2023 IRS/TPC Research Conference
Abstracts of Papers with Bios of Presenters

Session 1: Service is Our Surname

Looking Beyond Level of Service: Using Behavioral Insights to Improve Taxpayer Experience

Jan Millard *(IRS, RAAS); Omar Faruqi, Jonah Flateman, Jamil Mirabito, Sarah Smolenski, Michael Stavrianos, Lauren Szczerbinski (ASR Analytics)*

In 2016, as part of the Service-wide Future State Initiative, the IRS initiated a notice redesign effort focusing on Collection notices issued through the Automated Collection System (ACS). The redesigned notices included changes to wording and format which collectively guide taxpayers towards desired behaviors and away from undesired behaviors. These "behavioral nudges" were designed based on a robust and rapidly growing body of research from the behavioral sciences (e.g., psychology, neuroscience, behavioral economics), which examines how individuals absorb, process, and react to information, and applies this knowledge to design practical policies and interventions with human behavior in mind.

This paper discusses a pilot test conducted to evaluate the efficacy of a sequence of Customer Voice Portal (CVP) message prompts redesigned using behavioral insights to encourage callers routed to ACS to abandon the call queue and shift to online service channels. RAAS used behavioral design techniques to develop an alternative sequence of voice prompts with the taxpayer experience in mind, aiming to increase awareness of online resources relevant to specific tax issues (e.g., establishing an online account to access tax return information and view payment history) and provide callers with information necessary to consider self-service channels to resolve their issue rather than continue to wait on hold for a CSR. As the IRS seeks to reduce costs, improve taxpayer compliance, and enhance the overall taxpayer experience, redesigning CVP announcements based on research from behavioral sciences provides an opportunity to achieve all three objectives.

Jan Millard is a Program Manager in Research Applied Analytics Services (RAAS) for the Internal Revenue Service (IRS). She has worked for the IRS for over 38 years in a variety of functions within the Service but has the most knowledge and experience within the Collections department. Jan holds a Master of Music degree from the Conservatory of Music, University of Missouri Kansas City (UMKC). Although this degree is not an economics or mathematic degree, it does provide a unique perspective to visual, innovative, and design analytics that are well suited for behavioral insights toward improving the taxpayer's experience with the IRS.

The Balance Due Taxpayer: How Do We Reduce IRS Cost and Taxpayer Burden for Resolving Balance Due Accounts?

Howard Rasey, *Shannon Murphy, Frank Greco, Javier Framinan (IRS, Wage and Investment); Angela Colona, Javier Alvarez (IRS, Taxpayer Experience Office)*

Our studies aim to identify taxpayers most vulnerable to shifting into a balance due situation with the goal of prevention. Designing targeted interventions aimed to help taxpayers avoid such movement saves the Internal Revenue Service (IRS) resources and reduces taxpayer burden. The first study uses logistic regression to determine the change in predicted probability of a taxpayer shift to an unfavorable balance due category given changes in their personal characteristics or a change in their tax return. The study highlights how changes in taxpayers' personal characteristics and tax returns impact their risk of shifting to a balance due. Taxpayers who change their filing status from Married Filing Joint to Single are three times more likely to shift to a balance due. Taxpayers who remove Schedule A (Itemized Deductions) or attach Schedule C (Profit and Loss from Business) are twice as likely to shift to a balance due category.

The second study is a gap analysis that scanned for resources available to these taxpayers to help them avoid a balance due. We reviewed current messaging available to taxpayers on IRS.gov, searching for specific

keywords taxpayers might use in their research. A simple Google search on the topics of divorce, starting a business, and working in the gig economy revealed minimal or no guidance to naïve taxpayers who may not realize the tax implications of these life events. Adding "and taxes" to the keywords produced slightly more helpful information. However, search engine-based guidance as an "early intervention" mechanism was clearly insufficient.

