

STATISTICAL CONSULTING WITHIN THE INTERNAL REVENUE SERVICE

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I. Our Team

The Statistical Support Section of the Statistics of Income (SOI) Division of the Internal Revenue Service (IRS) is comprised of four mathematical statisticians and one management analyst, all working for one section supervisor. We provide general statistical consulting services on request to various areas of the IRS and to other agencies within the Federal Government. Individual projects range in size and complexity, and our level of involvement varies considerably between projects. Specifically, our team supports its customers with:

Designing

- samples
- satisfaction/product questionnaires
- quality/performance measures
- taxpayer data dissemination websites
- agency-wide databases/systems
- customer-driven products
- cognitive research studies

Analyzing

- survey data
- web-metric data from IRS websites
- product quality review data
- systemic database reports
- results from focus groups/usability studies

Ad-Hoc Requests

- educating customers in statistical concepts
- validating database programming
- developing sampling algorithms
- facilitating the OMB clearance process
- responding to TIGTA/GAO audits
- giving executive-level presentations

Our small team assists a relatively large number of customers concerning a wide range of statistical issues. In this way, we serve as the “jack-of-all-statistical-trades” within the IRS community.

II. Our Mission

All of our short-term and long-term goals center around delivering the highest quality statistical consulting services possible, given our available resources. To this end, we require that the products we produce:

- meet the customer's needs,
- are technically accurate,
- are well-documented,
- are attractively presented, and
- are easy to use.

Quality, as we define it, mandates that we successfully and consistently satisfy these basic criteria.

III. Our Customers

Our team provides support to a wide range of organizations throughout the IRS. Our primary customers include, but are not limited to, personnel from the following IRS Divisions:

- Wage & Investment (W&I),
- Small Business / Self Employed (SB/SE),
- Submission Processing (SP),
- Taxpayer Advocate Service (TAS), and
- Human Capital Office (HCO)

Our team also supports smaller ad-hoc projects for organizations outside of our primary clientele. Typically lasting anywhere from a few days to a couple of months, these requests require less support from our staff and are often handled by one team member working part-time. Customers conducting research in the following organizations have contacted us for this type of assistance:

- Treasury Inspector General for Tax Administration (TIGTA),
- Tax Exempt & Government Entities (TE/GE),
- Office of Chief Financial Officer (CFO), and
Office of Performance Evaluation and Risk Analysis (OPERA)

IV. Our Approach

Each year, our team administers a satisfaction survey to our customers to gauge the current level of service we are providing. The results from these surveys consistently indicate a very high level of satisfaction among our customers. We believe that our overall philosophy, which stresses teamwork, customer service, and attention to detail, is directly responsible for our enduring success.

We actively seek to form long-term relationships with our customers, allowing us to better learn about their operations and to develop more effective strategies to meet their needs. These established relationships have fostered a comfortable and productive rapport and have greatly enhanced the quality of the statistical services we are able to deliver.

The environment within our team is friendly, comfortable, cooperative, and professional with effective and unstructured communication at all levels. There is an unforced emphasis on camaraderie and teamwork. This work environment promotes an informal atmosphere conducive to the open exchange of information. We are given the freedom to show initiative and encouraged to take as much decision-making control as we can effectively handle. The resulting sense of empowerment promotes individual growth and is critical to the long-term success of our team.

The members of our team were selected so that their education, skill sets, and work preferences mesh with the needs of the team's mission. Although virtually all members perform statistical consulting in one form or another, specific duties can vary widely depending on the projects assigned. For example, one project may require designing a sample and calculating estimated quality rates, while another project necessitates developing an instruction manual and traveling to IRS Service Centers to educate customers on its proper implementation. Our team members' diverse backgrounds help enable us to effectively deal with the comprehensive nature of our work.

Our supervisor stresses collaboration within our team by assigning individual projects to at least two team members, whenever possible. This work arrangement ensures that someone who is knowledgeable about a particular project is always available should a customer need assistance. It also facilitates peer review, which is important for the growth of each individual and the team as a whole. Distributing work in this way allows team members to be involved with several projects at any given time. This provides team members the opportunity to gain experience working on a wide-range of statistical issues.

Every team member is given an equal opportunity to contribute ideas and to provide input. However, individual responsibilities can vary depending on tenure and level of experience. Newer team members generally assume an observatory role and are guided by more senior members. A team member's level of involvement in project-related decisions naturally increases as they gain experience and confidence. In general, individual roles and responsibilities on projects are flexible, not formally defined, and change often, depending on customer needs.

Our team relies on a system of project documentation, which plays an important role in providing high quality products to our customers. At the onset of a project, we provide the customer with an outline of obligations and responsibilities, as well as a timeline for deliverables. While working on a project, copies of all e-mail correspondence and project-related files are stored on a shared server accessible to all team members. In addition, paper copies of minutes from all conference calls and meetings are filed locally. Collectively, this documentation is an invaluable reference tool. It promotes consistency between projects, seamless support for long-term customers, and smooth transitions of project responsibilities between team members.

