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A comparative study to estimate the effect of the parameters of shape and measurement on the distribution gamma of the size of the sample using some non-scientific methods

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Abstract:

The objective of the paper was to study the effect of non-linear methods on the estimation of the shape and measurement parameters for the distribution of the sample and the effect of the size of the sample on the estimation of the parameters of shape and measurement. The problem was to identify the best method for estimating the parameters of shape and measurement, the method of simulation was obtained through the Matlab program. A number of results were obtained, the most important being the size of the large sample (100), the shape parameter (4 = α) the measurement parameter is small (1 = β) and medium (3 = β) and (5 = β) for the estimation of the measurement parameter that the least variance method is the most appropriate. the paper also made a number of recommendations, the most important of which is the use of the lower variance estimate for the estimation of the small measurement parameter at the size of a small, medium and large sample,), do not use the estimation method to estimate the measurement and shape parameters for distribution at the sample size is small, medium and large.

Key words: the effect of the parameters of shape and measurement, the distribution gamma of the size of the sample, non-scientific methods

INTRODUCTION:

The concept of appreciation is linked to one of the branches of statistics, namely, statistical inference, which, in the view of many, is divided into the estimates and the hypothesis test. There are two methods for testing the hypotheses used in the statistical methods, which are concerned with the social features. There are many cases in which these methods the non-scientific methods are the ones that enable the researcher to carry out the tests of the hypotheses that he is studying without making assumptions about the distribution of the studied society. The non-scientific census is defined as a census that does not comply with the required conditions it is used if the sample is too small if the distribution is not normal.

Advantages of Non-Formal Methods (8):

Does not require any assumptions about the basic distribution of society. Used in processing experimental data where the sample size is very small, in the case of analysis of nominal and ordinal data.

Are often used to process and analyze qualitative data that can not be used for any method of analysis.

Easy to apply, making it more widely used in economic, social and educational research.

The most important reasons for the study of the theory of samples is the desire to obtain information about the society to be studied in a timely manner, therefore, the definition of it as part of the community the steps to choose the sample is:

Availability of all characteristics and characteristics of the original community in the sample.

The proportion between the number of sample members and the number of individuals who make up the community.

Give all members of the indigenous community an equal opportunity.

The samples are divided into five probabilistic samples and seven non-probabilistic samples. Our efforts are based on probabilistic samples and are subject to the law of probabilities.

The study problem:

When using any method of estimation, it is necessary to find the best estimate of the characteristics of the society to be estimated so that they are close to the estimated with the least error, since there is a set of non-scientific methods used in applied research, the problem of study in the following questions:

What is the best way to estimate the least error to estimate the measurement and shape parameters for the distribution?

Is it possible to know the best way of estimating the parameters of the measurement and the form by comparing several methods of managing the teacher using a distributed distribution?

What is the effect of non-parameter estimation methods on estimating measurement and distribution parameters at different sample sizes?

The importance of studying:

The importance of the study was as follows:

To emphasize the importance of data processing in the sizes of different samples and different methods of estimation, in order to avoid any problems that researcher may encounter when conducting their research on real data.

The importance of using the sample data in estimating the measurement and shape parameters for the distribution of the use of the non-scientific methods to know the effect of these methods on the measurement and shape parameters in terms of good estimate.

Estimation of the point is the best estimate of the community parameter and is the basis of the estimation process in the probation period.

Objectives of the study:

The objectives of the study were as follows:

Identification of non-scientific estimation methods for estimating the measurement and distribution parameters.

Recognition of the criterion of differentiation for the estimation of the parameters of form and measurement using the attribution method, the least variance method and the greatest method of distribution.

To arrive at the best estimate for the form and measurement teachers of the distribution, so that this estimate is as close as possible to the values of the parameters of the form and the measurement of the distribution.

Methodology of the study:

The descriptive approach was followed with regard to the theoretical aspect of the subject of the study. as for the applied side, the case study was used to generate the sample data by simulation method.

Simulation style:

In some cases, simulation is seen as the method that is often used when all other methods fail and the method of simulation is based on finding the means by which the researcher can study the problem and analyze it despite the difficulties in expressing it in mathematical model.

The simulation of the real system is carried out by a theoretically predictable system of behavior through a specific probability distribution. Thus, a sample of this system can be sampled by so-called random numbers 5.

