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APPLICATION OF TIME SERIES MODELS IN FORECASTING PRODUCTION ACTIVITY IN AGRICULTURE

[1,2,3] *Tashkent State University of* [Economics]

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Abstract: The article analyzes the theoretical and practical aspects of forecasting agricultural production activities based on time series. Based on a linear trend model, the company's monthly sales volume is forecasted, a trend equation is constructed, and the accuracy of the forecast results is assessed using residuals and confidence intervals.

Keywords: dynamic series **,** time series, economic processes, trend, mathematical modeling, regression

Login

Economic in activity time according to variable indicators study and future directions prophecy to do current importance Such an analysis for **dynamic rows** and **timely rows** wide is used . Especially in production output , sales , income , inflation such as of indicators monthly or annual basically change analysis in doing timely row models important tool is considered .
Speaker row is this time during variable indicators own inside received information collection . These lines of variables time according to change study and prophecy to do for For example , economic growth rate of population annual growth or company income such as indicators dynamic rows using analysis will be done .
Timely row is this known one time measured over a period of time (daily , monthly , yearly) indicators sequence . Timed rows of variables time according to trends and seasonal changes study for used . Timely in line example : in Uzbekistan monthly inflation level , Stock exchange index every daily closure value , temperature daily change , of a company monthly sale size
A company monthly sale volume (thousand) in soums) are presented in Table 1 below .
Table 1. Monthly sales size change

Moon	Sales size (Y)
January	100
February	120
March	130
April	150
May	160

This on the ground : Y - timed of the row values (sales volume), t - time (months (according

to) Legislation and Trend analysis as follows is defined as :

1 Trend Determination : From data apparently as it stands , sale size month by month exceed This is going on . growth trend or positive tendency that is called .

2 Mathematical model: Growth simple with a linear trend expression possible :

= + · (1.1)

this on the ground : - t- at time sale size , - initial value (intercept), - trend coefficient (monthly growth pace)

Trend equation in finding linear regression from the method use possible . simple method with the trend equation calculating when it comes out as follows will be : t what as follows designation May : January = 1 , February = 2,… , May = 5 . Data : : 1,2,3,4,5, : 100,120,130,150,160 Linear regression to the formula according to formulas (1.2) and (1.3) below based on description possible :

$$b = \frac{N\sum(t \cdot Y) - \sum t \sum Y}{N\sum t2 - (\sum t)2} \quad (1.2)$$

$$a = \frac{\sum Y - b\sum t}{N} \quad (1.3)$$

Initial information calculation The results are presented in Table 2. passed .

Table 2. Trend equation in finding linear regression from the method use

Moon			·	2
January	1	100	100	1
February	2	120	240	4
March	3	130	390	9
April	4	150	600	16
May	5	160	800	25
Total	15	660	2130	55

Necessary values : = 5 (general months number), ∑ = 15, ∑ = 660, S(·) = 2130 , ∑ 2 = 55

Trend coefficient calculation results as follows will be :

$$\frac{\sum(\cdot) - \sum\sum}{} = \sum 2 - (\sum)2 = \frac{5 \cdot 2130 - 15 \cdot 660}{5 \cdot 55 - 15^2}$$

$$= \frac{10650 - 9900}{275 - 225} = \frac{750}{50} = 15$$

Elementary the value calculation results also as follows will be :

$$= \frac{\sum \quad - \quad \sum}{}$$

$$= \frac{660 - 15 \cdot 15}{5}$$

$$= \frac{660 - 225}{5} = \frac{435}{5} = 87$$

Above from formulas come out Trend equation the result as follows to hide possible :

$= 87 + 15 \cdot$ (1.4)

This is the trend equation this means that every one per month sale size average 15 thousand in soums exceed goes and elementary (= 0) The value is 87 thousand soums. will be .
To make predictions analysis to do as follows done increased :
For example , June (t = 6) month for sale size prophecy to do :

$_6 = 87 + 15 \cdot 6 = 87 + 90 = 177$

So, June in the month sale size 177 thousand soum to be is expected . If the graph to show or other additional analyses to do If you want , you can say it. possible .

Linear trend deep analysis to do

When it comes to trend time according to change expressive The mathematical model is understood . Timely row for the most The simple model is a linear trend , which is as follows: in appearance is written :

$= + \cdot +$ (1.5)

this on the ground : -t- at time variable value (sales) size), - initial value (intercept), - trend coefficient (growth rate), - time (months), - residue or error (random) noise), Trend on the graph show
Now this equation on the graph seeing transition possible :

1. Real values : monthly sale size (values)
2. Predicted values : trend equation through calculated ˆ values
3. Blue points and line - real monthly sale size values .
4. Red line - trend equation according to calculated prophecy values .

From the graph visible as it stands , sale size month by month is going and trend line this growth good explains .

Residual yield to do analysis

Remainder or residual real values and prophecy values between difference understood :

$= \quad - \quad \hat{}$ (1.6)

These are the remains. random distributed as follows to be necessary [2].

a. Residuals - real values and on trend prophecy values between differences .

b. Red line 0 degrees shows , that is, ideally remains this line around random distributed to be need .

Here remains periodic is changing see possible , that is they complete random This is not seasonal . or other of factors from the influence to be possible .
Prophecy and reliability interval application
Trend equation using future months for sale size prophecy let's do possible . Also , reliability also calculate the interval through prophecy accuracy level assessment possible . (t = 6) month for sale size prophecy so , reliability interval determination process [4]. lün (t = 6) month for sale size prediction about description below in order done increased :

a. Prophecy made Value : 177 thousand soum
b. 95% reliability interval : [166.45 thousand Soums , 187.55 thousand soum]

This is it. means that 95 % confidence with lun monthly sale size this in between to be is expected .

Conclusion

Village on the farm working release activity in forecasting timely row models important tool Trend analysis using working in the output main directions is determined by regression methods and clear forecasts to do opportunity gives . Future productivity reliable assessment through resources planning , market strategy formation and efficiency increase possible .

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