Papers Given at the 6th Annual Joint Research Conference on Tax Administration Co-Sponsored by the IRS and the Urban-Brookings Tax Policy Center

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Foreword

This edition of the *IRS Research Bulletin* (Publication 1500) features selected papers from the IRS-Tax Policy Center (TPC) Research Conference held at the Urban Institute in Washington, DC, on June 23, 2016. Conference presenters and attendees included researchers from many areas of the IRS, officials from other government agencies, and academic and private sector experts on tax policy, tax administration, and tax compliance. In addition to those who attended in person, many participated live online, as the TPC broadcast video of the proceedings over the Internet. The videos are archived on their website to enable additional participation. Online viewers participated in the discussions by submitting questions via e-mail as the sessions proceeded.

The conference began with welcoming remarks by Eric Toder, Co-Director of the Tax Policy Center, and by Ben Herndon, the IRS Director of Research, Applied Analytics, and Statistics. The remainder of the conference included sessions on interventions to influence taxpayer compliance, estimates of nonfiling using IRS and Census data comparisons, factors affecting revenue estimates of legislative proposals that would impact tax compliance, and behavioral research probing why people do what they do. The keynote speaker was Martin A. Sullivan, the Chief Economist of Tax Analysts, who offered his insights on current tax issues.

We trust that this volume will enable IRS executives, managers, employees, stakeholders, and tax administrators elsewhere to stay abreast of the latest trends and research findings affecting tax administration. We anticipate that the research featured here will stimulate improved tax administration, additional helpful research, and even greater cooperation among tax administration researchers worldwide.

Acknowledgments

This IRS Research Conference was the result of preparation over a number of months by many people. The conference program was assembled by a committee representing research organizations throughout the IRS. Members of the program committee included: Alan Plumley, Kara Leibel, Brenda Schafer, and Eric Tressler (National Headquarters Office of Research); Kim Stockton (Statistics of Income); Terry Ashley (Taxpayer Advocate); John Hribar (Human Capital Office Research); Kevin Mullen (Small Business/Self-Employed Division); and Joe Rosenberg (Tax Policy Center). In addition, Blake Greene and Ann Cleven from the Tax Policy Center and Linda Addison from the IRS RAAS Data Management Division oversaw numerous details to ensure that the conference ran smoothly.

This volume was prepared by Paul Bastuscheck, Camille Swick, and Lisa Smith (layout and graphics), and Carla Borden and Beth Kilss (editors), all of the IRS Statistics of Income Division. The authors of the papers are responsible for their content, and views expressed in these papers do not necessarily represent the views of the Department of the Treasury or the Internal Revenue Service.

We appreciate the contributions of everyone who helped make this conference a success.

Ben Herndon Director, IRS Office of Research, Applied Analytics, and Statistics

6th Annual IRS-TPC Joint Research Conference on Tax Administration

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Taxpayer Responses to Third-Party Income Reporting: Preliminary Evidence from a Natural Experiment in the Taxicab Industry

Bibek Adhikari (Illinois State University), James Alm (Tulane University), Brett Collins and Michael Sebastiani (Office of Research, Applied Analytics, and Statistics, Internal Revenue Service), and Eleanor Wilking (University of Michigan)

1. Introduction

The reporting by employers to the Internal Revenue Service (IRS) of the wage and salary income they paid to their employees has proved to be an effective tax compliance tool, resulting in 99 percent of such income being properly reported and taxed, while the compliance rate for income not subject to such "third-party" reporting is only 44 percent (Internal Revenue Service (2016)). To improve tax compliance by small business, the United States Congress enacted a law in 2008 (implemented starting in 2011), whereby processors of credit and debit cards such as Visa and MasterCard and electronic payment systems such as PayPal were required to report to the IRS the gross receipts of businesses accepting these forms of payment. A new information report called Form 1099-K was introduced to facilitate reporting. However, income received in cash was not affected by the Form 1099-K, and expenses are still not reported by third parties, which leaves room for tax evasion through underreporting of cash income or overreporting of expenses.

This paper proposes a novel method of estimating the causal impact of third-party reporting on smallbusiness tax compliance. We exploit the natural experiment created by the interaction of the introduction of Form 1099-K in 2011 and the introduction of laws requiring taxicabs to install credit card readers in various cities in the U.S. We use a difference-in-differences research design in which we compare the trends in the receipts, expenses, and the ratio of the receipts and expenses of the taxi services who operate in cities with mandatory credit card laws (i.e., the treated group) to the taxi services who operate in cities without mandatory credit card laws (i.e., the control group) before and after the treatment. We combine data on when credit card laws were implemented with administrative tax return data for the taxicab industry extracted from Form 1040 Schedule C and Form 1099-K.