Simulation is defined as a numerical technique used to perform tests on a numerical computer that includes logical and mathematical relationships that interact with each other to describe the behavior and structure of a complex system in the real world and are finally described as the process of creating the spirit of reality without achieving this reality at all.

Concept of Monte Carlo model:

The basis of this model is the selection of the hypothesis elements available (probability) by taking random samples and can be summarized in the following steps 6:

Put the probability distribution for each variable in the model to be studied.

Use random numbers to simulate probability distribution values for each variable in the previous step.

Repeat the process for a set of attempts.

Random numbers:

Is the number chosen by random quantity operation and random numbers are used to generate simulation values for many probability distributions.

There are many ways to generate random numbers such as linear matching, use random number tables, and use functions ready for this purpose, such as the rand function used in many programming languages.

Non-scientific statistical methods are the most important statistical tools inductive statistical analysis and can be used in all scientific and cognitive research, where the use of a high degree of importance and accuracy in the field of testing statistical hypotheses

Distribution of gamma distribution:

Is a continuous probability distribution, this is used

$$\Gamma\alpha = \int_0^\infty E^{-X} X^{A-1}\, Dx$$

Function Characteristics:

1. If N Is Positive, The Integration Is Approximated And Is

I. $\Gamma(1) = 1$

II. $\Gamma n = (n-1)\Gamma(N-1)$

2. . If N Is A Positive Integer, Then:

$\Gamma\alpha = (\alpha - 1)\Gamma(A-2) \times \ldots \times 3 \times 2 \times 1$

$\therefore \Gamma\alpha = A!$ Or $\Gamma(A+1) = A!$

The General Picture Of The Distribution Is: $f(X) = \frac{1}{\Gamma\alpha \quad B^A} E^{-\frac{X}{B}} X^{A-1} \quad , \quad X > 0 \quad , \quad \alpha, \beta > 0$

Distribution Characteristics:

1. Arithmetic Mean $E(X) = \alpha\beta$
2. Variance $E(X) = \alpha\beta$

ESTIMATION METHODS:

1. Moment Method [4]:

Is one of the methods of estimation? assuming that x is a random variable or a separate variable, it has a probability function of p (x) or a probability density function f (x), and you have a probability distribution of one parameter such as binomial, poisson, bernoulli or more natural agriculture, pharmaceutical distribution, beta. to estimate the parameter in these distributions, find the average variable random variable or what is known as the first one around zero, according to the following formula

$$E(X) = \begin{cases} \sum_X XP(X) & ,X : Discrete \\ \int Xf(X) & ,X : contunios \end{cases}$$

In the case of distributions with two parameters, we need to calculate the variance for the purpose of finding the estimate for the second parameter, noting that

$V(X) = \{EX^2 - (EX)^2$

Where:

EX^2 is the second moment around zero for the random variable x and is calculated from the following relationship

$$:EX^2 = \begin{cases} \sum_X X^2P(X) & ,X : Discrete \\ \int X^2f(X) & ,X : contunios \end{cases}$$

Estimation of Two Distribution Parameters [1]:

To obtain the estimation of the measurement parameter (α) and the parameter of the form (β) for the distribution of the azimuth, we equate the first sample of the sample) $\grave{m}_1$)with the first determination of the society ($\grave{\boldsymbol{\mu}}_1$) with the second determination of the community ($\grave{\boldsymbol{\mu}}_2$) as follows:

The first determination of society is: $\grave{\mu}_1 = E(X) = \alpha\beta$

The first torque of the sample is:$\grave{m}_1 = \frac{1}{n}\sum_{i=1}^{n} x_i = \overline{x}$

The second determination of society is: $\grave{\mu}_2 = E(X^2) = \alpha^2\beta(\beta+1)$

The second torque of the sample is: $\grave{m}_2 = \frac{1}{n}\sum_{i=1}^{n} x_i^2$

By equating the first determination of the sample with the first determination of society **:**

