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Statistics-2

RISE IN PETROL PRICES:

I had prepared a questionnaire based on the above topic in which I mentioned 6 different types of questions. My objective was to check whether the data is random or not and whether rise in petrol price affected people or not for which I have performed two Non-parametric tests.

NON - PARAMETRIC TEST:

If there is no knowledge about the population or parameter, but it is required to test the hypothesis of the population, then it is called as non – parametric test.

*To check whether data is random or not using RUN TEST

(I had mentioned a question –"Do you have your personal vehicle or not" in my questionnaire. For which I have performed run test. I have considered N = no & Y = yes)

The sequence of data is – N Y Y N Y N Y N N N N N N Y Y N Y N N N

Hypothesis:

H_0 : The data is random

H_1 : The data is not random

Procedure:

1) Arrange the observations in the order of magnitude.
2) In this ordering, we must keep the track of the samples to which each observation belongs.
3) Compute the run present in complete set of data.

Number of runs, r = 11

N_1 = 13, n_2 = 7

Test Statistics:

r = 11

Decision Rule:

Reject H_0 if r < lower critical value OR r > upper critical value

From Run Table,

lower critical value = 15

upper critical value = 5

11 > 5

Conclusion:

Since, r > upper critical value

Therefore, we reject H_0 and conclude that the data is not random

To check sample median against Hypothetical median using Wilcoxon Signed Rank Test

(I had given 5 options in my questionnaire for the question – **Does government should reduce taxes on petrol.**

For that five options I have allocated 5 values as given below initial from 1-5 which was obligatory to perform this test

Strongly agree (1)

Agree (2)

Neutral (3)

Disagree (4)

Strongly disagree(5))

Step 1:- Hypothesis

(Here I have taken median as 3)

$M = 3$ vs $M < 3$

Subject to LOS α

Procedure:

1) Find the absolute difference between the observed value Xi and the hypothetical median (M_0) i.e. $|Xi - M_0|$
2) Rank the differences in order to absolute value.
3) Assign the original signs of the differences to the ranks and compute two sums. i.e. T^- and T^+

Xi	1	2	1	1	2	2	1	2	1
Xi - M	-2	-1	-2	-2	-1	-1	-2	-1	-2
|Xi – M|	2	1	2	2	1	1	2	1	2
Rank	14	4.5	14	14	4.5	4.5	14	4.5	14
Signed rank	-14	-4.5	-14	-14	-4.5	-4.5	-14	-4.5	-14

2	3	2	1	1	1	1	1	2	2	1
-1	0	-1	-1	-2	-2	-2	-2	-1	-1	-2
1	0	1	1	2	2	2	2	1	1	2
4.5	0	4.5	4.5	14	14	14	14	4.5	4.5	14
-4.5	0	-4.5	-4.5	-14	-14	-14	-14	-4.5	-4.5	-14

Sum of positive rank , $T^+ = 0$

Sum of negative rank, $T^- = 190$

Critical value , d = 46

Decision rule:

Reject H_0 at α % LOS if T^+ <= d

0 <= 46

Conclusion:

Hence we reject Ho at 0.05 LOS and conclude that median is less than 3 .

Hence we can conclude that most of the people wants government to reduce their respective taxes on petrol.