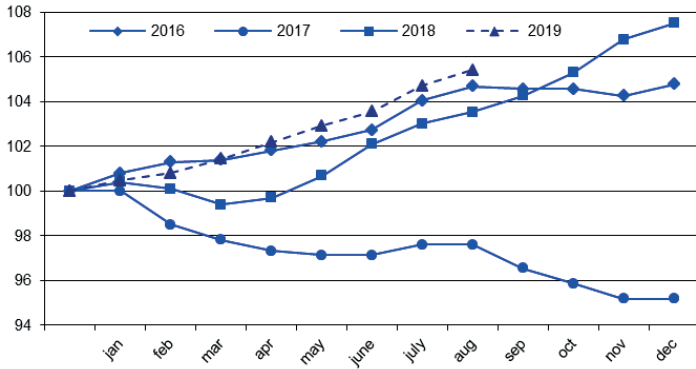


Fig. 20. The price index for the textile and sewing industry (as a percentage of that in December of the previous year)

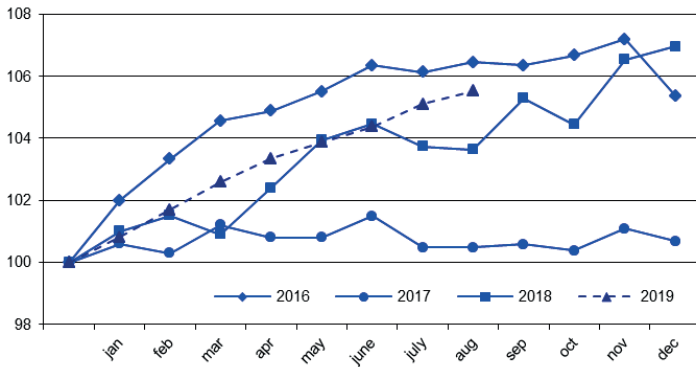


Fig. 21. The price index for wood products (as a percentage of that in December of the previous year)

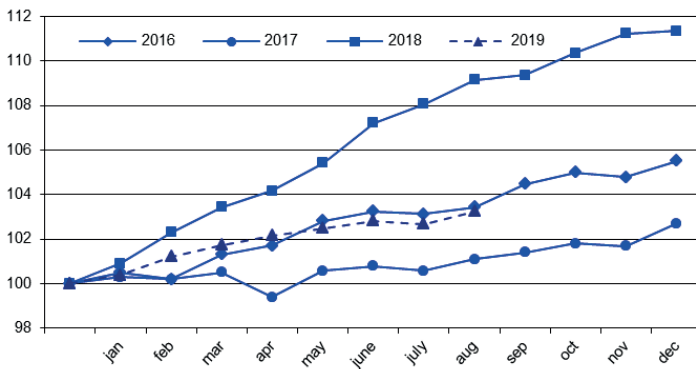
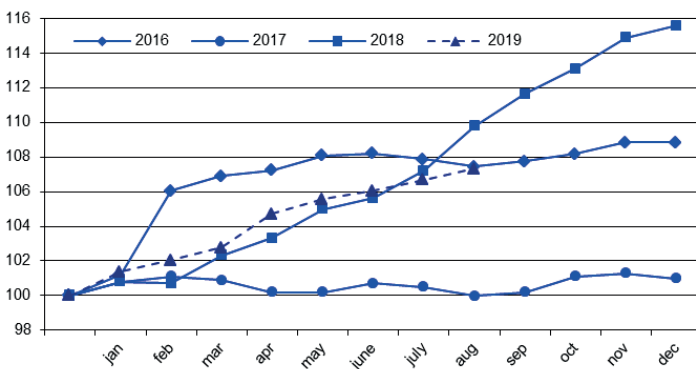


Fig. 22. The price index for the pulp and paper industry (as a percentage of that in December of the previous year)



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Fig. 23. The price index for coke and petroleum (as a percentage of that in December of the previous year)

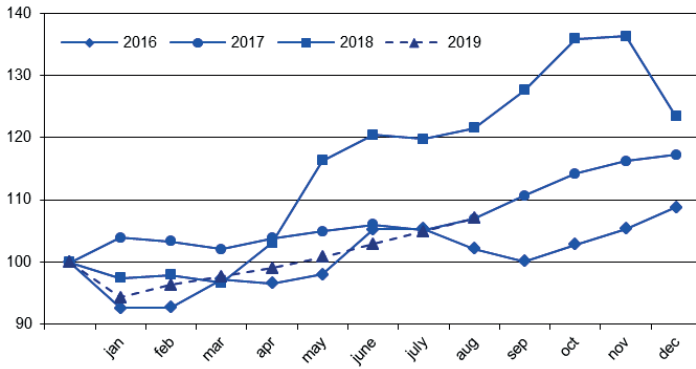


Fig. 24. The price index for the chemical industry (as a percentage of that in December of the previous year)