$\overline{x} = \hat{\alpha}\hat{\beta}$

By equating the second determination of the sample with the second determination of society:

$$\frac{1}{n}\sum_{i=1}^{n} x_i^2 = \alpha^2\beta(\beta+1)$$

And from the equation $\overline{x} = \hat{\alpha}\hat{\beta}$ we find that**:**

$$\hat{\beta} = \frac{\overline{x}}{\hat{\alpha}}$$

And compensation $\hat{\beta} = \frac{\overline{x}}{\hat{\alpha}}$ in the equation $\frac{1}{n}\sum_{i=1}^{n} x_i^2 = \alpha^2\beta(\beta+1)$ we find that:

$$\frac{1}{n}\sum_{i=1}^{n} x_i^2 = \alpha^2 \frac{\overline{x}}{\hat{\alpha}}\left(\frac{\overline{x}}{\hat{\alpha}} + 1\right)$$

$$\therefore \frac{1}{n}\sum_{i=1}^{n} x_i^2 = \hat{\alpha}\overline{x}\left(\frac{\overline{x}}{\hat{\alpha}} + 1\right)$$

$$\hat{\alpha}\overline{x} = \frac{1}{n}\sum_{i=1}^{n} x_i^2 - x_i^{-2}$$

But $\hat{\alpha}\overline{x} = s^2$ To That:

$$s^2 = \frac{1}{n}\sum_{i=1}^{n} x_i^2 - x_i^{-2}$$

Such As:

$$\hat{\alpha} = \frac{s^2}{\overline{x}}$$

and in the same way of the equation $\hat{\alpha} = \frac{\overline{x}}{\hat{\beta}}$ and compensation in $\frac{1}{n}\sum_{i=1}^{n} x_i^2 = \alpha^2\beta(\beta+1)$ we find that:

$$\hat{\beta} = \frac{\overline{x}}{s^2}$$

2. Maximum likelihood [(3)] **:**

In this method we find the weighting function, which is the function of the mass of the common probability of all the variables $x_1, x_2, x_3, \dots, x_n$ if these variables are intermittent, the weighting function is the common probability density function if all the variables are connected and symbolize this function $l(x_1, x_2, x_3, \dots, x_n)$.

$$l(x_1, x_2, x_3, \dots, x_n) = \begin{cases} P(x_1, x_2, x_3, \dots, x_n) & , X : Discrete \\ f(x_1, x_2, x_3, \dots, x_n) & , X : contunios \end{cases} .$$

That the estimate in this way requires: all variables are exploited and therefore the equation above becomes as follows:

$$l(x_1, x_2, x_3, \dots, x_n) = \begin{cases} \prod_{i=1}^{n} P(x_i) & , X : Discrete \\ \prod_{i=1}^{n} f(x_i) & , X : contunios \end{cases} .$$

assume that the parameter to be estimated is$(\boldsymbol{\alpha})$ and the maximum weighting function contains the parameter$(\boldsymbol{\alpha})$ ، therefore, this function is preferred for the parameter $(\boldsymbol{\alpha})$ the result of the differential is equal to zero to obtain the estimated parameter$(\widehat{\boldsymbol{\alpha}})$، this means that $(\widehat{\boldsymbol{\alpha}})$ produced from the following formula:

$$\frac{dl(x_1, x_2, x_3, \dots, x_n)}{d\boldsymbol{\alpha}} = 0$$

that $(\widehat{\boldsymbol{\alpha}})$ the result of the above equation always makes the weighting function as large as possible$(\widehat{\boldsymbol{\alpha}})$ represents an end point or a skeletal coup. in the case of more than one parameter, the process of differentiation is done by the number of parameters, and this method can not be used to estimate if the range of random variable depends on the parameter to be estimated such as regular distribution.

Estimation of two distribution teachers in the greatest possible way [3]:

to obtain an estimate of the parameter of α (α) and the parameter of form (β) for the distribution of the maximum possible method, follow these steps:

we derive the function of the greatest potential as follows:

$$l(x_1, x_2, x_3, \dots, x_n) = \prod_{i=1}^{n} f(x, \alpha, \beta)$$

$$l(x_1, x_2, x_3, \dots, x_n) = \frac{1}{(\gamma\alpha)^n \quad \beta^{n\alpha}} \prod_{i=1}^{n} (x_i^{\alpha-1}) e^{-\frac{-\sum_{i=1}^{n} x_i}{\beta}}$$

then we derive $\ln[l(x_1, x_2, x_3, \dots, x_n]$ for(α, β)we equate the derivative with zero**:**

