Example of essay on plu=p

Business, Marketing

Question#1.

- Explain Confidence intervals estimation and significance testing and its usefulness in a business organization.

According to Cox D. R., " Confidence interval is the term used in mathematical statistics in interval (as opposed to point) evaluating for statistical parameters, preferably with a small sample volume". Trustee referred to as an interval that covers the unknown parameter with a given reliability.

The method of confidence intervals by the American statistician Jerzy Neyman, based on the ideas of the English statistics Ronald Fisher.

The confidence interval for θ distribution of random variable X with a confidence level of 100%-p", begotten by the sample (x1,, xn) is an interval with the limits lx1,, xnand u(x1,, xn) which are realizations of random variables LX1,, Xnand U(X1,, Xn) such that

The limit points l and u of the confidence interval are called confidence limits.

Interpretation of the confidence interval, based on intuition, is as follows: if p is large (say, 0. 95 or 0. 99), then the confidence interval is almost certainly contains the true value of θ.

Another interpretation of the concept of confidence interval: it can be considered as a range of values of the parameter θ, consistent with experimental data and do not contradict them.

The use of confidence intervals plays an important role in statistical evaluation of business performance. For example, in the prediction of many

macroeconomic indicators (GDP growth , inflation , unemployment) are often used interval estimation . At the micro level, confidence intervals , for example, are used in determining the market value of the property being valued (real estate). Property valuation carried out by independent evaluators , the result can be a confidence interval in which prespecified likely to be the true value of the market value .

- Using suitable examples, show how you would estimate a population mean and proportion.

- Using suitable examples, show how you would apply significance testing for a population mean and proportion in a business situation.

I give the answer on these 2 questions in the examples below:

Population mean estimation example

Suppose that the management of bank A has decided to examine the level of wages is of cashiers working in the competitor bank – Bank B. This information is needed to make a management decision regarding salaries of Bank A cashiers. Bank A management decides, that if the average cashier salary in competitor bank is higher than $30, 000, it is time to increase the salaries of its own cashiers. The sample of 40 Bank B cashiers with their yearly wages:

Assume the confidence level is 95%. We have now to construct 95%-confidence interval for population mean. First, calculate sample mean. Using Excel, it is:

x= 31238. 95

The sample standard deviation is:

s= 1973. 783

The formula for confidence limits is:

x±z1-c2sn= 31239±611. 67

So, with 95% level of confidence the population mean of cashiers wage in bank B is between $30, 627 and $31, 851.

Now the management of bank A can see that as $30, 000 is out of this interval, it is time to increase the salary for cashiers in their bank, because the competitor bank gives better conditions to its staff.

Proportion estimation example

Suppose the management of Bank A interview 500 employees about if they are satisfied by their job. Of 500 employees, 290 reported that they are satisfied. Is it sufficient evidence to say that there are more than 50% of employers are satisfied with their job? (Confidence level 99%)

H0: p= 0. 5Ha: p> 0. 5

For such a large sample we can use CLT (central limit theorem) to state that the distribution of proportions is approximately normal. Calculating z-statistics:

z= p-ppqn= 290500-0. 50. 5*0. 5500= 3. 57771

We can compare obtained observed z-value with the critical z-value. According to the standard normal table, z-critical for 99% level of confidence is 2. 33; since z-observed is higher than z-critical, we can reject the null hypothesis and state, that the proportion of employees which receive satisfaction from their job is significantly higher than 50% (at 99% level of

significance).

- Assumptions when calculating confidence intervals and when conduction significance testing.

The assumptions for CI to be valid and when conduction significance testing are the following:

- All observations in a sample must be independent

- The data set must be a random sample from a large population

- If the data set is small (n <30), it must be assumed the approximately normal distribution

- If the data set is large (n> 30), the assumption of normal distribution is not necessary because of central limit theorem

- Examples on Breakeven analysis

According to David Reibstien, “ The break-even level or break-even point (BEP) represents the sales amount—in either unit or revenue terms—that is required to cover total costs (both fixed and variable). Profit at break-even is zero. Break-even is only possible if a firm’s prices are higher than its variable costs per unit. If so, then each unit of the product sold will generate some “ contribution” toward covering fixed costs”

In today's economy is widely used in the calculation of break-even point different versions . It can help you determine the risk of the investment project.

The essence of this method is to determine the minimum (critical) level of production (sales and services) , in which the company will be even.

For successful business need to know exactly how much of the product is required to implement the company to cover all the costs of its production .

With less production and sales of the company will be at a loss , with more - a profit . In addition, the lower the calculated critical level of production, the company will be more stable in the face of a possible reduction of markets.
Break-even point can be determined graphically and analytically. In the construction of the graphs in horizontal axis output and the vertical - production costs , and fixed and variable separately , and income.
It is assumed that sales occur uniformly , the prices of products and raw materials for the period of time does not change , when the volume of sales variable costs per unit of output are constant , fixed costs do not change in this range of sales , the entire volume of output sold .
As a result, the constructions are obtained graphs of fixed and variable costs, total costs , sales revenue. The point of intersection of the graphs of revenue and total expenses will be the break-even point .
Break-even point is the minimum volume of production and sales , in which the costs will be offset by income , and the production and sale of each subsequent unit production company begins to make a profit . Break-even point can be defined in terms of production, in terms of money or the expected profit margins .

Synonyms: critical point , CVP- point .

Not to be confused with the point of return (of the project) . It is calculated to determine the time when the profits of the project exceed the costs spent on it , it's the same break-even point is measured not only in pieces , and in the months and years .
Break-even point in terms of money - such minimum amount of income at which a fully recouped all costs (profit is then equal to zero) :

Where

BEP - break-even point

TFC - total fixed costs

VC - unit variable cost

P - unit sale price

C - unit contribution margin

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The example of Break-even Point calculation

Suppose the businessman is considering opening shop for selling soap. For this, he found a good commercial premises, which will cost him $50, 000. Also the unit variable cost is $2. 50 per one soap package (5 pieces of soap). He decided that the unit sell price will be $4. 00 per package. We consider all other charges are absent and ask: what is the break-even point for this business?

So, the total fixed cost is a price of commercial premises. TFC= 50000, unit variable cost VC= 2. 5, unit sale price P= 4. Then:

BEP= 500004-2. 5= 500001. 5= 33333. 33

So, the businessman should sale 33, 334 packages of soap to achieve the break-even point.

Sources

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