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ANALYSIS OF AVERAGE DAIRY PRODUCTS PRICES IN ODESSA REGION

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Summary. *The equations of time series of dairy products prices within Odessa region using the dynamic models with the contents of periodic component of the series have been developed. Attempting to combine econometric and optimization approaches. On the assumption of this the calculation of model parameters was carried out with the use of spreadsheet application Excel 2010 superstructure Finding Solutions. The period between 2007 and 2014 was chosen as the statistical database. Forecasting values of dairy products prices for 2017 have been got.*

Key words: *time series, trend, graphical analysis, model parameters, periodic component.*

Introduction. Analysis and prediction of goods prices level is one of the most important objectives of the economic science branch known as econometrics. This science combines theoretical achievements of economic science, as well as methods of statistics and calculation apparatus of mathematics. As a result of such a combination the following classical models appeared: correlation and regression models, time series, operations functions, simultaneous equations systems. The article comprises the analysis of the prices of the following dairy products: sweet butter, whole milk, hard pressed and soft-ripened kinds of cheese and sour cream.

Such analysis comprises the following phases: graphical analysis (which enables selecting the kind of time series), trend component analysis, discrimination of periodical component of time series, detecting the model parameters, check-up of the developed model adequacy, calculation of the forecasting values for the future

periods.

Analysis of the latest research. Time series is a classical economic model. Time series consists of two elements: time and indicator value.

At the end of XIX century statistical accounting of the main social life spheres started being carried out systematically.

The works of the Belgian mathematician Lambert-Adolph-Jacques Quetelet dedicated to the criminal statistics contained the survey of the crimes which aren't changed with the time passing. In other words, time series appeared.

Trying to explain the repeatability of the data in dynamics Wilhelm Lexis (1837-19141) came to the stability theory. He also subdivided time series into the following kinds:

- evolutionary(main manifesting of principal trends)
- undulation (wavy change with the time passing)
- periodical (regular reoccurrence of waves)
- oscilationary (chaotic fluctuation of levels)

There are also quite a lot of other kinds of time series.

The goal of research is to get the forecasting values of dairy products prices for 2017 calculated on the basis of time series of the products prices. The choice of time series equation is made with the help of graphical analysis. The calculation of unknown parameters is carried out with the help of spreadsheet application Excel 2010 superstructure Finding Solutions. Checking-up the adequacy is based on Fisher's ratio test.

The results of research. The first step of time series development is graphical analysis. It's necessary to build the line which is supposed to reveal the change of definite dairy products prices in the period of time between 2007 and 2015. For this purpose we will use Excel which offers a wide range of diagrams and plots. In our case we shall choose the plot.