first:$\frac{dl(x_1,x_2,x_3,\dots,x_n)}{d\beta}$

$$\frac{dl(x_1, x_2, x_3, \dots, x_n)}{d\beta} = \frac{n\overline{x}}{\widehat{\beta^2}} - \frac{n\,\widehat{\alpha}}{\widehat{\beta}}$$

$$= \frac{n\overline{x}}{\widehat{\beta^2}} - \frac{n\,\widehat{\alpha}}{\widehat{\beta}}$$

$$n\overline{x} = n\,\widehat{\alpha}\,\widehat{\beta}$$

$$\therefore \widehat{\alpha} = \frac{\overline{x}}{\widehat{\beta}}$$

second: $\frac{dl(x_1,x_2,x_3,\ldots,x_n)}{d\alpha}$

$$\frac{dl(x_1,x_2,x_3,\ldots,x_n)}{d\alpha} = \frac{-n}{d\alpha}[\ln(\gamma\widehat{\alpha})] - n\ln(\widehat{\beta}) + \sum_{i=1}^{n} \ln x_i = 0$$

and compensation $\widehat{\alpha} = \frac{\overline{x}}{\widehat{\beta}}$ in the above equation:

$$\psi(\widehat{\beta}) - \ln(\widehat{\beta}) = \ln\left[\frac{(x_1,x_2,x_3,\ldots,x_n)^{\frac{1}{n}}}{x}\right] = 0$$

where: $\psi(\widehat{\beta}) = \frac{\gamma'\widehat{\beta}}{\gamma\ \widehat{\beta}}$

It is a function known as a binary function, as follows:

$\psi(\widehat{\beta}) - ln\widehat{\beta} = lnR$

where (r) represents the ratio of the geometric mean to the arithmetic mean of the sample.(sinha) adopted the following approximation of the binary function:

$$\psi(\widehat{\beta}) = \ln(\widehat{\beta}) - \frac{1}{2\ \widehat{\beta}}$$

and compensation (sinha in the formula) $\widehat{\beta} = \frac{\overline{x}}{s^2}$ we get:

$\ln\widehat{\beta} - \frac{1}{2\ \widehat{\beta}} - \ln(\widehat{\beta}) = lnR$-

$$\frac{-1}{2\ \widehat{\beta}} = lnR$$

$$\therefore\ \widehat{\beta} = \frac{-1}{2\ lnR}$$

Gamma distribution* [(2)]*:

is a continuous probability distribution. this distribution is used to study machine downtime. it is also used to study the time between the arrival of words to a particular service center, such as the arrival of the customers to the bank or patients entering the hospital. ($\gamma\alpha$) as follows:

$$\gamma\alpha = \int_0^{\infty} e^{-x}x^{\alpha-1}\,dx$$

Estimation of two distribution parameters in the minimum variance method [1]

To obtain the measurement parameter rating) α (and the shape parameter) β (for distribution in the least variance method, follow these steps:

When estimating the distribution of teachers in the greatest possible way we find that:

$$\frac{\partial l}{\partial \beta} = \frac{n\overline{x}}{\widehat{\beta^2}} - \frac{n\,\widehat{\alpha}}{\widehat{\beta}}$$

And the unification of denominations and division by $n\,\widehat{\alpha}$:

$$\frac{\partial l}{\partial \beta} = \frac{\frac{\overline{x}}{\widehat{\widehat{\alpha}}} - \widehat{\beta}}{\frac{\widehat{\beta^2}}{\widehat{n\,\widehat{\alpha}}}}$$

in comparison with the equation: $\frac{\partial \ln l(x_1,x_2,x_3,\dots,x_n)}{\partial \theta} = \frac{\tau-\theta}{\lambda}$ is being:

$$\therefore \widehat{\alpha} = \frac{\overline{x}}{\widehat{\widehat{\beta}}}$$

$$\therefore \widehat{\beta} = \frac{\overline{x}}{\widehat{\widehat{\widehat{\alpha}}}}$$

Materials and methods of research: materials and methods of research:

Distributed tracking data was generated using the(minitab) program as follows:

1. generation of community size (m) of binomial distribution $X \sim B(n, P)$ with knowledge (n, P) and poisson distribution $X \sim Pos(\lambda)$ with knowledge (λ) و natural distribution $X \sim N(\mu, \sigma)$ with knowledge (μ, σ) ، and gamma distribution $X \sim Gamma(\alpha, \beta)$ with knowledge(α, β)
2. choose sample size (n) symbolized by the symbol) j).
3. 3. estimation of the parameters of the form and measurement and shape of the distribution using the method of indentation and the least variance method and the method of maximum possibility
4. 4. reset the steps from (1-3) from j=1,2,3

