APPLICATIONS OF CORRELATION AND REGRESSION ANALYSIS TO PRACTICAL PROBLEMS

Karimova Shalola Musayevna

Namangan Engineering Construction Institute

Republic of Uzbekistan, Namanagan city, 12 Islam karimov street.

Qirgizboev Umidjon

Student Namangan Engineering Construction Institute

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Abstract: *This article presents ideas and comments on the application of correlation and regression analysis to practical issues.*

Keywords: *Correlation, regression, equation, comparison, least squares method, coefficient.*

The effectiveness of correlation and regression analysis plays an important role in solving many economic and social problems. Prior to correlation and regression analysis, the relationship between the studied phenomena should be carefully analyzed in detail. If there is indeed a link, it will be possible to use the method of correlation and regression analysis as well as to obtain results of real significance.

The cumulative correlation analysis examines the single effect effect of a series of processes. The conditions for cumulative correlation analysis are the same as for correlation analysis. Typically, cumulative correlation is analyzed in direct contact with cumulative regression analysis. The cumulative regression equation can be constructed in the form of a simple scale, i.e. a variable included in the regression equations on a normal and normalized scale at the same rhythm, or as a variable expressed in a unit of comparison.

As a regression equation, it is often linear:

$$\hat{y} = a_0 + a_1 x_1 + a_2 x_2 + \ldots + + a_n x_n \qquad (1)$$

and level functions are used:

$$\hat{y} = a_0 x_1^{a_1} x_2^{a_2} \ldots x_n^{a_n} . \qquad (2)$$

The parameters of this equation are usually determined by the least squares method. In general, the system of normal equations is expressed as follows:

$$\begin{cases} na_0 + a_1\sum x_1 + a_2\sum x_2 + ... + a_n\sum x_n = \sum y \\ a_0\sum x_1 + a_1\sum x_1^2 + a_2\sum x_1x_2 + ... + a_n\sum x_1x_n = \sum x_1 y \\ .... \\ a_0\sum x_n + a_1\sum x_1x_n + a_2\sum x_2x_n + ... + a_n\sum x_n^2 = \sum x_n y \end{cases} \quad (3)$$

To determine the parameters of the model levels, we must first convert the model (2) to a logarithmic-linear view:

$$\ln\hat{y} = \ln a_0 + a_1\ln x_1 + a_2\ln x_2 + ... + a_n\ln x_n \quad (4)$$

We then use logarithms to construct a system of normal equations.

$$\begin{cases} n\ln a_0 + a_1\sum\ln x_1 + a_2\sum\ln x_2 + ... + a_n\sum\ln x_n = \sum\ln y \\ a_0\sum\ln x_1 + a_1\sum\ln x_1^2 + a_2\sum\ln x_1\ln x_2 + ... + a_n\sum\ln x_1\ln x_n = \sum\ln x_1\ln y \\ .... \\ a_0\sum\ln x_n + a_1\sum\ln x_1\ln x_n + a_2\sum\ln x_2\ln x_n + ... + a_n\sum\ln x_n^2 = \sum\ln x_n\ln y \end{cases} \quad (5)$$

The bond density is similar to the correlation index and is estimated using the cumulative correlation coefficient:

$$R_{yx_j} = \sqrt{1 - \frac{\sum\left(y - \hat{y}\right)^2}{\sum\left(y - \bar{y}\right)^2}}, \quad (6)$$

here, $\hat{y}$ - theoretical value of the resultant indicator determined using the regression equation;

$\bar{y}$ - the arithmetic mean of the resultant value.