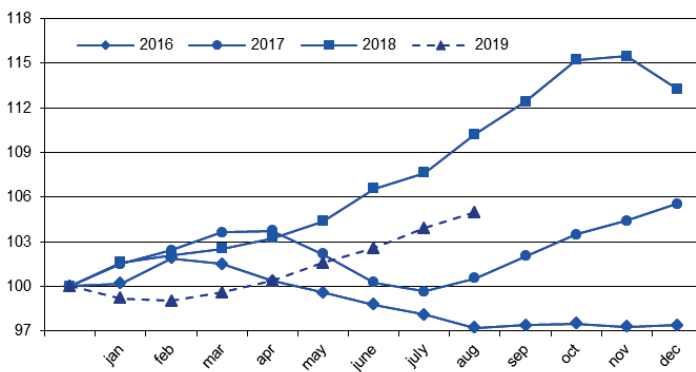


Fig. 25. The price index for primary metals and fabricated metal products (as a percentage of that in December of the previous year)

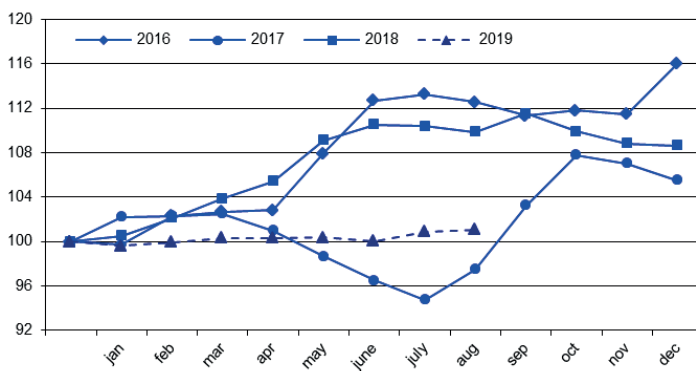


Fig. 26. The price index for machinery (as a percentage of that in December of the previous year)

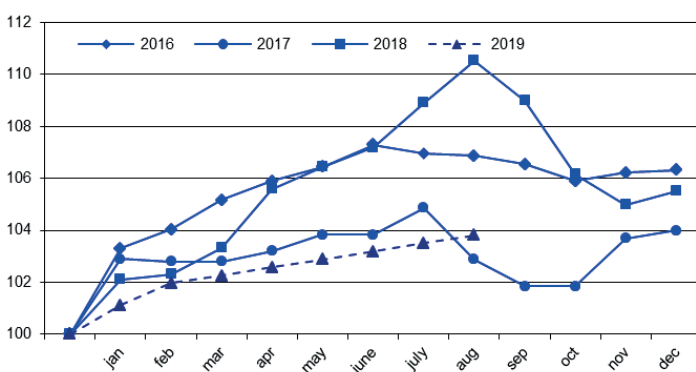


Fig. 27. The price index for transport equipment manufacturing (as a percentage of that in December of the previous year)

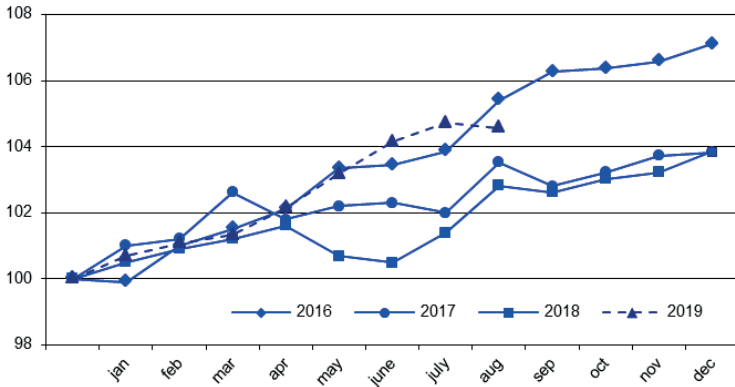


Fig. 28. The cost of the monthly per capita minimum food basket (RUB)