Howard Rasey *Howard Rasey is a Lead Social Scientist for IRS Wage & Investment Strategies and Solutions (WISS). In the 18 years Howard has worked as an IRS Social Scientist, he has conducted research on refundable credits, return errors, due diligence requirements, and impacts of new legislation on tax administration. His current research focuses on balance due taxpayers and employee retention. Howard received his doctorate in Experimental Psychology from the University of Tennessee in 1998 and has an undergraduate degree in Psychology with a minor in Behavioral Medicine from the University of North Florida. Howard lives in the suburbs of Atlanta, GA with his wife and daughter.*

Understanding Yearly Changes in Family Structure and Income and Their Impact on Tax Credits

*Elaine Maag, **Nikhita Airi**, Lillian Hunter (Urban-Brookings Tax Policy Center)*

The earned income tax credit (EITC) and child tax credit (CTC) provide substantial assistance to low- and moderate-income families with children but determining how much credit a family qualifies for can be complicated. Credit amounts depend primarily on number of eligible children, income, and marital status of the tax unit, which is often, but not always, a family. These factors can change throughout the year and from one year to the next—sometimes in ways that are unpredictable. Among low-income households interviewed in two consecutive years for the Current Population Survey (CPS), we find 39 percent saw their EITC drop by at least $500. For the CTC, we find about 20 percent of low-income families saw their CTC drop by at least $500. Hispanic families with low-income were more likely to see a reduction in their EITC and CTC from one year to the next than non-Hispanic White families and non-Hispanic Black families.

*Nikhita Airi** is a research analyst in the Urban-Brookings Tax Policy Center at the Urban Institute. She researches the design and administration of cash assistance through the tax code using microsimulation modeling to estimate the distributional and revenue consequences of major policy proposals, and quantitative analysis of children and families' interactions with the tax system. She manages and contributes to Innovations in Cash Assistance for Children, a joint project of the Urban Institute and Berkeley Opportunity Lab investigating the effects of cash assistance policies on child well-being, and contributes to the Urban Institute State and Local Finance Initiative.*

Racial Disparities in Audit Rates

Tom Hertz, *Kara Leibel, Mark Payne (IRS, RAAS); Brian Sartain (IRS, Wage and Investment)*

The IRS has extended the analysis of racial disparity in audit rates initiated by Elzayn et al (2023). We have focused on assessing the operational relevance of the three hypothesized drivers of disparity reported in that analysis, and on identifying other mechanisms that appear responsible for elevating the audit rate for Black taxpayers. Our presentation will present some preliminary findings regarding the role of the EITC/non-EITC audit mix, the role of errors in the imputation of the residency and relationship status of claimed dependents, and the role of unscrupulous paid return preparers in submitting invalid EITC claims on the part of Black taxpayers. We also describe the disparity and revenue properties of a feasible version of the disparity-reducing audit strategy suggested by Elzayn et al. This is one that prioritizes EITC-claiming returns with the highest values of total underreported taxes, rather than those with the largest EITC overclaims, but respects IRS resource constraints which dictate that the majority of EITC exams must be conducted via correspondence.

Tom Hertz is an economist who has been with IRS – RAAS since 2019. He has 35 years' experience in empirical social science research on topics including the determinants of health outcomes, the role of race and gender in labor markets, intergenerational mobility, immigration and agricultural labor, and the economics of education. He currently leads the RAAS-RICS collaboration on Exam Disparity which is charged with building an understanding of the drivers of differences in audit rates by race.

Deena Ackerman is an economist in the Individual Taxation Division of the Office of Tax Analysis in the Department of the Treasury. She is an expert on family and education related tax issues. Her current work focuses on the tax support received by families.

Janet Holtzblatt is a senior fellow at the Urban-Brookings Tax Policy Center. Holtzblatt's recent research focuses on tax administration, the tax treatment of families and workers, and wealth taxes. Before joining the Tax Policy Center, Holtzblatt was the unit chief for tax policy studies in the Tax Analysis Division of the Congressional Budget Office.

