Multiple Regression Analysis (MRA)

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INTRODUCTION

- Multiple regression analysis is a powerful technique used for predicting the unknown value of a variable from the known value of two or more variables.
- It also called as predictors.
- Method used for studying the relationship between a dependent variable and two or more independent variables.
- Purposes:
  - Prediction
  - Explanation
  - Theory building

- The variable whose value is to be predicted is known as the dependent variable.
- The ones whose known values are used for prediction are known Independent (exploratory) variables.

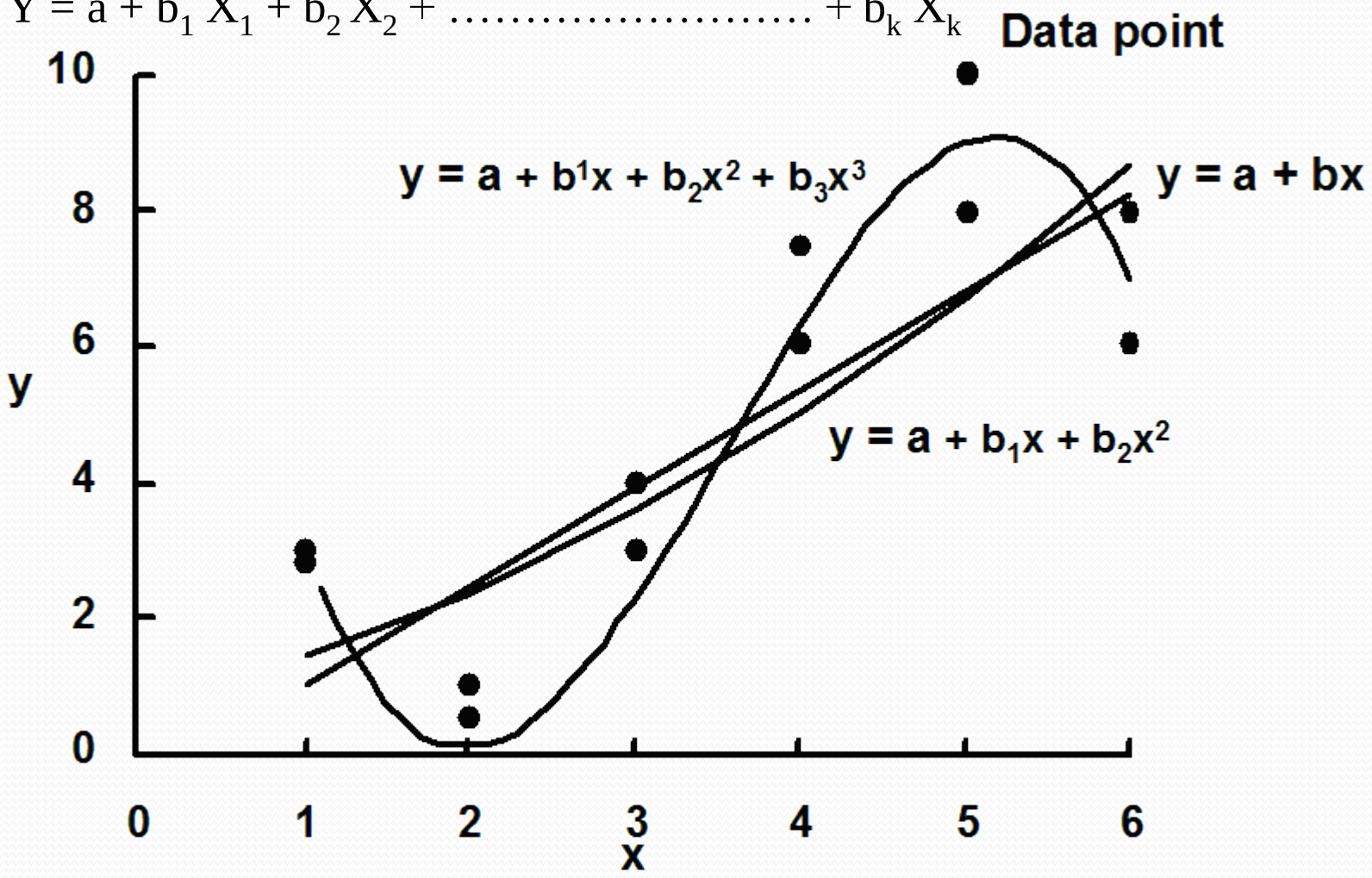
Design Requirements:

- One dependent variable (criterion)
- Two or more independent variables (predictor variables).
- Sample size: ≤ 50 (at least 10 times as many cases as independent variables)

GENERAL EQUATION:

In general, the multiple regression equation of Y on X_1, X_2, …, X_k is given by:

$$Y = a + b_1 X_1 + b_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + b_k X_k$$



Simple vs. Multiple Regression

- One dependent variable Y predicted from one independent variable X
- One regression coefficient
- **r^2**: proportion of variation in dependent variable Y predictable from X

- One dependent variable Y predicted from a set of independent variables (X1, X2 ….Xk)
- One regression coefficient for each independent variable
- **R^2**: proportion of variation in dependent variable Y predictable by set of independent variables (X's)

ADVANTAGE:

- Once a multiple regression equation has been constructed, one can check how good it is by examining the coefficient of determination(R2). R2 always lies between 0 and 1.
- All software provides it whenever regression procedure is run. The closer R_2 is to 1, the better is the model and its prediction.

ASSUMPTIONS:

- Multiple regression technique does not test whether data is linear. On the contrary, it proceeds by assuming that the relationship between the Y and each of X_i's is linear. Hence as a rule, it is prudent to always look at the scatter plots of (Y, X_i), i= 1, 2,…,k. If any plot suggests non linearity, one may use a suitable transformation to attain linearity.


Thank
You!!!