Chapter-3

HYPOTHESES

AND

RESEARCH METHODOLOGY

3.1.1 Hypotheses Related with the Causal Educationometric Analysis

The marks in verbal section $x_{2i}$ which a student gets in his first evaluation test is an important determinant and is hypothesized to be positive and significant determinant for the estimation of final GRE score. The marks in the quantitative section $x_{3i}$ which a student gets in his first evaluation test is an important determinant and is hypothesized to be positive and significant for the estimation of final GRE score. The marks in 10th grade $x_{4i}$ which a student gets in his first evaluation test is an important determinant and is hypothesized to be positive and significant determinant
of final GRE score. The marks in 12th grade $x_{5i}$ which a student gets in his first evaluation test is an important determinant and is hypothesized to be positive and significant determinant of final GRE score. The Financial background of parents $x_{6i}$ is an important determinant and is hypothesized to be negative and significant determinant of final GRE score. The number of hours spent per day for studies (also called stamina) $x_{6i}$ after the class is an important determinant and is hypothesized to be positive and significant of final GRE score.

3.1.2 Residuals(Observed Test Score- Estimated Test Score) are Useful for Ranking of the Students.

3.1.3 The Mean Final GRE Score is Greater than Mean Score Before GRE.

3.1.4 The Estimated Causal Model is Valid for Forecasting of Final GRE Score.

3.1.5 The Estimated Model is Useful for Controlling of the Determinants.

3.2 Research Methodology

This section describes the research methodology needed to empirically test the previous chapter. This study explores the determinants of GRE score and its forecasting and control.

3.2.1 Multiple Regression Equation for Determinants

$$Y_i = \beta_1 + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + \ldots + \beta_k x_{ki} + u_i \quad \ldots .3.1$$

Where $Y = \text{Final GRE score in the actual exam}$

$x_{2i}, x_{3i}, x_{4i}, \ldots \ldots \ldots x_{ki}$ are determinants of GRE.
Description of variables for analysis of determinants

\( x_{2i} \) - English Score when student joins
\( x_{3i} \) - Mathematics Score when student joins.
\( x_{4i} \) - % of 10\(^{th}\) class
\( x_{5i} \) - % of 12\(^{th}\) class
\( x_{6i} \) - Financial background
\( x_{7i} \) - Stamina of the student (hours for GRE preparation/day)

### 3.2.2 Analysis for Ranking of Performance

Using the multiple regression 3.1 all residuals (722) will be calculated and the highest positive residual will be observed. The positive residual related student is the best and highest negative residual student will have the last rank in the GRE performance.

### 3.2.3 Comparison of Mean Score using Regression on Dummy Variable

\[ Y_i = \alpha_1 + \alpha_2 D_i + u_i \]  
...(3.2)

\( D_i = 1 \) for Final GRE score  
\( D_i = 0 \) for initial GRE score  
Mean final GRE Score:  \( E(Y_i / D_i =1) = \alpha_1 + \alpha_2 \)  
Mean initial GRE Score:  \( E(Y_i / D_i =0) = \alpha_1 \)

The difference is \( \alpha_2 \). If \( \alpha_2 \) is positive and significant the coaching may be treated beneficial.

### 3.2.4 Forecasting of GRE Score

Using estimated equation 3.1 forecasting of GRE score is proposed on various combinations of the determinants.

### 3.2.5 Control

Using estimated equation 3.1 controlling of determinants is proposed.