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ISSUES ON ANALYSING PRODUCTION PROCESSES BY USING PRACTICAL ECONOMETRIC MODEL

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Abstract: The article deals with the information on the issue of meat production in agriculture, enterprises and farms, and comments on the factors influencing it. Given the fact that dairy and meat products of agriculture in the country at the present time are grown mainly on farms, peasant farms and the regression relationship between the factors affecting it has been scientifically studied and the results are presented.

Keywords: regression, farming, forecasting, predicting, production, meat production, correlation coefficient, Fisher criterion, Student criterion.

It is known that certain rules must be followed when creating time series (requirements), which can occur as a result of non-compliance with certain conditions, which can make the row incomparable.

As can be seen from this process, all the components that make up the level of the time series are divided into three groups. The main component is the trend. Once the trend component is removed from it, the value of the seasonal and random components remains.

Also, if all the components of a series are found to be exact, then the mathematical expectation of the random component is zero and its oscillation around the mean is constant.

The main component of the time series is the trend. Trend is a stable trend of the line over time and is more or less free from the effects of random oscillations.

Indicators of changing trends of complex social events and processes can be approximated only by one or another equation, trend lines.

In time series, there are usually three types of trends. The midpoint trend usually represents the changing real level of the phenomenon sought around a straight line, expressed using a mathematical equation:

$$y_t = f(t) + \varepsilon_t, (1)$$

The essence of this function is that the values of the trend will be the mathematical expectation of the dynamic series at some point in time.

The variance trend characterizes the tendency of the difference between the empirical levels and the deterministic component of the series to change.

The autocorrelation trend characterizes the relationships between individual levels of the dynamic series.

The principle of simplicity must be followed in selecting the trend equation sought, and it consists in selecting the closest (somewhat simpler) to the empirical data from several different lines. This is further justified by the fact that the more complex the equation of a linear trend and the more parameters it contains, the more difficult it is to reliably estimate these parameters even when their degree of approximation is equal.

In practice, the following main-view time series trends are often used.

Similarly, trend types and trend equations are also divided.

In econometric studies, a quantitative analysis of each of the components listed above is performed according to the selected model.

Before distinguishing a trend, it is necessary to test the hypothesis of its existence. In practice, there are several criteria for checking for the presence of a trend, but the main one is the two criteria listed in the diagram.

Criteria for checking the presence of a trend:

1)The method of separating the averages of two parts of a row. The hypothesis of the existence of a difference of averages is tested: To do this, the time series is divided into two equal or almost equal parts. The Student Criterion is accepted as the test criterion of the hypothesis. If t ≥, then t is the calculated value of the Student

Criterion; the level of significance is the value in the table, which rejects the hypothesis that there is no trend; if t <, then the (H0) hypothesis is accepted.

2) Foster - Stewart method. The trend of the event and the presence of a trend of variance of the time series levels are determined. Often this method is used in in-depth analysis of the time series and making forecasts on it.

The simplest of the linear trends is the straight line, and it is represented by the linear equation trend:

$$\tilde{y} = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4, (2)$$

As a preliminary information, we take 4 different key indicators as factors influencing meat production in Samarkand region for ten years:

The volume of meat production of dehkan farms of Samarkand region over ten years

Table 1

No.	*Years*	*tons*	*Meat prices Tons UZS.*	*Veterinary service, mln, UZS*	*Salary, UZS.*	*Costs per unit of feed, thousand. UZS.*
1	2010	146545	8767	45	8000	20000
2	2011	151380	12164	45	8000	20000
3	2012	156658	14578	45	8000	20000
4	2013	164037	15668	50	8500	25000
5	2014	171610	21128	50	8500	25000
6	2015	179835	22879	50	9000	25000
7	2016	189106	22465	55	9000	30000
8	2017	185725	26928	60	9500	30000
9	2018	178883	35838	65	9500	35000
10	2019	195799	43122	75	11000	35000
11	2020	201567	45601	86	12540	42000

Here:

$\tilde{y}$ - meat production, tons;

x_1 – price of meat, thousand UZS;

x_2 – veterinary services, mln. UZS;

x_3 – salary, thousand UZS;

x_4 – costs per unit of food, tons per thousand UZS;

a_0, a_1, a_3, a_4 – current unknown regression coefficients.