Emily Lin is an economist at the Individual Taxation Division of the Office of Tax Analysis in the Department of the Treasury. She is an expert on tax compliance, administration, equity and family related issues. Her recent works focus on EITC compliance, gender equity, and filing status.

Session 2: Estimating Audit Aftershocks

Changes to Voluntary Compliance Following Random Audits on Income Tax Returns

Murat Besnek, **Allan Partington** *(Australian Taxation Office)*

In this paper, using Gemmell and Ratto (2012) as a guide, we estimate the change in voluntary compliance that occurs in the period immediately after a taxpayer is audited (direct deterrent effect). To do this, we use a sample of Australian taxpayers who are treated with a random audit of their income tax returns. We perform this for the individuals not in business (INIB), small business – individuals in business (SB-IIB), and small business – small company (SB-SC) populations. The audits typically have outcomes where a taxpayer is found to have misreported their liability (non-compliant) or correctly reported their liability (compliant). This study shows that different populations respond to audits differently and that audits influence subsequent taxpayer behavior. We find that the direct deterrent effect for non-compliant taxpayers in the INIB population is negative. Similarly, we find that the direct deterrent effect for compliant taxpayers in the SB-IIB population is negative. In contrast, the direct deterrent effect for non-compliant taxpayers in the SB-IIB population is positive. We also find that the direct deterrent effect for both compliant and non-compliant taxpayers in the SB-SC population is positive, but larger for non-compliant taxpayers. The audit treatment effects seem to remain strong in all the population types, with no indication of returning to the levels displayed by the control groups.

Allan Partington is currently a Director in the Performance Measures and Tax Gap team at the Australian Taxation Office. He is responsible for estimating compliance gaps for direct and indirect taxes. Prior to this Allan was in the ATO's Evaluation capability using quantitative and mixed-method approaches to estimate the impact the ATO has on taxpayer behavior, and also held various roles with KPMG and the Australian Department of the Treasury. Allan has a Masters in Economics.

The Long-Term Impact of Audits on Nonfiling Taxpayers

India Lindsay, Jess Grana (MITRE); Alan Plumley (IRS, RAAS)

Nonfilers contribute 9 percent, or $32 billion, towards the individual income tax gap. Audits of this population have decreased due to declining resources. Fewer audits not only result in loss of direct revenue, but there are impacts on voluntary compliance, as well. In this paper, we estimate the effect of in-person audits of nonfilers on their future filing behavior. We compare the filing behavior of taxpayers audited during Tax Years 2009-2014 against a group of unaudited taxpayers who were eligible for the audit. We find that

audited taxpayers are 2.9 to 5.3 percentage points more likely to file a return in subsequent years, an indirect effect that attenuates over time. These findings are qualitatively similar to other studies of the indirect effects of audits on future compliance.

India Lindsay is a Senior Data Scientist at the MITRE Corporation. Her current research involves statistical analysis of tax policy and the application of machine learning methods to mitigate dataset shift. She received her Masters of Science in Business Analytics from the University of Texas and Bachelor of Science in Applied Math from the College of William and Mary.

Silver Lining: Estimating the Compliance Response to Declining Audit Coverage

Alan Plumley, Daniel Rodriguez (IRS, RAAS); Jess Grana, Alexander McGlothlin (MITRE)

IRS audit rates have fallen for over a decade due to declining resources. In addition to loss of direct revenue, decreased enforcement likely results in lower voluntary compliance, as well. We contribute to a small literature on the "comprehensive" indirect effects of IRS enforcement on voluntary compliance across the general taxpayer population. Using microdata from random audits conducted for research purposes, we find that noncompliance increases on certain line items as overall audit rates decline. Put another way, we estimate that underreporting of high visibility income – wage and salaries – drops by 3.6 to 6.1 percent with a one percentage point increase in the audit rate. For other tax return line items, the indirect effect is detected only for certain taxpayers. Our findings suggest that the deterrent effects of IRS enforcement depend on how well noncompliance is able to be measured and validated.

