UNIT 2 :→ SIMPLE LINEAR REGRESSION MODEL : TWO VARIABLE CASE

For SEC

Introduction :

REGRESSION :

Economics is basically concerned with the establishment of relation among variables. For eg:, if other things such as income, taste and preferences, prices of other commodities are remain constant, we can express the demand function as →

$$D = f(P)$$; D → Demand
f(P) → function of price

In this particular function, the value of 'P' helps for regressing the value of 'D'. This functional form may be called as regression equation. In statistics, linear regression is a linear approach for modeling the relationship between a dependent variable (Y) and one or more independent variables or explanatory variables denoted by X. The case of one independent variable or explanatory variables is called simple linear regression.

Important

The simple form of two variable linear regression model (one dependent and one independent) is defined by the following equation:

$$Y = \alpha + \beta X$$

where, Y = Dependent variable
X = Independent variable
α = constant or intercept
β = regression coefficient.

For more than one explanatory variables the process is re-

called multiple linear regression.

23-4-2022

USE OF REGRESSION :

1. Causal Analysis :-

The regression might be used to identify the amount and the strength of the effect that independent variables have on the dependent variables.

2. Forecasting and effect :-

Regression can be used to forecast effects. i.e. the regression analysis helps us to understand how much dependents variable change with a sense in the independent variable.

3. Trend forecasting :-

Regression analysis predicts trends and future values.

TWO VARIABLES LINEAR REGRESSION MODEL :

Linear regression is a statistical procedure for predicting the value of a dependent variable from an independent variable where the relationship between the variables can be describe with a linear model. The simplest form of relationship between two variables X and Y is called simple linear regression model. It is expressed as —

$$Y_i = \alpha + \beta X_i + U \quad (i = 1, 2, 3, \ldots, n)$$

Where, Y_i → dependent variable
X_i → independent variable / Explanatory variable.
α → intercept / constant
β → regression coefficient
U → disturbance term or stochastic variable or error term

Since the exact value of Y i.e. dependent variable can never be predicted certainly. This happens due to the existent of the disturbance term U. The main reasons for the inclusion of the disturbance term U in econometrics are mention below —

Why is the disturbance term 'U' added in econometric models?

1. Variables left out :

It is not possible to include all the independent

23-4-2022

variables that affect the independent variable in the regression model. Thats why ~~two~~ to ~~include the b - input the all input~~ include the effect of all the left of variables we have to introduced the disturbance term in econometrics model.

2. Unpredicttability of human behaviour :-

The behaviour of individuals are unpredictable by nature. This can be treated as random characterised by the inclusion of disturbance term.

3. Variant behaviours among individuals :-

The economic behaviour of an individual varies due to condition
size of family, income, climate etc. To solve this issue we include disturbance term in model.

4. Errors of observation ~~and~~ or measurement :-

The errors of observation and measurement also represented by disturbance term.

25-4-2022 (FOR SEC)

STEPS IN REGRESSION ANALYSIS :

Regression analysis includes the following steps.—

1. Statement of the problem under consideration :-

The first important step in conducting any regression analysis is to specify the problems and the objectives.

2. Choice of relevent variables :-

Once the problem is formulated and objectives are determined the next question is to choose the relevent variables for the regression model.

3. Collection of data on relevent variable :-

After selecting the relevent variables next data on the variables are needed to be collected from survey.

4. Specification of Model :-

After collecting the data, the regression model need to be specified. The model can be linear or non-linear.

5. Choice of method for fitting the data :-

After the the model has be defined and data have been collected next step is to estimate the parameters of the model base on the collected data. This is known as parameter estimations or model fitting.

6. Forecasting or Prediction :-

After running the regression model on the basis of the results forecasting or prediction can be made.

4-22