The less the resultant value deviates from the cumulative regression line, the greater the value of the correlation coefficient, which is significant in absolute value over a given interval. The cumulative correlation coefficient varies in the following range:

$$0 \le |R| \le 1.$$

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES., under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Once the main indicators of the correlation-regression analysis are known, the predictive indicators are determined: $\hat{y} = a_0 + b_0 t$; $\hat{x}_1 = a_1 + b_1 t$;....; $\hat{x}_n = a_n + b_n t$

$a_0,\ b_0,\ a_1,\ b_1,...,\ a_n,\ b_n$ the least squares method is used to calculate the coefficients. Once the value is known, the deviation of the current variable values from the corresponding initial values is calculated:

$$\varepsilon_{y_t} = y_t - \hat{y}_t;\quad \varepsilon_{x_1 t} = x_{1t} - \hat{x}_{1t};...;\quad \varepsilon_{x_n t} = x_{nt} - \hat{x}_{nt}$$

and then proceed to the regression analysis of the value, $\varepsilon_y,\ \varepsilon_{x_1},...,\ \varepsilon_{x_n}$.

Thus, to derive a linear trend from connected and unbound variables at the same time t the cumulative regression equation should be included in the time fund. In this case, the equation is expressed as follows:

$$\hat{y} = a_0 + \sum_{i=1}^{k} a_i x_i + a_{k-1} t. \qquad (7)$$

If the development trend of events is of a nonlinear nature, in such cases the difference of the highest order is determined or the most complex trend form is excluded:

$$\varepsilon = \frac{1}{l}\sum_{l=1}^{n}\left|\frac{y_i - \hat{y}}{y_i}\right| \cdot 100\% \qquad (8)$$

The average error of the prediction calculated in the formula can serve as an important issue in prediction - the criterion of accuracy in increasing the accuracy of calculations. Here y - the current level of the time series of the predicted time series level; l - forecast period.

The accuracy of the period depends on the past event and the duration of the predicted period.

As a mathematical model, we consider a conditional example of an enterprise.

Through the analysis, we make the following definitions $x_1^{(i)}$ - production volume at current prices, $x_2^{(i)}$ - flour production capacity, $x_3^{(i)}$ - mixed feed production, $x_4^{(i)}$ - bran preparation, Y – let the net profit of the enterprise.

Mathematical model view

$$Y = a_0 + a_1 \ln x_1^{(i)} + a_2 \ln x_2^{(i)} + a_3 \ln x_3^{(i)} + a_4 \ln x_4^{(i)} \quad (9)$$

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES., under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

look in the view.

In particular, we create economic factors that affect the net profit of enterprises and methods of their assessment. By calculating the coefficients of the system of normal equations in the form (5), and then solving the system of equations, the net profit of enterprises

$$Y = 58{,}4 \cdot \ln x_1 + 47{,}6 \cdot \ln x_2 + 11{,}11 \cdot \ln x_3 - 19{,}135 \cdot \ln x_4 - 242{,}253$$

can be calculated by the formula. The mathematical models analyzed are significant with a probability of 0.95 according to Fisher statistics.

References:

1. Ismoilov A.A, O.Q. Rixsimboev. Mathematical methods of economic analysis and forecasting. –T .: TDIU, 2007. -335 p.

2. Zamkov O.O. Mathematical methods and models. – M.: DiS, 2005.

3. M.O.Gafurov, K.Kholmurodov Economic mathematical methods and models. Tashkent, 2000.

4. Kremer N.Sh., Putko B.A. Econometrics. – M.: UNITI-DANA, 2002.

5. Musayevna, K. S. (2021). Find A General Solution of an Equation of the Hyperbolic Type with A Second-Order Singular Coefficient and Solve the Cauchy Problem Posed for This Equation. International Journal of Progressive Sciences and Technologies, 25(1), 80-82.

6. Akhmadjon o‘g‘li, H. A., Musayevna, K. S., & Abduvaxobovich, E. D. (2021). Evasion Problem for Movements with Acceleration On Constraint of Granwoll Type. International Journal of Progressive Sciences and Technologies, 24(2), 108-113.

7. Karimova, S. M. (2019). FIXED POINTS OF WHEN LINEAR OPERATORS MAPS. Scientific Bulletin of Namangan State University, 1(10), 62-65