Monte Carlo simulation results:

The performance of this method is compared to different statistical calibrations. It is the mean of the error squares within the different sampling sizes using a small sample size (20), an average (35) and a large (100) and a small (0.5) (1), large (2.5), and a parameter (β) equal to (4). Also, data were generated using a small sample size (20), average (35) and large (100) 1), medium (3), large (5) and parameter (α) is equal to (4). And were identified with duplicates for stability purposes and the experiment is repeated (100) times.

Analysis, interpretation and discussion:

First: estimating the measurement parameter:

Table (1) estimation of the measurement parameter β for the distribution of small, medium and large values with the size of a small sample (20)*:*

sample size	measurement parameter	estimator	estimation method			less MSE
			moment	maximum likelihood	minimum variance	
20	a small (1)	measurement	11.811149	0.83875	0.82873	minimum variance
		MSE	5.844047	0.0023	0.0013	
	medium (3)	measurement	30.47235	2.8454	2.8744	maximum likelihood
		MSE	37.736501	0.0006813	0.0007913	
	large (5)	measurement	43.70302	5.2375	5.3375	maximum likelihood
		MSE	74.8982	0.004695	0.005785	

source: preparation by minitab

From table (1) we note that the least variance method is the best of the estimation methods to estimate the parameter of the measurement β for the distribution of the height when it is small and is equal to 1 at the size of the small sample 20 because it has the mean error less than 0.0013 and the estimated value is 0.82873 and is close to measurement parameter value 1.

When the measurement parameter is β for the distribution of an average population, it is equal to 3 and at the size of the small sample 20, the greatest possible method is the best of the estimation methods because it has the lowest mean error square and is 0.0006813 and the estimated value is 2.8454 and is close to the value of the measurement parameter 3.

When the measurement parameter is β for the distribution of a large population, it is equal to 5, and when the size of the small sample is 20, the greatest possible method is the best of the estimation methods because it has the least mean error box and is equal to 0.004695 and the estimated value is 5.2375 and is close to the value of the measurement parameter 5.

Table (2) estimation of the measurement parameter β for the distribution of small, medium and large values with average sample size (35):

sample size	measurement parameter	estimator	estimation method			less MSE
			moment	maximum likelihood	minimum variance	
35	a small (1)	measurement	8.0987	1.08936	1.07925	minimum variance
		MSE	1.4398	0.000228	0.000126	
	medium (3)	measurement	23.2244	3.4476	3.2475	minimum variance
		MSE	11.6864	0.00346	0.00335	
	large (5)	measurement	3.7607	5.805	5.905	maximum likelihood
		MSE	0.04369	0.0134	0.0235	

Source: preparation by minitab

From table (2) we observe that the least variance method is the best of the estimation methods for estimating the parameter of the ß measurement for the distribution of the scale when it is small and is equal to 1 at the average sample size 35 because it has the mean error less than 0.000126 and the estimated value is 1.07925 and is close to measurement parameter value 1.

When the measurement parameter is ß for the distribution of an average population, it is equal to 3 and at the average sample size 35, the least variance method is the best of the estimation methods because it has the least mean error box and is equal to 0.00335 and the estimated value is 3.2475 and is close to the value of the measurement parameter 3.

When the measurement parameter is ß for the distribution of a large population, it is equal to 5 and at the average sample size 35, the greatest possible method is the most appropriate of the estimation methods because it has the least mean error box and is equal to 0.0134 and the estimated value is 5.805 and is not close to the value of the measurement parameter 5.

Table (3) estimation of the measurement parameter β for the distribution of small, medium and large values with the size of a large sample (100):

sample size	measurement parameter	estimator	estimation method			less MSE
			moment	maximum likelihood	minimum variance	
100	a small (1)	measurement	8.28061	1.1595	1.0595	minimum variance
		MSE	0.5301	0.000036	0.000025	
	medium (3)	measurement	23.1445	3.0515	3.0405	minimum variance
		MSE	4.05802	0.000029	0.000016	
	large (5)	measurement	40.5685	4.72176	4.70075	minimum variance
		MSE	12.6512	0.00076	0.00057	

Source: preparation by minitab

From table (3) we observe that the least variance method is the best of the estimation methods to estimate the parameter of the measurement ß for the distribution of the height when it is small and it is equal to 1 at the size of the large sample 100 because it has the mean average error box equals 0.000025 and the estimated value is 1.0595 measurement parameter value 1.