Alan Plumley is a Technical Advisor in the IRS Office of Research, Applied Analytics, and Statistics. His expertise is in the areas of compliance measurement and modeling for efficient workload selection and resource allocation. A 38-year veteran of IRS research, Alan earned his Ph.D. in public policy from Harvard University. His dissertation on the determinants of individual income tax compliance broke much new ground in the effort to estimate the impact of various IRS activities on the voluntary compliance behavior of the general population. He has presented research papers at many tax conferences, and has co-authored chapters for two books related to tax administration and compliance. He is also the editor of the annual IRS Research Bulletin*.*

John Guyton is the Senior Advisor for Knowledge Development and Application in Research, Applied Analytics, and Statistics at the IRS. John has a PhD from the University of Maryland, 15 years of experience at the IRS, and prior experience in a Big 4 tax practice. John has published and led research on a wide range of tax topic areas ranging from policy to application, outreach to enforcement, low-income taxpayers to the largest corporations. John's current research and program management focus is reporting compliance and examination.

William Boning is a Financial Economist in the Office of Tax Analysis at the U.S. Department of the Treasury. His research focuses on the role of technology in tax administration, on stimulus payments, and on tax enforcement. He received his Ph.D. from the University of Michigan.

Who are Married-Filing-Separately Filers and Why Should We Care?

Emily Y. Lin, Navodhya Samarakoon (U.S. Department of the Treasury)

Less than 4 percent of married taxpayers file separate federal income tax returns, claiming the married-filing-separately (MFS) status. Filing separate returns generally results in a higher tax liability for married couples than filing a joint return, but some couples may file separately for a tax or non-tax reason. Using administrative data from 2013 to 2021, we estimate that 57 to 63 percent of MFS filers pay more federal income tax than they would if they filed jointly while 13 to 16 percent pay less tax by filing separately. Possibly because of the different reasons for using this filing status, MFS filers consist of a diverse group of taxpayers by income and by how long they claim this status. About half of MFS claims end after one year, more than 70 percent end after three years, but 12 percent last after eight years. Examining the complexity and compliance issues, we find a large percentage of filing status errors associated with the MFS status.

Emily Lin is an economist at the Individual Taxation Division of the Office of Tax Analysis in the Department of the Treasury. She is an expert on tax compliance, administration, equity and family related issues. Her recent works focus on EITC compliance, gender equity, and filing status.

Willing but Unable to Pay? The Role of Gender in Tax Compliance

*Andrea Lopez-Luzuriaga (Universidad del Rosario); **Carlos Scartascini** (Inter-American Development Bank)*

Recent estimates of the yearly tax gap exceed $600 billion in the United States, and a significant portion of this gap is due to financial transactions whose sequence and structural design results in exploiting loopholes in the Internal Revenue Code (IRC). Taken individually, these transactions may appear perfectly innocuous and routine, but considered collectively, and in the context of the financial networks in which they occur, reveal an insidious intent to reduce tax liability.

Our approach consists of an Evolutionary Behavior Discovery software framework (EBD): an iterative, two-fold computational framework for generating novel taxpayer behaviors. One portion of this framework employs an evolutionary algorithm—a search heuristic inspired by the process of Darwinian evolution, which encodes potential taxpayer behaviors as "chromosomes" that are iteratively modified via mutation, recombination, and selection. The second portion of the framework is the taxpayer behavior simulation that occurs during the evaluation phase of the evolutionary cycle (before chromosome selection). The simulation executes any viable economic transactions encoded by the chromosomes, in which financial entities exchange goods and services, and computes any taxable income incurred.

We are currently investigating behaviors that may have emerged in response to significant changes in the IRC introduced under the Tax Cuts and Jobs Act (TCJA). We are exploring several mechanisms by which large businesses might reduce their liability under specific provisions. By extending our EBD into the domains of new tax policy, we hope to enable the IRS to anticipate novel taxpayer avoidance behaviors that may have emerged following these changes to the IRC, and to aid in the development of filters, or other statistical techniques, capable of detecting these novel tax planning behaviors.

