Washington Statistical Society Seminar

Title: A Comparison of the Accuracy of Design-Based and Model-Based Estimation in the Presence of "All or Nothing" Data
Speakers: Hamid Ashtiani and Wendy Rotz, Grant Thornton Advisors, LLC
Discussant: Taylor Lewis, Research Triangle Institute (RTI) International
Chair: Pushpal Mukhopadhyay, U. S. Energy Information Administration
Date: October 8, 2025
Time: 1:00 PM – 2:00 PM ET

Abstract:
Model-based estimation has been used to estimate values on tax returns for decades now with a goal of estimating a dependent variable, y, such as a qualifying amount or taxable amount, from a model built from an independent variable, x, that typically is some type of cost or expenditure. In many tax settings, y=x with probability p, and y=0 with probability 1-p. For example, an expenditure, x, either qualifies for a deduction or credit in its entirety or not at all. This has informally been dubbed the "all or nothing" scenario. This webcast reviews the theoretical foundation of applying model-based estimation in this common tax setting and provides simulations demonstrating its efficacy in comparison to common design-based alternatives used in tax – the Mean Per Unit (MPU) or Horvitz-Thompson estimator, and the difference estimator (DIFF).

About the speakers:
Hamid Ashtiani is a data scientist and economist with over 10 years of experience leveraging statistical and machine learning techniques to drive business outcomes in tax, consulting, and economic research. He began his career at State Street Associates, worked for IHS Markit and is currently a Senior Manager in the Statistics in Advisory, Audit, and Tax (STAAT) at Grant Thornton Advisors, LLC. His research and simulation studies at Grant Thornton Advisors has driven statistical methods in estimation of tax values, audit strategy, and pay equity studies.

He is a member of the American Statistical Association where he holds PStat® accreditation and is part of the leadership of ASA's Statistics in Audit Interest Group (SAIG).

Wendy Rotz has over 30 years of experience in sampling and estimation primarily in tax or accounting settings. She began her career at the Statistics of Income in the Internal Revenue Service, worked at the accounting firm, Ernst and Young, and now is the Managing Director of the Statistics in Advisory, Audit and Tax (STAAT) at Grant Thornton Advisors, LLC. Her primary area of research is achieving variance reduction of estimates from smaller sample sizes and the efficacy of statistical methods applied in accounting.

Wendy is a member of the Washington Statistical Society and served on its board for several years. She now chair's the American Statistical Association's (ASA's) Statistics in Audit Interest Group (SAIG) and is Vice Chair of ASA's Committee on Disability Statistics.

Taylor Lewis is a senior research statistician with RTI International's Center for Official Statistics, where he is lead statistician for the National Survey of Family Growth, the Healthy Chicago Survey, and the Los Angeles County Health Survey. He is an expert in designing and analyzing data from complex surveys, particularly those conducted using address-based sampling frames. Taylor also serves as an adjunct professor for the George Mason University Department of Statistics and the Odum Institute at the University of North Carolina, where he teaches graduate-level courses in survey sample design and analysis.

Taylor is a member of the Washington Statistical Society, the American Statistical Association, the International Association of Survey Statisticians, and the American Association of Public Opinion Research.

For additional information, please contact Pushpal Mukhopadhyay (pushpalm@gmail.com), WSS Methodology Section Chair.

How to Join:
WSS is excited to partner with Instats for seminars and workshops, as well as connecting with the research community more broadly through free community forums, social networking, Q&A boards, and job postings. Use the following link to join the seminar: "Design-Based vs. Model-Based Estimation (Free Seminar)"