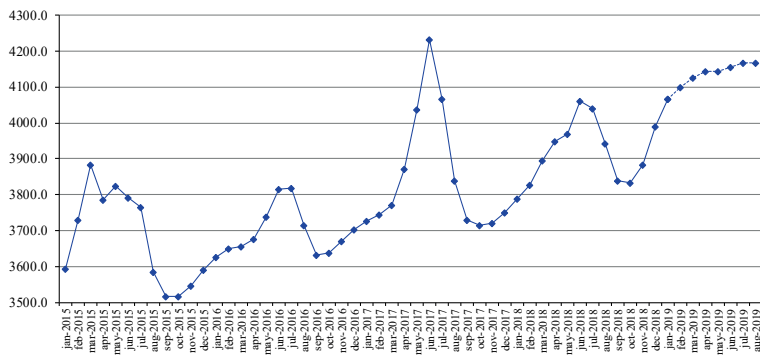


Fig. 29. The composite index of transport tariffs (for each year, as a percentage of that in the previous month)

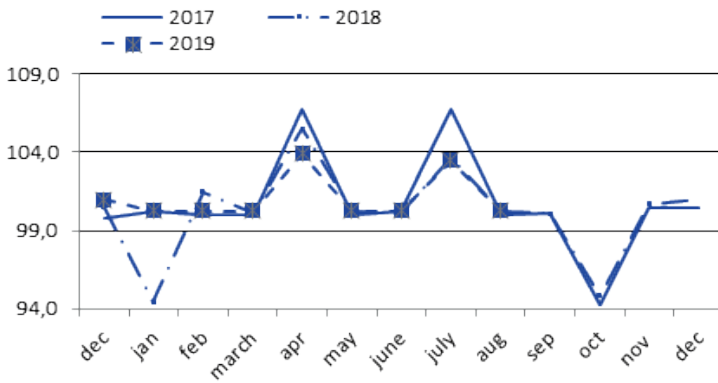
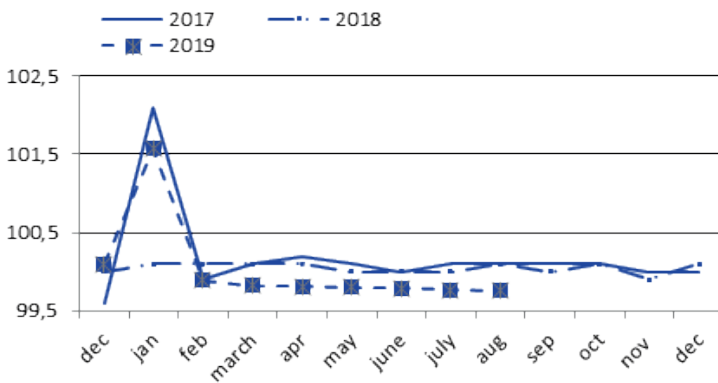


Fig. 30. The index of motor freight tariffs (for each year, as a percentage of that in the previous month)



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

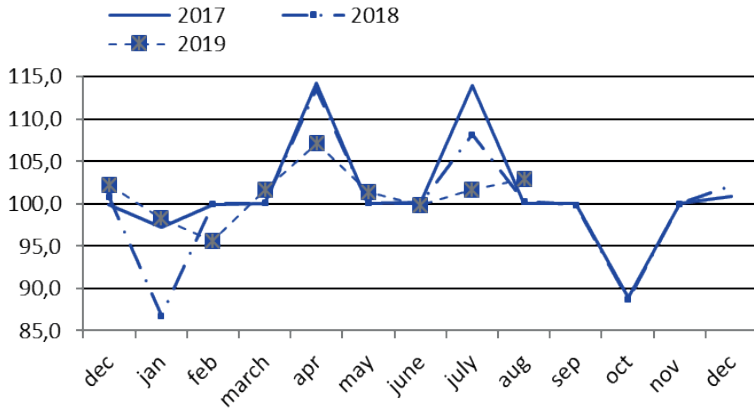


Fig. 32. The Brent oil price (\$ per barrel)

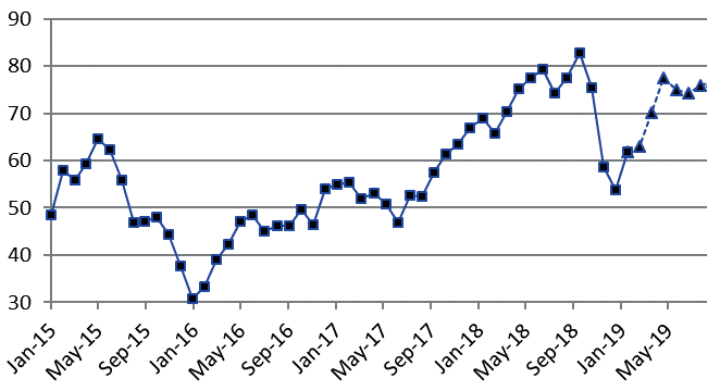


Fig. 33. The aluminum price (\$ per ton)

