Homoscedasticity

Purpose of Homoscedasticity:

- Homoscedasticity, or homogeneity of variances, is **an assumption of equal or similar variances in different groups being compared**.

- This is an important assumption of parametric statistical tests because they are sensitive to any dissimilarities. Uneven variances in samples result in biased and skewed test results.

Importance:

- Why Is Homoskedasticity Important? Homoskedasticity is important because **it identifies dissimilarities in a population**. Any variance in a population or sample that is not even will produce results that are skewed or biased, making the analysis incorrect or worthless.

- Homoscedasticity is a pivotal concept in regression analysis that **plays a substantial role in evaluating the trustworthiness of regression models**.

- It denotes the assumption that the variance of the errors (residuals) remains constant across all levels of the independent variable(s).

- Homoscedasticity is **a key assumption for employing linear regression analysis**. To validate the appropriateness of a linear regression analysis, homoscedasticity must not be violated outside a certain tolerance.

Heteroskedasticity

Purpose of Heteroskedasticity:

- Heteroskedasticity refers to **a situation where the variance of the residuals is unequal over a range of measured values**.
- If heteroskedasticity exists, the population used in the regression contains unequal variance, the analysis results may be invalid.
- **It tests whether the variance of the errors from a regression is dependent on the values of the independent variables.**

Importance:

- it **invalidates statistical tests of significance that assume that the modelling errors all have the same variance.**
- Heteroskedasticity is **an important concept in regression modeling,** and in the investment world, regression models are used to explain the performance of securities and investment portfolios.

Which one is better? Either Homoskedasticity? (or) Heteroskedasticity?

- There are two big reasons why you want homoscedasticity: While **heteroscedasticity does not cause bias in the coefficient estimates, it does make them less precise.**

- Lower precision increases the likelihood that the coefficient estimates are further from the correct population value. likelihood that the coefficient estimates are further from the correct population value.

- **Heteroscedasticity doesn't create bias**, but it means the results of **a regression analysis become hard to trust.**

Summery:

“I think Homoskedasticity is Better we compare to Heteroskedasticity.”