In this case, the regression equation is:

$$\tilde{y} = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4,$$

We create following results using a Microsoft Excel spreadsheet:

1	ВЫВОД ИТОГОВ								
2									
3	*Регрессионная статистика*								
4	Множественный R	0,959254585							
5	R-квадрат	0,920169359							
6	Нормированный R-	0,866948931							
7	Стандартная ошибк	6651,489155							
8	Наблюдения	11							
9									
10	Дисперсионный анализ								
11		*df*	*SS*	*MS*	*F*	*ачимость F*			
12	Регрессия	4	3,06E+09	7,65E+08	17,28978	0,001913			
13	Остаток	6	2,65E+08	44242308					
14	Итого	10	3,33E+09						
15									
16		*Коэффициент*	*тартная о*	*татисти*	*-Значени*	*ижние 95%*	*ерхние 95%*	*ижние 95,0*	*рхние 95,0%*
17	Y-пересечение	77246,90718	33050,17	2,337262	0,058061	-3623,94	158117,8	-3623,94	158117,8
18	Переменная X 1	1,20712725	0,683985	1,764846	0,128034	-0,46652	2,880777	-0,46652	2,880777
19	Переменная X 2	-3578,01303	1332,129	-2,68594	0,036248	-6837,61	-318,412	-6837,61	-318,412
20	Переменная X 3	20,03037802	8,690963	2,304736	0,060705	-1,23564	41,2964	-1,23564	41,2964
21	Переменная X 4	3,102595368	1,26522	2,452218	0,049641	0,006714	6,198477	0,006714	6,198477
22									

From the table: a_0*= 77246,9 ;*a_1*=1,2071;* a_2*=-3578,01;* a_3*=20,0303;* a_4*=3,1025.*

Putting the found values in formula (1), we construct the regression equation:

$$\tilde{y} = 77246{,}9 + 1{,}2071x_1 - 3538{,}01x_2 + 20{,}030x_3 + 3{,}1025x_4$$

As long as the correlation coefficient is R = 0.95. This result indicates that the relationship between the factors is strong enough because R> 0.7.

The significance of the multivariate correlation coefficient is found by the Fisher criterion: F_{haq} = 17.76.

So, since $F_{haq} > F_{jad}$ = 0.0019, the significance of the correlation coefficient is derived. The forecast for the coming years is as follows.

If the view of the regression equation is chosen as follows:

$$\ln \tilde{y} = \ln a_0 + a_1 \ln x_1 + a_2 \ln x_2 + a_3 \ln x_3 + a_4 \ln x_4, (3)$$

The results of the calculation are as follows:

1	ВЫВОД ИТОГОВ								
2									
3	*ɛгрессионная статистика*								
4	Множественный	0,9736							
5	R-квадрат	0,948							
6	Нормированный	0,9133							
7	Стандартная оши	0,0135							
8	Наблюдения	11							
9									
10	Дисперсионный анализ								
11		*df*	*SS*	*MS*	*F*	*ачимость F*			
12	Регрессия	4	0,02	0,005	27,332	0,00054			
13	Остаток	6	0,001	2E-04					
14	Итого	10	0,021						
15									
16		*Коэффициє*	*ртная атист*		*Значени*	*ижние 95*	*ерхние 95*	*кние 95*	*рхние 95,0%*
17	Y-пересечение	1,0031	1,263	0,794	0,4573	-2,0876	4,093804	-2,088	4,093804
18	Переменная X 1	0,1228	0,058	2,132	0,077	-0,0181	0,263689	-0,018	0,263689
19	Переменная X 2	-0,854	0,332	-2,572	0,0422	-1,6664	-0,0414	-1,666	-0,0414
20	Переменная X 3	0,8452	0,367	2,306	0,0606	-0,0517	1,742146	-0,052	1,742146
21	Переменная X 4	0,4166	0,183	2,277	0,0631	-0,0312	0,864332	-0,031	0,864332

If we make logarithmic transformations, we create the following econometric model:

$$\tilde{y} = 2{,}72 \cdot x_1^{0{,}12} \cdot x_2^{-0{,}85} \cdot x_3^{0{,}84} \cdot x_4^{0{,}4}, (4)$$

As long as the correlation coefficient is R = 0.9736. This result indicates that the relationship between the factors is strong enough because R> 0.7.

The significance of the multivariate correlation coefficient is found by the Fisher criterion: F_{haq} = 27.76.

Hence, the significance of the correlation coefficient is derived from the fact that F_{haq}> F_{jad} = 0.00054. The forecast for the coming years is as follows. According to the table, meat production in the coming years will be as follows:

Table 2.

Years	2021	2022	2023	2024	2025

Meat production	223142,9	240465,2	284844,3	312130,6	333598,6

In summary, it can be said that increasing meat production and reducing the cost of agricultural products remains one of the key issues. Prediction and analysis are important as a result of the analysis of this issue.

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