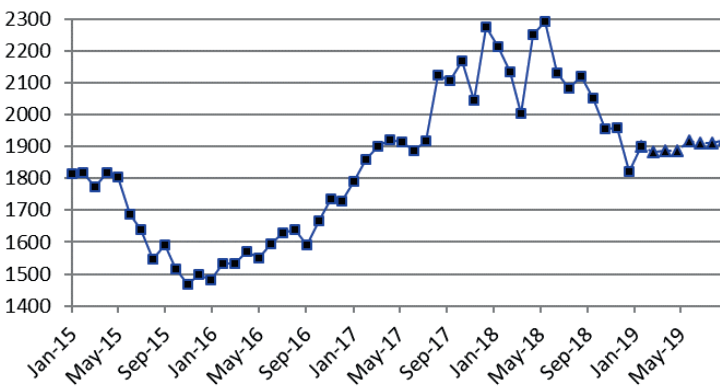


Fig. 34. The gold price (\$ per ounce)

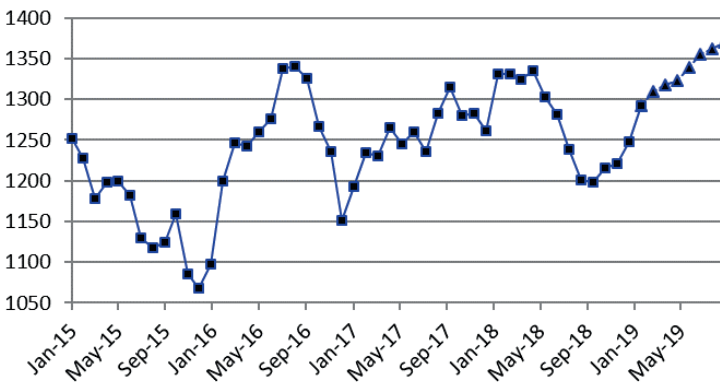




Fig. 35. The nickel price (\$ per ton)

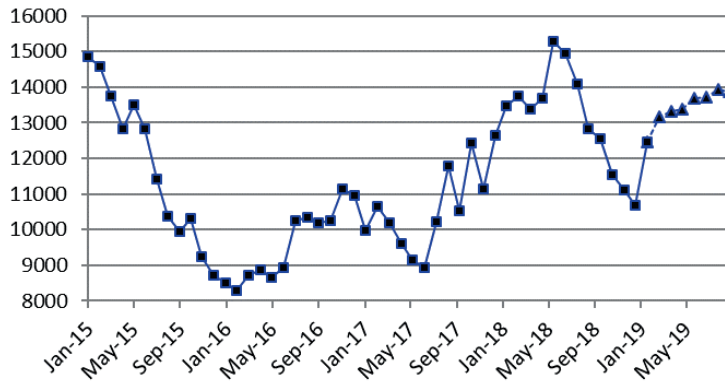


Fig. 36. The copper price (\$ per ton)

