



BASIC CONCEPTS OF PROBABILITY AND MATHEMATICAL STATISTICS IN ECONOMETRICS

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Abstract

In this article, the opinions of our country and foreign scientists are mentioned about the basic concepts of probability theory and mathematical statistics in econometrics.

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Probability theory first appeared as a result of gambling. People first came to understand it because of situations in games, not as a science.

An event is a process that may or may not occur in life. The incident is divided into 3 types.

1. An inevitable event
2. Impossible event
3. Random event

m-convenient n-all possibilities.

$$P = m/n$$

Probability theory is a branch of mathematics that deals with finding the probabilities of the occurrence of other random events that are somehow related to the occurrence of certain random events. It does not matter that the probability of an event, for example, is equal, because one wants to achieve a reliable result. From this point of view, the conclusion that the probability of occurrence of any event A is very close to 1 (or the probability of non-occurrence is close to 0) is of great importance. Such an event is considered an event that is practically inevitable. Such phenomena, which have both scientific and practical significance, are usually based on the assumption that event A does or does not occur due to the influence of a large number of random, loosely related factors (see Law of Large Numbers). Therefore, Probability Theory is a subject that identifies and studies patterns that emerge from the interaction of a large number of random factors. section.

In natural science, the following 2 schemes are used to describe the relationship between a certain set of conditions S and event A , which can be clearly said to have occurred or not occurred when these conditions are met: 1) event A occurs in every case where set of conditions S is fulfilled. For example, the laws of classical mechanics confirm that the movement of a body is determined by a single value given the initial conditions and forces acting on the body; 2) event A occurs with certain probability $R(A/S)=r$ when condition set S is fulfilled. For example, the laws of radioactive radiation state that for each radioactive substance there is a certain probability that N atoms of this substance will decay in a given time interval. The laws represented by the second scheme are called statistical laws. Statistical laws related to birth and death (for example, the probability of a boy being born is 0.515) are already known. Since the end of the 19th century, many statistical laws are discovered in physics, chemistry, biology, and other sciences. The study of statistical laws in various fields by the methods of Probability Theory is based on the fact that the probabilities of events are always based on the satisfaction of some simple relations. Based on these simple relationships, the study of the properties of the probabilities of occurrence of events constitutes the subject of the Theory of Probabilities.

Analysis and summarization of statistical data is the final stage of statistical research, the ultimate goal of which is to obtain theoretical conclusions and practical conclusions about the trends and laws of socio-economic phenomena and processes under study. In the theory of probability, relative frequency, It is necessary to know the concept of probability, the concepts of marginal and conditional probability, and to have information about Bayes' theorem. Analysis is a method of scientific research taking into account individual aspects and components of an object. Economic and statistical analysis is the development of a methodology based on the extensive use of traditional statistical and mathematical methods in order to control the adequate reflection of the studied phenomena and processes. The tasks of the statistical analysis are as follows: to determine and evaluate the uniqueness and characteristics of the phenomena and processes under study, to study their structure, connections and laws of development.

Steps of statistical analysis:

- forming the purpose of the analysis;
- critical evaluation of data;
- providing comparative evaluation and comparison of data;
- formation of summarizing indicators;
- to identify and justify the important features, similarities and differences, connections and forms of the studied events and processes;
- formation of conclusions and practical proposals on the development prospects of the studied phenomenon.

Analytical methods should change depending on the nature of the studied processes, their uniqueness, characteristics and forms of manifestation. The statistical analysis of the data is carried out in close connection with the quantitative tools suitable for the theoretical and qualitative analysis of the essence of the studied phenomena and the study of their structure, connections and dynamics. Mathematical statistics is the systematization of mathematics for scientific and practical conclusions, a section devoted to mathematical methods of processing and using statistical data. Mathematical statistics is a science that deals with methods of processing experimental data.

Any subject solves the following tasks in order to increase its complexity and importance:

- 1) description of the event;
- 2) analysis and forecasting;
- 3) search for an optimal solution.

Mathematical statistics also solve such a problem:

- 1) systematization of received statistical materials;
- 2) evaluation of the numerical characteristics of the observed random variable based on the obtained experimental data;
- 3) determining the number of experiments sufficient to obtain reliable results with minimal measurement errors.

It is necessary to know the properties of the probability distribution of random variables and the normal distribution of the probability expectation and the binomial distribution. In statistical sampling, it is enough to know the simple sampling method. In terms of estimation, it is necessary to know its methods, variance, variance calculation and error-free data. To make a statistical conclusion, you need to know how to conduct t- and F-tests, confidence intervals, the meaning and significance of estimates.

Basic statistical indicators are divided into 2 groups: those that measure the average level and those that measure the dispersion. Average level indicators give the average characteristics of a selection of objects according to a certain characteristic: average value; standard error; standard deviation; excess; asymmetry; interval; minimum; maximum; median; fashion; quantile; confidence interval.

Indicators that measure dispersion: the dispersion of a random variable; mean square deviation; variation coefficient and similar statistical indicators. Mathematical statistics does not analyze all objects, but only a few selected from a large group created on the basis of the general characteristics of such objects. This phenomenon in mathematical statistics is called the selection method of analysis.

In statistics, the term set is very widely used. The size of the set is the number of objects in the set. A set is called homogeneous if one or more studied important properties of its objects are common to all units. The total, which includes different phenomena, is considered non-homogeneous. A total can be homogeneous in one respect and different in another. In each individual case, the homogeneity of the collection is established by conducting a qualitative analysis, clarifying the content of the studied social phenomenon.

The following types of collection are available:

1. main;
2. selection;
3. limited;
4. unlimited.

A sample set, or simply a sample, is a set of randomly selected objects. The main set is a set of separated objects. For example, if 100 details are taken for checking out of 1000 details, then $N=1000$ is the size of the main set, and the sample size is $n=100$. A master set often contains a finite number of elements. But if this number is much larger, then for the purpose of simplifying calculations or condensing theoretical conclusions, it is sometimes assumed that the main set consists of an infinite number of objects. By doing this, increasing the size of the main set in the whiteboard does not practically affect the results of the development of the sample data. The main task of mathematical statistics is to estimate the characteristics of the population of samples. As a rule, we do not know anything for sure about the entire master set and can only make assumptions. To test our hypotheses, we examine an independent sample from the general population and construct sample estimates of unknown theoretical parameters. A collection unit is an item that requires tracking.

Symbol types of symbol-set unit:

- numerical (quantitative);
- non-quantifiable (attributive).

Expressed as a quantitative-numeric measure (age, length of service, sales, income, etc.). According to them, you can get final information about the specific value of the symbol and the number of units with the total or average value of the symbol in the set. Attributive (descriptive) - verbally expressed, for example, gender, nationality, education, etc. According to them, a conclusion can be made about the number of statistical units with a given value of the attribute. Variation is a change of sign.

A variant is a concrete expression of a variable symbol. Variants are designated in Latin letters. For example: kkYYYYXXX,.....,2121

The set of quantities of a variable sign is called a variational series. If we place the options in increasing or decreasing order, we will create an ordered variational series.

In Uzbekistan, the theory of probability began to develop from the 20s of the 20th century with the initiative and direct participation of V.I. Romanovsky. T.A. Sarimsakov, S.Kh. Sirojiddinov, T.A. Azlarov, Sh.K. Farmonov, A.N. Nagayev, N.U. Gafurov, T.M. The research of scientists like Zuparov on the Theory of Probability is important. Today, probability theory and mathematical statistics are one of the most advanced branches of mathematics.

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