***What is the purpose of Homoscedasticity Heteroscedasticity and thumb rule*?**

Homoscedasticity:

The error term is the same across all values of the independent variables. This is also known as homogeneity of variance. Homoscedasticity is a central assumption of linear regression models.

Importance:

- Ensures that the estimates of the regression coefficients are efficient and unbiased.
- Assures valid hypothesis tests and confidence intervals, leading to more reliable results

Heteroscedasticity:

The size of the error term differs across values of the independent variables. This is also known as heterogeneity of variance. Heteroscedasticity is the violation of homoscedasticity

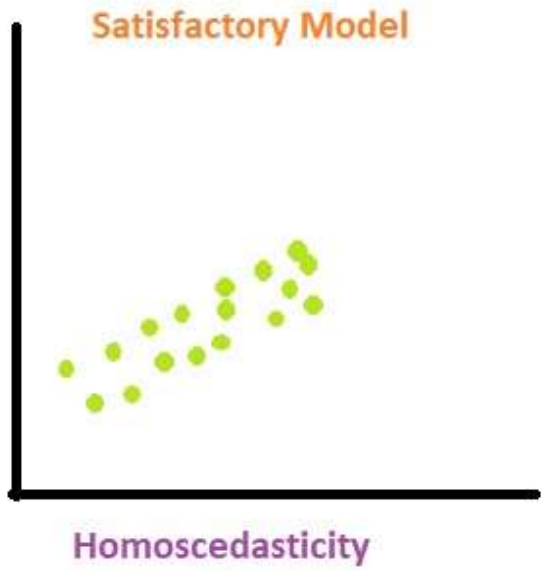
Importance:

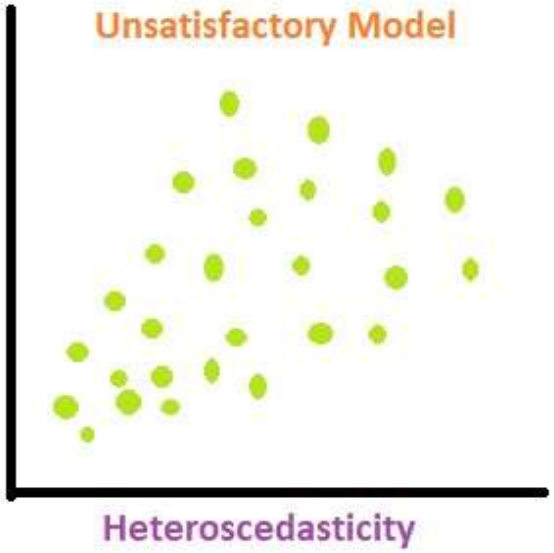
- If present, it can lead to inefficient estimates and biased standard errors, affecting hypothesis tests.
- It can indicate that a different model may be more appropriate or that a transformation of the data might be necessary.

Assumption:

1. Error has zero mean
2. Error has constant variance
3. Errors are uncorrelated
4. Errors are normally distributed

The *second assumption* is known as **Homoscedasticity**; therefore, the violation of this assumption is known as **Heteroscedasticity**.


Satisfactory Model
Homoscedasticity


Unsatisfactory Model
Heteroscedasticity