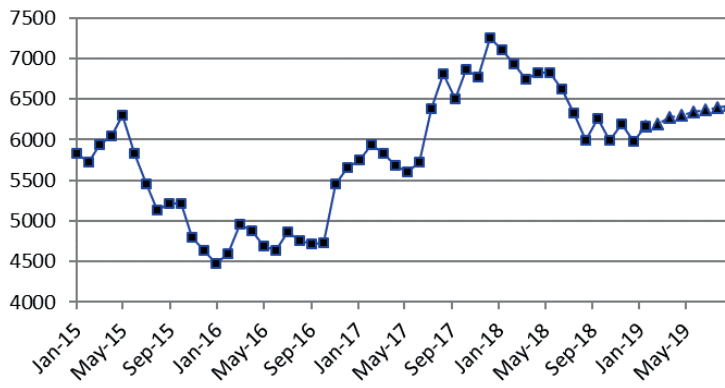


Fig. 37. The monetary base, billion RUB

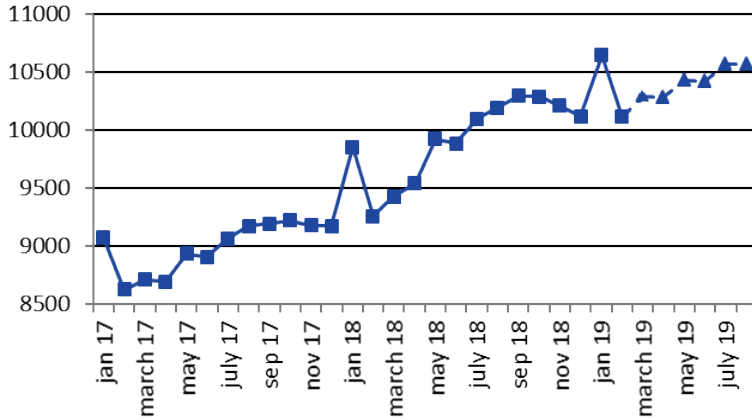
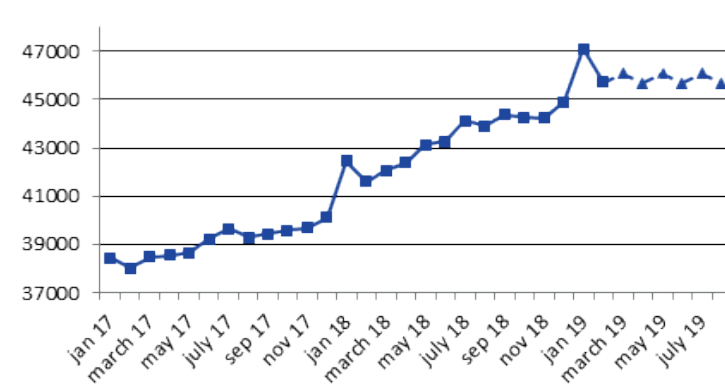


Fig. 38.  $M_2$ , billion RUB



MODEL CALCULATIONS OF SHORT-TERM FORECASTS...

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

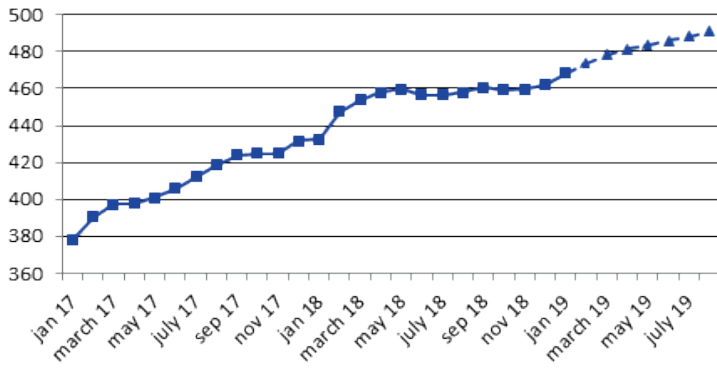


Fig. 40. The RUB/USD exchange rate

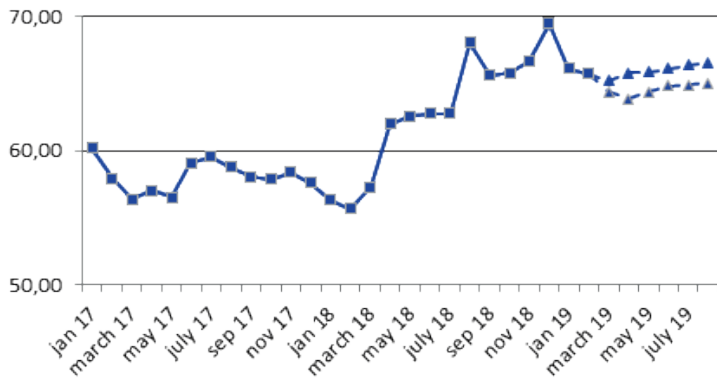


Fig. 41. The USD/EUR exchange rate

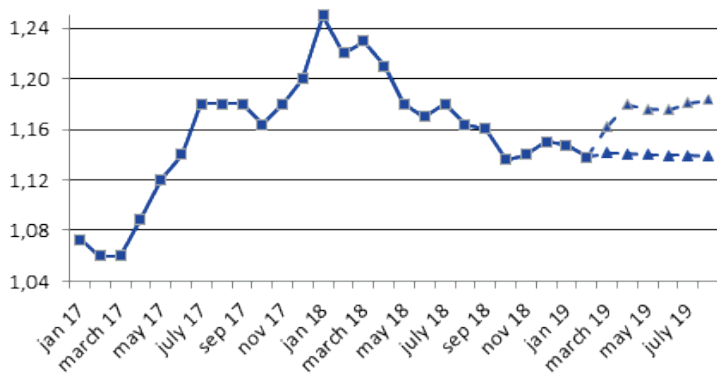


Fig. 42. Real disposable cash income (as a percentage of that in the same period of the previous year)

