STAISTICS

ANALYSIS OF FREQUENCY DISTRIBUTIONS

Analysis of Frequency Distributions

To assess the variability of two series with the same mean, measured in different units, it is insufficient to merely calculate measures of dispersion. Instead, we need measures that are independent of units. The measure of variability that is unit-independent is known as the coefficient of variation (C.V.) and is defined as

$$\text{C.V.} = \frac{\sigma}{\bar{x}} \times 100, \quad \bar{x} \neq 0$$

Where σ and $\bar{x}$ represent the standard deviation and mean of the data, respectively. The series with a higher coefficient of variation (C.V.) is considered more variable than the other series, while the series with a lower C.V. is considered more consistent.

COMPARISION OF TWO FREQUENCY DISTRIBUTION WITH SAME MEAN

(For competitive exam)

Let σ_1 and σ_2 be the standard deviations of two series with a common mean $\bar{x}$, then

$$\text{C.V. (I}^{st}\text{ Distribution)} = \frac{\sigma_1}{\bar{x}} \times 100, \quad \bar{x} \neq 0$$

$$\text{C.V. (II}^{nd}\text{ Distribution)} = \frac{\sigma_2}{\bar{x}} \times 100, \quad \bar{x} \neq 0$$

Thus, the comparison of the two coefficient of variations (C.V.) is based solely on the values of σ_1 and σ_2.

Therefore, when two series have equal means, the series with a higher standard deviation (or variance) is considered more variable or dispersed than the other. Conversely, the series with a lower standard deviation (or variance) is deemed more consistent than the other.

Ex.1 The One Day International (ODI) performance of two cricket players from a cricket team is outlined as follows:

Player	Runs in last 10 ODI matches									
Rahul	27	45	31	46	23	87	101	78	24	11
Sachin	43	95	5	78	88	103	23	01	41	52

Which of these two is more dependable?

Sol. It is evident that Sachin scored significantly more runs than Rahul, with 529 compared to 473, resulting in a higher average of 52.9 versus 47.3. However, to assess the reliability of the two datasets, we must calculate the standard deviation.

S.D. of Rahul: $s = 30.8$

S.D. of Sachin : $s = 36.9$

C.V For Sachin: $= 0.698$

C.V. for Rahul: $= 0.651$

Decision: Since the C.V. of Rahul is less, he is more reliable than Sachin.