When the measurement parameter is ß for the distribution of an average height of 3 and at the size of the large sample 100, the least variance method is the best of the estimation methods because it has the least mean error box and is equal to 0.000016 and the estimated value is 3.0405 and is close to the value of the measurement parameter 3.

When the measurement parameter is ß for the distribution of a large population and is equal to 5 and at the size of the large sample 100, the method of the least variance method is the best among the estimation methods because it has the least mean error box and is equal to 0.00057 and the estimated value is 4.70075 and is close to the value of the measurement parameter 5.

Second: estimating the shape parameter

Table (4) estimation of the shape parameter α for the distribution of small, medium and large values in the size of a small sample (20) with the stability of the measurement parameter (4 = β):

sample size	**shape** parameter	estimator	estimation method			less MSE
			moment	maximum likelihood	minimum variance	
20	a small (1)	**shape**	3.7185	1.2312	1.0845	minimum variance
		MSE	0.3695	0.002672	0.00036	
	medium (3)	**shape**	5.7344	2.41122	3.68	maximum likelihood
		MSE	0.3738	0.01733	0.02312	
	large (5)	**shape**	5.6528	3.1282	5.365	minimum variance
		MSE	0.02131	0.1752	0.0067	

Source: preparation by minitab

From table (4), we observe that the least variance method is the best of the estimation methods for estimating the α shape parameter for a small scale distribution. It is equal to 1 at the size of the small sample 20 because it has the mean error less than 0.00036. Medium and is equal to 3 and at the size of the small sample 20, the maximum possible method is the best of the estimation methods because it has the least mean square error and equals 0.01733. We also note that when the parameter of the form α for the distribution of a large object is equal to 5 and at the size of the small sample 20, the least variance method is the best of the estimation methods because it has the least mean square error and is equal to 0.0067.

This means that at the small sample size and the measurement parameter β for the distribution of a value, it is equal to 4 for estimating the parameter of figure α when it is small. The least variance method is the best of the estimation methods because the estimated value of 1.0845 is close to the value of the shape parameter. the size of the small sample and the measurement parameter β for the distribution of a figure of 4 is equal to the estimate of the parameter of figure α when it is significant that the least variance method is better than the estimation methods because the estimated value of 5.365 is close to the value of the shape parameter.

Table (5) estimation of the shape parameter α for the distribution of small, medium and large values with the size of an average sample (35) with the stability of the measurement parameter (4 = β):

sample size	**shape** parameter	estimator	estimation method			less MSE
			moment	maximum likelihood	minimum variance	
35	a small (1)	**shape**	3.3025	0.9903	1.117	maximum likelihood
		MSE	0.1515	0.00000027	0.00039	
	medium (3)	**shape**	5.4314	2.5192	3.355	minimum variance
		MSE	0.1689	0.0066	0.0036	
	large (5)	**shape**	3.7815	5.3463	4.4625	maximum likelihood
		MSE	3.3025	0.9903	1.117	

Source: preparation by minitab

From table (5) we find that the method of possibility is the best of the estimation methods to estimate the parameter of the form α for the distribution of the height when it is small and it is equal to 1 at the average sample size 35 because it is the least mean square error and equals 0.00000027, medium is equal to 3 and at the average sample size 35, the least variance method is the best of the estimation methods because it has the least mean error box and is equal to 0.0036. Also, when the parameter of the form α for the distribution of a large population is equal to 5 and at the size of the average sample 35, the method of maximum possibility is the best among the estimation methods because it has the least mean square error and is equal to 0.0034.

This means that at the average sample size and the measurement parameter β, it is equal to 4 to estimate the parameter of figure α when it is small. The maximum possible method is the best of the estimation methods because the value of the estimate of 0.9903 is close to the value of the shape parameter.

When the average sample size and the measurement parameter β are for the distribution of a value, it is equal to 4 for estimating the parameter of figure α when it is significant that the maximum method is the best of the estimation methods because the estimated value of 5.3463 is close to the value of the shape parameter.