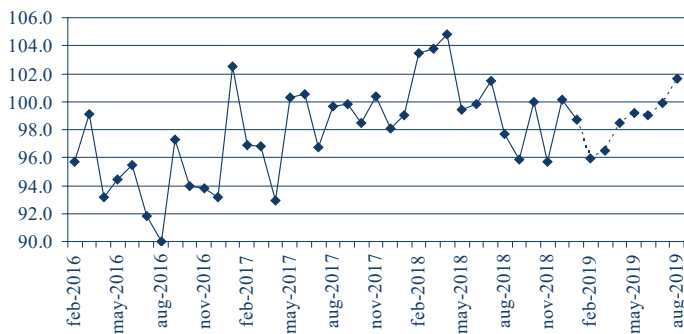


Fig. 43. Real cash income  
(as a percentage of that in the same period of the previous year)

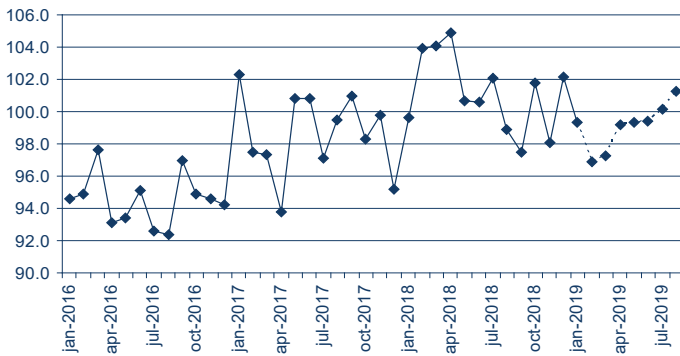


Fig. 44. Real accrued wages  
(as a percentage of those in the same period of the previous year)

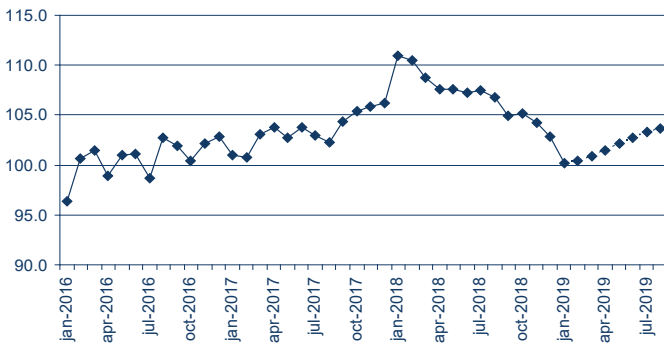


Fig. 45. Employment (million people)

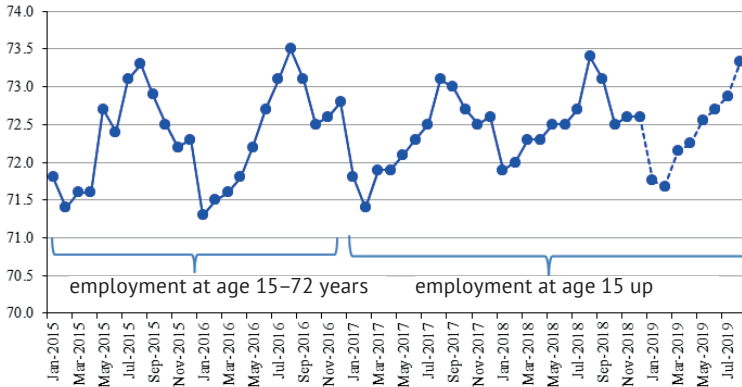
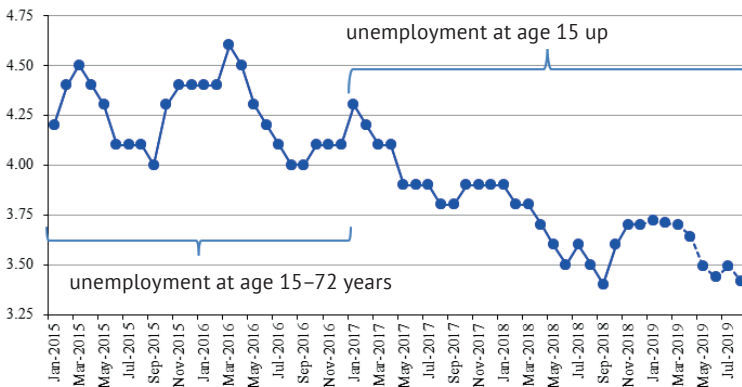


Fig. 46. Unemployment (million people)



