

Answer on Question #39008 – Economics – Finance

Test the significance of variation of the retail prices of the commodity in three principle cities; Bombay, Kolkata and Delhi. The four shops were chosen at random in each city and prices observed in rupees were as follows

Bombay 16 8 12 14

Kolkata 14 10 10 6

Delhi 4 10 8 8

Solution

To test the significance of variation of the retail prices of the commodity in three principle cities we should find the coefficient of variation.

The coefficient of variation (CV) is defined as the ratio of the standard deviation σ to the mean μ .

$$c_v = \frac{\sigma}{\mu}$$

Mean = $\text{sum}(X)/n$

Mean1 = $(16 + 8 + 12 + 14) = 50/4 = 12.5$

Mean2 = $40/4 = 10$

Mean3 = $30/4 = 7.5$

In the case where X takes random values from a finite data set x_1, x_2, \dots, x_N , with each value having the same probability, the standard deviation is

$$\sigma = \sqrt{\frac{1}{N} [(x_1 - \mu)^2 + (x_2 - \mu)^2 + \dots + (x_N - \mu)^2]}, \quad \text{where } \mu = \frac{1}{N}(x_1 + \dots + x_N),$$

SD1 = $((16 - 12.5)^2 + (8 - 12.5)^2 + (12 - 12.5)^2 + (14 - 12.5)^2)/4)^{0.5} = ((12.25 + 20.25 + 0.25 + 2.25)/4)^{0.5} = 2.96$

Cv1 = $2.96/12.5 = 0.237 = 23.7\%$

SD2 = $((4^2 + 0 + 0 + (-4)^2)/4)^{0.5} = 2.83$

Cv2 = $2.83/10 = 0.283 = 28.3\%$

SD3 = $(((-3.5)^2 + 2.5^2 + 0.5^2 + 0.5^2)/4)^{0.5} = (19/4)^{0.5} = 2.18$

Cv3 = $2.18/7.5 = 0.291 = 29.1\%$

So the variation of the retail is not great and it is almost similar between these cities.

Bartlett's test (Snedecor and Cochran, 1983) is used to test if k samples have equal variances. Bartlett's test is sensitive to departures from normality.

The Levene test is an alternative to the Bartlett test that is less sensitive to departures from normality.