Multilevel Data Analysis AQ801-3-M & Version 1.1

Introduction

Contents & Structure

- Multilevel analysis
- Probability models

Learning Outcomes

- At the end of this topic, You should be able to:
  - Discuss the meaning of multilevel data.
  - Apply the multilevel data model to some real life cases

Key Terms You Must Be Able To Use

- If you have mastered this topic, you should be able to use the following terms correctly in your assignments and exams:
- Multilevel data
- Probability model
- Multiple linear regression
- ANOVA

Learning Outcome 1

- Discuss the meaning of multilevel data.

Multilevel Analysis

- Multilevel analysis is a methodology for the analysis of data with complex patterns of variability, with a focus on nested sources of such variability – pupils in classes, employees in firms, suspects tried by judges in courts, animals in litters, longitudinal measurements of subjects, etc.
- In the analysis of such data, it is usually enlightening to take account of the fact that each level of nesting is associated with variability that has a distinct interpretation.

- There is variability, for example, between pupils but also between classes, and one may draw incorrect conclusions if no distinction is made between these different sources of variability.
- Multilevel analysis is an approach to the analysis of such data, including the statistical techniques as well as the methodology for their use.

- In its present form, multilevel analysis is a stream which has two categories: contextual analysis and mixed effects models.
- Contextual analysis is a development in the social sciences which has focused on the effects of the social context on individual behavior.

- Mixed effects models are statistical models in the analysis of variance (ANOVA) and in regression analysis where it is assumed that some of the coefficients are fixed and others are random.

Probability models

- The main statistical model of multilevel analysis is the hierarchical liner model, an extension of multiple linear regression to a model that includes nested random coefficients.
- This model forms the basis of most of this module.

Learning Outcome 2

- Apply the multilevel data model to some real life cases

More Example on Multilevel Data Model

- 1) Company – employees
- 2) Judge – suspects
- 3) teacher – students

Summary of Main Teaching Points

- Multilevel analysis is a stream which has two categories: contextual analysis and mixed effects models.

Question and Answer Session

Q & A

What we will cover next

- Multilevel Theories, Multistage Sampling, and Multilevel Models