Equipercentile Equating for Multisession Objective Type Examinations conducted by IBPS,

Introduction

For any examination, if number of candidates exceeds the total available capacity of computer nodes available at a centre, the examination is conducted in multiple sessions in a day or across multiple days for a particular post. The candidates are thus administered different sets of questions in each session.

Equipercentile equating is a statistical method used in psychometrics to ensure score comparability across different test forms. This method plays a crucial role in maintaining fairness in candidate evaluation across multiple test sessions. Given the necessity of using different test forms due to security concerns and large applicant volumes. equipercentile equating ensures that no candidate is disadvantaged in case of any unintended variations in test difficulty.

Definition and Purpose

Equipercentile equating aligns scores from different test forms by ensuring that scores corresponding to the same percentile rank in one test match the equivalent percentile rank in another test. This method ensures fairness in ranking candidates despite different test forms being used. The approach follows international testing standards, ensuring compliance with principles of equity and fairness.

Statistical Formulation

The core principle of equipercentile equating relies on cumulative distribution functions (CDFs). Let:

- X be the raw scores from Test Form A
- Y be the raw scores from Test Form B
- $F_X(x)$ and $F_y(y)$ represent the cumulative distribution functions of X and Y. respectively). The equipercentile equivalent score Y_e for a given score X is determined by :

$$Y_e = F_Y^{-1}(F_X(X))$$

where F_y^{-1} is the inverse of the cumulative distribution function of Test Form B. This equation ensures that the score X and its equivalent Y_e represent the same percentile rank in their respective distributions, ensuring fair candidate comparisons.

Methodology in IBPS Equating:

The process of equipercentile equating in IBPS involves:

1. Computing Score Distributions: The empirical cumulative distributions of different test forms arc estimated based on recruitment data.
2. Pre-Smoothing Score Distributions: Log-linear models are used to smooth score distributions before equating. reducing statistical noise and ensuring stable estimates.
3. Selecting the Base Test Session: One of the test sessions as the base for equating. based on the statistical properties of its score distribution, ensuring it serves as a stable reference.
4. Matching Percentile Ranks: Each score in a given test form is mapped to its corresponding percentile rank.
5. Determining Equivalent Scores: The score from an alternate test form that shares the same percentile rank in the base session is identified as the equivalent score.
6. Validation and Implementation: The equated scores are evaluated for consistency. and statistical checks are performed to ensure the method maintains fairness and validity in candidate ranking. Peculiarities of the distribution are also evaluated and taken into account during the equating process.

Example: How Scores Change After Equating

Consider two test forms, A and B. ith different score distributions:

Raw Score (A)	Percentile Rank	Equated Score (B)
40	70th percentile	42
50	85th percentile	51
60	95th percentile	59

If a candidate scores 50 on Test A. their percentile rank is 85. Using equipercentile equating, we find the score in Test B that corresponds to the 85th percentile. which is 51. This ensures that the difficulty variations between test forms do not unfairly impact candidate ranking. In cases where there is no corresponding exactly matching percentile. the usual way to determine this score is by interpolation.

Assumptions and Validity

- Population Comparability: The candidate groups across different test sessions must be similar in ability distribution. a requirement IBPS ensures through randomised distribution and standardized test administration protocols.
- Construct Equivalence: The different test firms must measure the same competencies required for the recruitment process.

Practical Justification

Equipercentile equating is a standardized methodology recognized as essential for ensuring nondiscriminatory selection processes. Furthermore, alternative equating methods, such as linear equating, do not account for distributional differences as effectively as equipercentile equating.

Empirical Evidence

There are extensive analyses demonstrating that equipercentile equating maintains score fairness. Comparative studies of raw versus equated scores hate confirmed that this method successfully normalizes differences across test sessions. This statistical approach ensures that all candidates are assessed equitably, strengthening the reliability of the process.

Conclusion

As a recognized statistical psychometric technique, equipercentile equating is essential for maintaining fairness in examinations conducted in multiple sessions as its application ensures that candidates across different test sessions are es evaluated equitably.