Carlos Scartascini is Head of the Development Research Group at the Research Department and Leader of the Behavioral Economics Group of the Inter-American Development Bank. He has published eight books and more than 60 articles in academic journals and edited volumes. He is a member of the Executive Committee of IDB's Gender and Diversity Lab, member of the Scientific Committee of Elcano Royal Institute, member of the Board of Advisors of the Master of Behavioral and Decision Sciences at the University of Pennsylvania, Associate Editor of the academic journal Economía, and Founding Member of LACEA's BRAIN (Behavioral Insights Network).

Who Sells Cryptocurrency?

Jeffrey L. Hoopes (University of North Carolina at Chapel Hill);
Tyler S. Menzer, *Jaron H. Wilde (University of Iowa)*

Cryptocurrency has become a major force in the financial system in the last decade. However, even as regulators and policymakers across the globe deliberate on how to account for, regulate, tax, and oversee digital assets and cryptocurrency marketplaces, there is little population-level empirical evidence on cryptocurrency users. Providing broad-based evidence on cryptocurrency sellers and activities is critical to policy deliberations because the nature of regulation is often predicated on who is involved in particular activities. Using administrative data, we provide information on the general characteristics of cryptocurrency users who report their sales to the government, focusing on those individuals who own cryptocurrency directly on the blockchain or through cryptocurrency exchanges. Among the insightful patterns we document are ages, incomes, professions, geographic residences, student and marital statuses, and reported income from gambling of cryptocurrency sellers. The average income of cryptocurrency sellers has declined over time, suggesting the base of sellers has expanded in recent years; the average cryptocurrency seller is just under 33 years old—much younger than the average non-crypto investor at 56—and this gap has grown over time. Moreover, from 2013 to 2020, the population of individuals selling cryptocurrency evolved from small clusters of people largely working in related industries and residing in coastal states (e.g., California and New York) to an expansive population employed in a broad range of industries and spread out across the country. By documenting compelling patterns of increasingly broad-based use of cryptocurrencies, this study contributes timely evidence to the significant regulatory deliberations and towards an innate understanding of these relatively new financial products.

Tyler S. Menzer *is a PhD candidate at the University of Iowa, and an IRS employee under a Student Volunteer agreement through the Joint Statistical Research Program (JSRP)*

Russell James *is a Technical Advisor in IRS's Research, Applied Analytics, and Statistics Division.*

Yan Sun *is an Economist in the Strategy and Business Solutions (SBS) Division in Research, Applied Analytics and Statistics (RAAS) Division at the Internal Revenue Service (IRS). Dr. Sun's current research includes tax compliance, public economics, and applied econometrics. She earned her Ph.D. in Economics from George Washington University.*

Session 4: Hidden Assets, Hidden Networks

Following K-1s: Considering Foreign Accounts in Context

Tomas Wind, *David Bratt, Alissa Graff (IRS, RAAS)*

Estimates suggest that U.S. taxpayers have disclosed holding trillions of dollars in foreign accounts (Johannesen et al., 2023). Despite an increased effort by the IRS and advancements in international cooperation, the amount disclosed is likely an undercount to what is actually held overseas. In this paper we use U.S. federal tax microdata from 2006-2017 to determine whether information embedded within a taxpayer's Schedule K-1 network can be used to identify taxpayers with undisclosed foreign accounts. We build individualized networks for taxpayers that received K1s and have disclosed foreign accounts, and compare them across numerous metrics with K-1 recipients that have never reported owning foreign accounts. We find that the presence of other taxpayers that have disclosed foreign accounts and receiving income from a multi-tiered pass-through entity is predictive of disclosing an offshore account. This evidence suggests an additional pathway to potentially identify taxpayers that are likely to have undisclosed foreign accounts.