## MODEL CALCULATIONS OF SHORT-TERM FORECASTS...

### Model calculations of short-term forecasts of social and economic indices of the Russian Federation: February 2019

Index	Dec 2018	2019							
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Rosstat IIP (growth rate, %)*	<b>2,0</b>	1,0	2,3	2,1	2,4	1,5	2,4	2,6	2,0
HSE IIP (growth rate %)*	<b>4,5</b>	<b>1,9</b>	3,1	2,3	2,7	1,4	2,2	2,8	2,4
Rosstat IIP for mining (growth rate, %)*	<b>6,3</b>	5,0	4,8	3,4	2,8	2,9	1,5	0,6	-0,9
HSE IIP for mining (growth rate, %)*	<b>5,6</b>	<b>4,3</b>	3,1	2,7	2,2	2,6	1,7	1,6	1,4
Rosstat IIP for manufacturing (growth rate, %)*	<b>0,0</b>	-0,3	0,7	1,6	1,0	0,4	1,7	1,6	1,3
HSE IIP for manufacturing (growth rate, %)*	<b>3,8</b>	<b>0,6</b>	3,6	2,8	1,8	0,6	1,8	1,7	1,8
Rosstat IIP for utilities (electricity, water, and gas) (growth rate, %)*	<b>4,5</b>	2,1	0,2	-4,3	-0,1	1,9	2,9	1,8	2,1
HSE for utilities (electricity, water, and gas) (growth rate, %)*	<b>5,5</b>	<b>1,1</b>	-3,3	-5,9	-0,6	1,3	2,7	3,2	3,0
Rosstat IIP for food products (growth rate, %)*	<b>4,5</b>	3,6	3,8	1,8	3,2	3,5	3,6	3,2	2,7
HSE IIP for food products (growth rate, %)*	<b>-2,0</b>	<b>-1,9</b>	3,7	1,8	3,8	2,5	3,6	3,1	1,9
Rosstat IIP for coke and petroleum (growth rate, %)*	<b>0,2</b>	0,4	3,7	-0,2	1,2	-0,6	-0,8	-1,3	0,7
HSE for coke and petroleum (growth rate, %)*	<b>1,8</b>	<b>0,5</b>	2,7	1,6	1,7	0,0	-1,0	-1,6	2,4
Rosstat for primary metals and fabricated metal products (growth rate, %)*	<b>-8,3</b>	-4,4	-0,7	-2,6	-2,0	-4,9	13,0	-0,5	0,4
HSE IIP for primary metals and fabricated metal products (growth rate, %)*	<b>-0,1</b>	<b>1,0</b>	4,2	2,7	-0,4	1,4	1,9	1,5	1,8
Rosstat IIP for machinery (growth rate, %)*	<b>-6,2</b>	-12,7	-3,7	5,2	-6,2	-7,6	-3,1	5,8	0,1
HSE IIP for machinery (growth rate %)*	<b>19,2</b>	<b>3,9</b>	-3,0	-2,9	-9,4	-1,3	4,5	2,5	-7,6
Retail sales, trillion Rb	<b>3,31</b>	2,49	2,41	2,61	2,59	2,64	2,68	2,76	2,86
Real retail sales (growth rate, %)*	<b>2,3</b>	1,6	1,5	1,3	1,3	1,1	0,9	0,5	0,8
Export to all countries (billion \$)	<b>41,4</b>	<b>29,8</b>	41,8	41,4	41,3	41,7	42,3	42,0	42,0
Export to countries outside the CIS (billion \$)	<b>36,4</b>	<b>26,3</b>	35,3	35,3	34,4	35,1	37,5	35,9	36,3
Import from all countries (billion \$)	<b>22,5</b>	<b>16,5</b>	21,3	22,5	22,2	22,1	23,1	23,2	23,3
Import from countries outside the CIS (billion \$)	<b>20,1</b>	<b>14,6</b>	18,9	20,3	19,4	20,0	19,9	20,7	20,2
CPI (growth rate, %)**	<b>0,8</b>	1,0	0,6	0,5	0,5	0,5	0,5	0,4	0,2
PPI for industrial goods (growth rate, %)**	<b>-3,3</b>	-1,1	0,8	0,3	1,4	1,4	1,6	0,6	0,1
PPI for mining (growth rate, %)**	<b>-7,7</b>	-7,2	-0,6	5,6	4,2	1,0	1,5	0,0	0,0
PPI for manufacturing (growth rate, %)**	<b>-2,0</b>	-0,5	1,0	0,6	1,1	1,8	0,8	-0,2	0,2
PPI for utilities (electricity, water, and gas) (growth rate, %)**	<b>-0,3</b>	-0,1	1,5	0,6	-0,6	0,3	-0,6	0,7	2,2
PPI for food products (growth rate, %)**	<b>0,7</b>	0,5	0,3	0,6	0,8	0,7	0,6	1,1	0,7
PPI for the textile and sewing industry (growth rate, %)**	<b>0,4</b>	0,8	0,9	0,9	0,7	0,5	0,5	0,7	0,4
PPI for wood products (growth rate, %)**	<b>0,1</b>	0,4	0,8	0,5	0,4	0,3	0,3	-0,1	0,6
PPI for the pulp and paper industry (growth rate, %)**	<b>0,6</b>	1,4	0,7	0,7	1,9	0,8	0,5	0,6	0,6
PPI for coke and petroleum (growth rate, %)**	<b>-9,5</b>	-5,7	2,2	1,4	1,4	1,7	2,1	1,9	2,0
PPI for the chemical industry (growth rate, %)**	<b>-1,9</b>	-0,8	-0,2	0,6	0,8	1,2	1,0	1,3	1,0
PPI for primary metals and fabricated metal products (growth rate, %)**	<b>-0,2</b>	-0,4	0,3	0,4	0,0	0,1	-0,4	0,9	0,2
PPI for machinery (growth rate, %)**	<b>0,5</b>	1,1	0,8	0,3	0,3	0,3	0,3	0,3	0,3
PPI for transport equipment manufacturing (growth rate, %)**	<b>0,6</b>	0,7	0,4	0,3	0,8	1,0	0,9	0,5	-0,1
The cost of the monthly per capita minimum food basket (thousand Rb)	<b>3,99</b>	4,07	4,10	4,13	4,14	4,14	4,15	4,17	4,17
The composite index of transportation tariffs (growth rate, %)**	<b>0,1</b>	1,6	-0,1	-0,2	-0,2	-0,2	-0,2	-0,2	-0,2
The index of pipeline tariffs (growth rate, %)**	<b>2,2</b>	-1,7	-4,3	1,7	7,1	1,4	-0,1	1,6	3,0
The index of motor freight tariffs (growth rate, %)**	<b>1,0</b>	0,3	0,3	0,3	3,9	0,2	0,2	3,5	0,2
The Brent oil price (\$ a barrel)	<b>53,8</b>	<b>61,9</b>	62,9	70,2	77,6	75,0	74,3	76,0	76,8
The aluminum price (thousand \$ a ton)	<b>1,82</b>	<b>1,90</b>	1,88	1,89	1,89	1,92	1,91	1,91	1,92