V. Our Projects

The following is a list of a few of the main projects we are involved with and a brief description of each:

Volunteer Site Quality Review – There are over 10,000 volunteer-run taxpayer assistance sites open nationwide during the filing season. Each year, approximately 2.5 million taxpayers visit these sites to receive help in meeting their tax filing obligations.

Our team supports an effort within the IRS to use statistical sampling to evaluate the accuracy of the returns prepared by the volunteers working in these sites.

Walk-in Center Quality Review – There are nearly 400 taxpayer assistance centers located nationwide and open throughout the year. Over 7 million taxpayers visit these sites each year and receive help from IRS employees to resolve various tax-related issues. Our team is involved with establishing and maintaining the Contact Recording System, whereby the “live” interactions between IRS employees and the taxpayers visiting these centers are recorded, sampled, and reviewed to determine the quality of service provided in these centers.

Lockbox Quality – Each year, the IRS uses 9 private banks (called lockboxes) to process approximately 60 million taxpayer payments totaling over \$340 billion. The IRS uses a collection of performance measures to evaluate each lockbox's overall performance on a quarterly basis. We support this project by updating and developing reviews, designing and evaluating scorecards, compiling and explaining results, consulting with IRS analysts and bank management, and providing other statistical support as needed.

Submission Processing Balanced Measures – The IRS uses a series of quality measures to evaluate the accuracy and timeliness of various processing functions within each of the 6 IRS Service Centers. Samples of notices, letters, deposits, and refunds are selected and analyzed within each center on a monthly basis throughout the year. Our team provides on-going statistical support in collecting, analyzing, and reporting data pertaining to these measures.

Centralized Quality Review Site (CQRS) – Located in Philadelphia, the CQRS is responsible for selecting, reviewing, and coding the sampled cases used to measure the quality of service provided by the IRS call sites and processing centers. Our team supports the CQRS by providing sampling plans for all product lines monitored by the site, as well as on-going statistical expertise and advice.

National Quality Review System (NQRS) – The NQRS is an online database that stores raw sample data, generates estimates, and disseminates reports for a large network of customer-service-oriented quality measures being employed throughout the IRS. Our team provides expertise related to the statistical formulas NQRS uses to produce all point estimates and variances, as well as advice on the proper interpretation of results.

IRS Employee Satisfaction Survey – Each Spring, the IRS administers a survey to all IRS employees to measure various aspects of job satisfaction within the IRS. Our team provides on-going analytical and statistical support to various customers throughout the IRS in an effort to provide in-depth analysis of survey data from current and prior years. We also help prepare executive-level briefings on progress with regard to survey implementation and analysis of results.

Section 1204 Review – Section 1204 of the IRS Restructuring and Reform Act of 1998 (RRA98) prohibits the use of production quotas when evaluating IRS employees. In an effort to verify that IRS managers are complying with this law, the Office of the IRS Chief Financial Officer conducts an annual review of employee evaluations. Our team assists with designing sample plans and analyzing the final results for this review.

Generic Clearance for Cognitive Research – Our team facilitates a process which provides advanced OMB approval for well-defined plans for cognitive research within the IRS. More specifically, we review and track research proposals and act as a liaison between the client and OMB.

VI. A Typical Project

The final section of this paper will provide a comprehensive description of our work with the Taxpayer Advocate Service (TAS). Our work with this organization is indicative of the many ways in which we assist our other customers.

TAS is an independent organization within the IRS that primarily helps individual taxpayers resolve problems with the IRS. Taxpayers go to TAS when they encounter issues trying to reconcile a problem directly with the IRS or when an IRS action causes an economic burden on a taxpayer. The inventory of taxpayer cases are handled by TAS employees working in 73 offices located in 7 geographic areas.

TAS developed several quality measures to evaluate the level of service they provide to taxpayers. The Closed Case Review is the primary measure. It is used to determine the accuracy, timeliness and overall quality of the inventory of cases handled by employees working in TAS offices. In addition to this review, TAS uses a series of secondary reviews to evaluate the quality of service provided by other segments of the TAS organization.

Our team has provided statistical support to the TAS organization for the past 10 years. During this time, we have developed a close working relationship with TAS executives, analysts, and programmers. Most of the products and services that we provide take the form of statistical advice and expertise related to the TAS quality measures. We are directly involved with the design, implementation, and analysis of each measure. The following is a list of the main ways in which we support TAS and a brief description of each:

DCI Development

Our team assists TAS in establishing data collection instruments (DCIs) for their quality review measures. Using DCIs to collect raw sample data ensures that TAS reviews sampled cases consistently both across quality reviewers and over time. TAS uses unique DCIs for each measure. They requested our team's assistance while designing several of these DCIs. We advised TAS regarding the development of individual data entry points and provided feedback related to general layout.