Tomas Wind *is a data scientist at RAAS within the IRS, where he has worked on a range of issues including exploring new uses for graph analytics in tax administration and advancing the use of data-driven decision making to internal IRS functions.*

Application of Network Analysis to Identify Likely Ghost Preparer Networks

Joshua King, Andrew Soto, Getaneh Yismaw, Izabel Doyle, Ririko Horvath, Ashley Nowicki, Chris Hess (IRS, RAAS); Brandon Gleason (IRS, Criminal Investigations); Will Sundstrom, Jacob Brooks, Michael Mastrangelo, Mike Stavrianos, Daniel Hales (GCOM)

More than half of individual taxpayers rely on paid tax return preparers to assist them in meeting their federal tax filing obligations. Paid preparers are an important IRS partner as the Service depends on them to help taxpayers comply with tax laws. Because of the critical role tax preparers have in helping taxpayers comply with the tax laws, identifying incompetent and/or unscrupulous preparers or groups of preparers is an essential component of the IRS's tax administration responsibilities. Ghost preparers are compensated tax return preparers who do not identify themselves on the returns they prepare with a preparer tax identification number (PTIN) or any other form of identification. Ghost preparers avoid IRS oversight, are in violation of Treasury rules and regulations, and more importantly, may engage in unscrupulous behavior which victimizes taxpayers and undermines the integrity of tax administration. Ghost Preparers evade most of IRS's current systems and processes designed to identify return preparer non-compliance because they rely on the PTIN.

This paper reviews efforts to employ (graph) network analysis to identify highly connected clusters of self-prepared returns which is indicative of ghost preparer involvement. In addition to identifying taxpayers who may be using a ghost preparer, we consider tools which leverage graph datasets to provide insights and context to ghost preparation schemes and potentially identify ghost preparers. Given these new approaches and tools, the paper considers how clusters evolve during the filing season, attempts to quantify the impact ghost preparers have on individual returns as well as propose additional approaches to better understand the extent of ghost preparation.

Joshua King works in the IRS Research and Applied Analytics and Statistics Division's Emerging Risks Lab where he and his colleagues support efforts to operationalize graph analysis within the service. Prior to joining the IRS Josh worked in the Federal Emergency Management Agency and the National Flood Insurance Program.

The Offshore World According to FATCA: New Evidence on the Foreign Wealth of U.S. Households

Niels Johannesen (University of Copenhagen); Daniel Reck (University of Maryland); Max Risch (Carnegie Mellon University); Joel Slemrod (University of Michigan); John Guyton, Patrick Langetieg (IRS, RAAS)

This paper uses account-level information, reported to the IRS by foreign financial institutions under the Foreign Account Tax Compliance Act (FATCA), to produce new evidence on the foreign financial wealth of U.S. households. We find that U.S. taxpayers hold around $4 trillion in foreign accounts, almost half in jurisdictions usually considered tax havens. Combining the FATCA reports with other administrative tax data and tracing account ownership through partnerships, we document a steep income gradient in the propensity to hold assets in foreign financial institutions. Specifically, more than 60% of the individuals in the top 0.01% of the income distribution own foreign accounts, the vast majority in tax havens and more than half through a partnership. We discuss the likely implications of these findings for the overall impact of FATCA on tax compliance and government revenue.

Daniel Reck is an Assistant Professor of Economics at the University of Maryland and a Faculty Research Fellow at the National Bureau of Economic Research. His research interests include tax administration and tax compliance, pension design, and behavioral public economics.

Paul Organ is a Financial Economist in the Office of Tax Analysis at the U.S. Department of the Treasury, where he primarily works on international tax topics concerning businesses and individuals.

Robert McClelland is currently a senior fellow at the Urban-Brookings Tax Policy Center, where he analyzes issues such as how taxation affects charitable giving and capital gains, and how the tax code might favor

white families over Black families. He is also a member of a team creating synthetic tax data for public use. He has worked at the Bureau of Labor Statistics and the Congressional Budget Office and he has published in journals such as the American Economic Review, the Journal of Public Economics and the Review of Economics and Statistics. He received his PhD in economics in 1989 from UC Davis.