Table (6) estimation of the shape parameter α for the distribution of small, medium and large values with the size of a large sample (100) with the stability of the parameter of measurement (4 = β):

sample size	**shape** parameter	estimator	estimation method			less MSE
			moment	maximum likelihood	minimum variance	
35	a small (1)	**shape**	2.3831	1.1625	0.9195	minimum variance
		MSE	0.01913	0.00026	0.0000065	
	medium (3)	**shape**	4.4074	2.8626	3.2658	maximum likelihood
		MSE	0.01981	0.00019	0.00071	
	large (5)	**shape**	4.0691	4.9423	5.05	minimum variance
		MSE	0.0087	0.0000033	0.0000025	

Source: preparation by minitab

From table (6) we find that the least variance method is the best of the estimation methods to estimate the parameter of the α form for the distribution of the height when it is small. It is equal to 1 at the size of the large sample 100 because it has the lowest average error box and equals 0.0000065, medium is equal to 3 and at the size of the large sample 100, the maximum possible method is the best among the estimation methods because it has the least mean square error and equals 0.00019. also, when the parameter of the form α for the distribution of a large population is equal to 5 and at the size of the large sample 100, the least variance method is the best among the estimation methods because it has the least average error box and equals 0.0000025.

This means that when the size of the large sample and the measurement parameter is β, it is equal to 4 to estimate the parameter of figure α when it is small. The least variance method is the best of the estimation methods because the estimated value of 0.9195 is close to the value of the shape parameter.

When the size of the large sample and the measurement parameter β for the distribution of a value is 4, for the estimation of the parameter of figure α, when it is significant, the least variance method is better than the estimation methods because the estimated value of 5.05 is close to the value of the parameter of the shape

RESULTS:

When the shape parameter (α = 4) is fixed:

1. When the small sample size (20) to estimate the measurement parameter is small (1 = β) for the distribution, the less variance method is the most appropriate, the intermediate measurement parameter (β = 3) and the large (5 = β) between estimation methods.
2. When the measurement parameter is small (β = 5) and the mean (3 = β) for the distribution, the lower variance method is the most appropriate and when the measurement parameter is large (5 = β) the best among the methods of appreciation.
3. At the size of the large sample (100), to estimate the measurement parameter is small (1 = β), medium (3 = β) and large (5 = β) for distribution, the least variance method is more appropriate.

When the parameter of measurement (4 = β) is fixed:

4. When the size of the small sample (20) and the large (100) is used to estimate the parameter of the shape is small (1 = α) and large (5 = α) the method of greatest possibility is the best of the methods of estimation.
5. When the average sample size (35) to estimate the parameter of the form is small (1 = α) and large (5 = α) for the distribution, the maximum possible method is best and when the shape parameter is medium (α = 3) among the estimation methods.
6. When the sample size is small (20), the mean (35) and the large (100) are uniformly stable (1). The parameters (4 = β), (4 = α) to estimate the other.

Comparison:

7. (1 = β) and Figure (1 = α) are small for distribution, so that the lower variance method is the most appropriate, and when the measurement and shape parameters are average (3 = β) and (3 = α), the greatest possible method is the best, and for the estimation of the large parameter of measurement (5 = β),

the greatest possible method is the most appropriate and for estimating the large form parameter and (5 = α) Appreciation.

8. For the estimation of the measurement and shape parameters at the sample size, the mean (35) and the measurement parameters (1 = β) and the figure (α = 1) are small for the distribution. (3 = β) and (3 = α), the lower variance method is better. In order to estimate the large parameters of measurement and shape (5 = β) and (5 = α) between estimation methods.

9. For estimation (1 = β) and (1 = α) are small for distribution, so that the lower variance method is more appropriate to estimate the mean parameter (β = 3) the greatest possible method is the most appropriate, to estimate the parameter of the form (3 = α), the method of the greatest potential is the most appropriate. For the estimation of the large measurement and shape parameters (5 = β) and (5 = α), the least variance method is one of the estimation methods.

Recommendations:

1. Use the lower variance estimate to estimate the small parameter of measurement at the size of a small, medium and large sample and the parameter of the form (α = 4).

2. Do not use the estimation method to estimate the measurement and shape parameters for distribution at the size of the sample is small, medium and large.

3. Expanding the study of a number of other community distributions.

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