Sample Size Determination

Our team is responsible for determining the sample sizes used for many of the TAS quality measures. For example, at the beginning of each Fiscal Year, we provide sample sizes for the Closed Case Review. Using estimated accuracy rates from the most recent Fiscal Year, we calculate recommended sample sizes for each of the 73 TAS offices. These sample sizes ensure that estimated accuracy rates for each office and for all offices combined will be within a desired level of precision by the end of the current Fiscal Year and at the end of each month, respectively.

In addition to the Closed Case Review, our team also determines the sample sizes for some of the other TAS measures. The populations for these measures tend to be small. However, the number of resources required to review sampled cases for these measures tends to be relatively large. These key differences between these measures and the Closed Case Review necessitate a different approach to calculating sample sizes. For these measures we developed an ad-hoc technique that uses simulated raw sample data to generate sample sizes under different assumptions about population size and the distribution of incorrect cases falling in the sample. Using this procedure, we recommend monthly sample sizes that are intended to provide estimated accuracy rates within a desired level of precision by the end of the Fiscal Year.

Sample Selection

TAS uses automated sample routines to select the samples for most of their quality measures. However, for some reviews, TAS must use a manual process for selecting cases. Our team assists in developing procedures to randomize the sample selection for these reviews.

We designed a Microsoft Excel-based software solution for these situations. This solution takes the form of a sample selection tool and is directly provided to our TAS customer. At the end of each month, they open it and input a listing of all cases in their population for the prior month. Then the tool identifies a statistically valid random sample of cases to be included in the quality review. Until TAS is able to incorporate these reviews in their automated sampling routines, our team will continue to provide updated versions of these sample selection tools at the beginning of each Fiscal Year.

Weighting Specifications

TAS releases a series of monthly and fiscal year weighted reports summarizing the current level of service they provide to taxpayers. These reports cite statistically valid estimates of quality, which are calculated using the raw sample data from TAS' various quality measures. Our team is directly responsible for developing the formulas used to produce these estimates and their corresponding measures of variability. We take into consideration each quality review's specific sample design, measurement procedures, and outcome measures when developing these formulas.

For the Closed Case Review, the DCI is divided into eight mutually exclusive "attributes," each measuring a different aspect of quality. The customer requires estimates by individual attribute and for total cases (all attributes combined). However, not all attributes are applicable to each case. Therefore, the point estimate and precision margin formulas developed by our team utilize ratio estimation procedures, which account for the possibility of sampled cases having inapplicable attributes. In addition, the sample plan for this measure consists of selecting random samples of closed cases from each of the 73 TAS sites on a monthly basis. Given this design, we assumed the sample is stratified by site by month, when developing the formulas for this measure. Hence, strata are weighted by actual monthly population counts from each site.

The point estimate and precision margin formulas for the other measures are simpler than those for the Closed Case Review. First, ratio estimation procedures are not necessary to account for the possibility of sampled cases having inapplicable attributes. This is due to the fact that for these measures TAS only produces estimated quality rates for entire cases

and does not require estimates for individual attributes on the DCI. Because at least one attribute will be applicable for any given case, estimates of total case quality can be calculated as proportions and do not meet the requirements for ratio estimators. Second, samples for the other quality measures have one less layer of stratification. Stratifying by site is not necessary, because sites are not relevant to these measures. Instead, the monthly samples for these measures are selected from comprehensive listings of population elements. Therefore, point estimates and precision margins are only weighted by month.

Database Development

TAS employs a series of databases to generate reports for each of their quality measures. The databases serve as central locations for entering DCI information. They also facilitate standardized reports and a streamlined process for disseminating quality information to stakeholders across the IRS. Our team supports the effort to continuously develop and validate these databases to ensure quality and consistency of published results.

Our team develops written specifications breaking down the weighted point estimate and precision margin formulas used to report monthly and monthly cumulative results for each measure. We provide these specifications to TAS programmers and work closely with them during the process of incorporating statistical formulas into the code used to generate database reports.

Once reports are available on a TAS database, our team is responsible for routinely validating the accuracy of reported figures. This entails extracting raw sample data from the database, manually computing weighted estimates offline, and comparing our results to those in published reports. We investigate the reasons for any discrepancies and work with TAS programmers to have them resolved within database reports.

When a new measure is rolled out, there is usually a period of time during which sampling is being conducted but reports have not yet been programmed. During this often lengthy transition phase, TAS is left without a method for generating automated statistically valid results for the new measure. To help our customers successfully navigate this type of situation, our team designs and implements Excel-based software solutions, taking the form of weighted report generation tools. These tools use raw sample data to quickly and accurately generate all necessary weighted reports. TAS distributes monthly reports from these tools until database reports are available.

Ad-Hoc Support

Our team provides ad-hoc assistance to TAS concerning a variety of statistical issues on a flow basis. We are always on-call to provide statistical expertise when necessary. For example, we help TAS analysts and executives correctly interpret results contained in their reports. In addition, when one of TAS' quality measures is reviewed by TIGTA or GAO, we lead discussions with the corresponding auditing agency concerning all statistical aspects of the measure. The type and level of support that our team provides TAS continues to evolve as TAS expands its quality measurement and statistical research efforts.