

Video 20 of 21: Weighting Trimming

Sampling



THE WORLD BANK

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BUSINESS SCHOOL

Trimming (I)

- The distribution of the final weights should be examined to determine if there were very large weights that could have a large effect on either the estimates or the variances of the estimates
- The Unequal Weighting Effect (Kish, 1992) can be used to measure the impact of the weights on the precision of the survey estimates:

$$UWE = n \frac{\sum_{i=1}^n w_i^2}{\left(\sum_{i=1}^n w_i\right)^2}$$

- When observations with large weights are found, the weights for these cases can be reduced in a process called trimming
 - May be performed at different stages of the weighting process

Trimming (II)

1. The main idea is to set an upper bound on weights, U . Choosing this bound is generally an arbitrary decision
2. The decision could be to trim any weight greater than 3.5 times the median weight
3. Then the trimmed weights can be computed as

$$w_{i,trim} = \begin{cases} U, & \text{if } w_i \geq U \\ w_i, & \text{if } w_i < U \end{cases}$$

4. Determine the sum $K = \sum_s |w_i - w_{i,trim}|$, i.e., the net amount of weight lost by trimming

Trimming (III)

5. Distribute K evenly among the units whose weights were not trimmed

$$w_{i,trim_2} = \begin{cases} w_{i,trim}, & \text{if } w_i \geq U \\ w_{i,trim} + \frac{K}{\sum_{i \in S} I_i}, & \text{if } w_i < U \end{cases}$$

where $I_i = \begin{cases} 1, & \text{if } w_i < U \\ 0, & \text{otherwise} \end{cases}$

6. Repeat the steps (3)–(5) until no weights fail the bound check

Trimming (IV)

- Bias-Variance trade-off
 - Trimming decreases sampling variance (i.e., improves precision), but it can also increase bias
- Compare UWE before and after trimming
- Evaluate distribution on calibration variables after trimming
 - If UWE is still high or the distribution on calibration variables is far off from population totals, consider changing trimming threshold or method
 - Also consider calibration methods that put bounds on weights

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