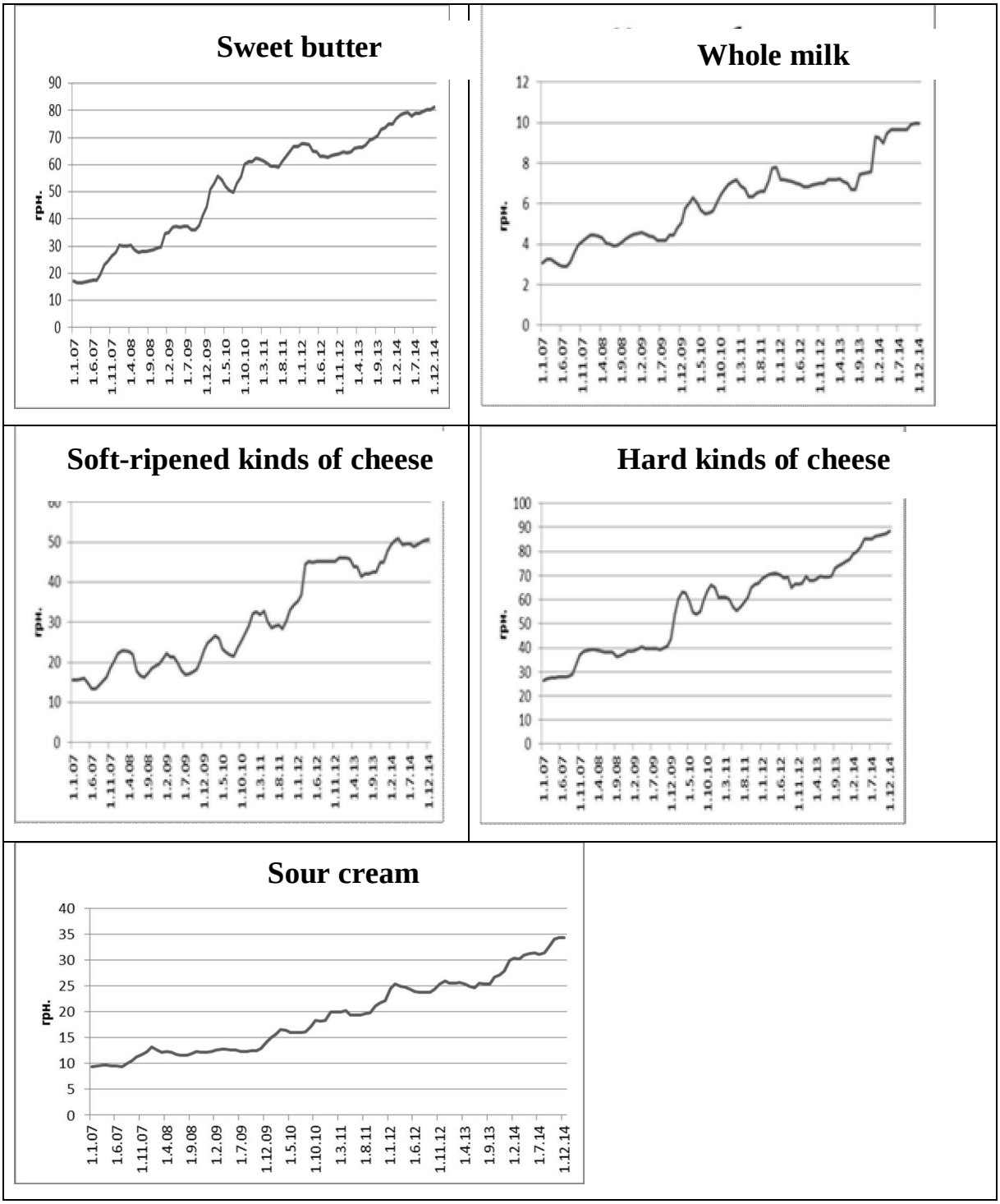

Fig. 1. Fluctuations of dairy product prices

The visual analysis of the plots developed reveals the sinuous tendency of prices fluctuation. And the assumption that the price will grow perpetually proves the choice of the following dynamic model:

$$Y_{прогноз}(t) = L(t) + S(t) \quad (1)$$

in which *L(t)* is the trend component, *S(t)*- is the periodic component.

The trend component can be described with merely any mathematical function,

however, taking into consideration the objective set, we shall chose the logistic trend.

$$L(t) = A + B \cdot Ln(t) \tag{2}$$

To solve the equation of the trend we shall use the standard option of Excel "Trend Line".

Fig. 2. Trends of dairy products prices time series

The equation of the periodical component looks like that:

$$S(t) = C \cdot \sin(D \cdot t) \tag{3}$$

Using the standard spreadsheet application Excel 2010 superstructure Finding Solutions we get the following models:

Table 1

Models of the dairy products prices

Types of Products	Model	Forecasting Values for January 2014, UAH
Sweet butter	Y(t)=14,783Ln(t)	70,89
Whole milk	Y(t)=0,019+1,69 Ln(t)	8,14
Soft-ripened kinds of cheese	Y(t)=8,76Ln(t)	42,02
Hardpressed kinds of cheese	Y(t)=0,2+15,68Ln(t)	75,41
Sour cream	Y(t)=5,43Ln(t)	26,03

Conclusions and Perspectives of further researches. Forecasting is the final phase of economic model building which enables to calculate the future numeric characteristics of phenomenon under analysis on the basis of the previous periods values. Such forecasting values are of probabilistic nature. To make them as close to the true values as possible, it's necessary to sort out the correct dynamic model. The time series theory is still developing alongside with the development of mathematical apparatus, model parameters calculation methods and correspondent software, which makes it possible to get more precise forecasting values in the future.

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АНОТАЦІЯ

Касьянова В.А., Гончарова О.М. Аналіз середніх цін на молочні продукти по одеській області

Побудовані рівняння рідів динаміки цін на молочні продукти по Одеській області, використовуючи моделі динаміки з вмістом періодичної складової ряду. Спроба поєднати економетричні та оптимізаційні методи. Виходячи з цього розрахунок параметрів моделей відбувався з використання надбудови табличного процесору Excel 2010 Поиск решения. Статистичною базою для побудови був обраний період з 2007 по 2014 роки. Отримані прогнозні значення цін на продукти молочної групи на 2017рік.

Ключові слова: *ряд динаміки; тренд; графічний аналіз; параметри моделі; періодична складова.*

АННОТАЦИЯ

Касьянова В. А., Гончарова Е. Н. **Анализ средних цен на молочные продукты по одесской области**

Построены уравнения рядов динамики цен на молочные продукты по Одесской области с использованием моделей динамики, содержащие периодические компоненты ряда. Попытка соединить эконометрические и оптимизационные методы. Исходя из этого, расчет параметров моделей производился с использованием надстройки табличного процессора Excel 2010 Поиск решения. Статистической базой для построения был выбран период с 2007 по 2014 год. Получены прогнозные значения цен на продукты молочной группы на 2017 год.

Ключевые слова: *ряд динамики; тренд; графический анализ; параметры модели; периодическая компонента.*