Index	Dec 2018	2019							
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
The gold price (thousand \$ per ounce)	<b>1,25</b>	<b>1,29</b>	1,31	1,32	1,32	1,34	1,36	1,36	1,37
The nickel price (thousand \$ a ton)	<b>5,98</b>	<b>6,16</b>	6,20	6,27	6,30	6,34	6,37	6,39	6,42
The copper price (thousand \$ a ton)	<b>10,7</b>	<b>12,5</b>	13,2	13,3	13,4	13,7	13,7	13,9	13,9
The monetary base (trillion Rb)	<b>10,1</b>	<b>10,6</b>	<b>10,1</b>	10,3	10,3	10,4	10,4	10,6	10,6
M <sub>2</sub> (trillion Rb)	<b>44,9</b>	<b>47,1</b>	<b>45,7</b>	46,1	45,7	46,1	45,7	46,1	45,7
Gold and foreign exchange reserves (billion \$)	<b>0,46</b>	<b>0,47</b>	0,47	0,48	0,48	0,48	0,49	0,49	0,49
The RUR/USD exchange rate (rubles per one USD)	<b>69,47</b>	<b>66,10</b>	<b>65,76</b>	64,82	64,83	65,15	65,50	65,62	65,82
The USD/EUR exchange rate (USD per one Euro)	<b>1,15</b>	<b>1,15</b>	<b>1,14</b>	1,15	1,16	1,16	1,16	1,16	1,16
Real disposable cash income (growth rate, %)*	<b>0,1</b>	<b>-1,3</b>	-4,1	-3,5	-1,5	-0,8	-1,0	-0,1	1,6
Real cash income (growth rate, %)*	<b>2,2</b>	<b>-0,7</b>	-3,1	-2,7	-0,8	-0,6	-0,6	0,2	1,3
Real accrued wages (growth rate, %)*	<b>2,9</b>	<b>0,2</b>	0,5	0,8	1,5	2,2	2,8	3,4	3,9
Employment (million people)	<b>72,6</b>	71,8	71,7	72,1	72,2	72,6	72,7	72,9	73,3
Unemployment (million people)	<b>3,7</b>	3,7	3,7	3,7	3,7	3,6	3,5	3,6	3,5

Note: actual values are printed in the bold type

\* % of the respective month of the previous year

\*\* % of the previous month.



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