Our research is among the first to systematically evaluate the effects of the Form 1099-K on small-business tax compliance. It builds upon the work by Slemrod, Collins, Hoopes, Reck, and Sebastiani (2015) by providing causal evidence on the impact of third-party reporting. Our results are preliminary, but they suggest that taxpayers respond to third-party information reporting in offsetting ways; that is, firms reported more revenue after the introduction of Form 1099-K, but the increase in reported revenue was accompanied by an offsetting increase in reported expenses.

2. The Natural Experiment

In the last decade, more than 25 cities have passed laws requiring taxicabs to install credit card readers in their vehicles, referred to as "credit card laws." These credit card laws were passed to improve the riding experience of the public. We compiled a list of all cities that introduced credit card laws from 2004 to 2016 by referring to various legal sources (e.g., Municode¹ and the American Legal Publishing Corporation²), local government websites, and articles from the local press. Table 1 lists the cities with credit card laws, the date of adoption,

¹ See https://www.municode.com/library/.

² See http://www.amlegal.com/code-library/.

and the effective date of implementation. In 2004, New York was the first city to pass the credit card law, and Seattle and Philadelphia followed suit the following year. These credit card laws are plausibly exogenous to the introduction of Form 1099-K because they were passed as a measure to improve the quality of taxi services and not because of any fiscal or tax compliance reasons, providing a source of variation comparable to those obtained via randomization.³

City	State	Adoption Date	Effective Date
Seattle	Washington	Feb 2005	Jul 2005
Philadelphia	Pennsylvania	2005	2006
New York	New York	Mar 2004	Dec 2008
Boston	Massachusetts	Aug 2008	Jan 2009
Indianapolis	Indiana	N/A	2011
Minneapolis	Minnesota	N/A	Jun 2012
Charlotte	North Carolina	Jul 2011	Jul 2012
San Francisco	California	Jun 2012	Jul 2012
New Orleans	Louisiana	Apr 2012	Aug 2012
Chicago	Illinois	Jul 2012	Jan 2013
Washington	District of Columbia	May 2013	Sep 2013
Columbus	Ohio	Jul 2013	Jun 2014
Fort Worth	Texas	Aug 2014	Aug 2014
Baltimore	Maryland	N/A	Dec 2014
Houston	Texas	Aug 2014	Feb 2015
Miami	Florida	Jan 2014	Jan 2016
Kansas City	Missouri	Apr 2015	N/A
Atlanta	Georgia	Sep 2015	N/A

TABLE 1. Adoption of Taxicab Credit Card Laws in U.S. Cities, by Order of Effective Date

NOTE: N/A denotes that the credit card law was adopted but that the precise date could not be obtained.

SOURCE: Municode (https://www.municode.com), eLaws.us (http://www.elaws.us), and American Legal Publishing (http://www.amlegal.com).

3. Data, Sample Selection, and Methodology

We examine city-level aggregate data for the hundred largest cities in the U.S. from 2006 to 2014. These data come from the Form 1040 Schedule C and Form 1099-K filed with the IRS, which were accessed via the Compliance Data Warehouse (CDW), the IRS research repository of tax return data. The information reports from credit card and other payment processing companies were matched to the income details from 1040 Schedule C using Taxpayer Identification Numbers (TINs).

The taxicab industry was identified using the North American Industry Classification System (NAICS) code 485300. Although the tax return data from the IRS are of very high quality, there are still some issues with the data. Some errors are caused by errors in filing and others by unsuccessful matching of the TINs when combining Form 1099-K and 1040 Schedule C. Thus, we clean the data of outliers and data errors that create implausible numbers. First, the amount of receipts reported on Form 1099-K should be lower than the total receipts reported in Schedule C for most taxpayers since Form 1099-K reports only amounts received through credit card and electronic payment systems. Accordingly, we remove individual taxpayers for whom the ratio of receipts from Form 1099-K to Schedule C is greater than 1.1.⁴ Second, there were some cases where the reported expenses were implausibly high, so we removed the top 1 percentile of filers with "excessive" expenses (or expenses exceeding \$124,156).

³ For instance, New Orleans and Indianapolis implemented credit card in taxi laws in the year that they hosted the Super Bowl, so as to improve the quality of the city's taxi services.

⁴ There are a number of reasons why the Form 1099-K amount could exceed reported receipts. For example, consider merchandise returns or cash back services on card purchases provided by merchants. The full amounts of these transactions would be included in the payment processor and thus in the Form 1099-K amount, but these amounts would not all add to actual revenues for the merchants.

Since we do not have a direct measure of tax underreporting, we infer the effect on underreporting from the data on taxpayer reports, using a "traces-of-evasion" approach (Slemrod and Weber (2012)). To that end, we examine the changes in three important outcomes around the treatment: receipts reported, expenses reported, and the ratio of expenses to receipts.

Figure 1 presents the trends in the log of total receipts from 2006 to 2014. The horizontal axis contains relative years from treatment; that is, Year 0 indicates the first year when both Form 1099-K was implemented and the credit card law was in effect for the particular city. There is a clear jump in the receipts reported in Year 0 and forward, suggesting that the treatment increased reported revenue. Similarly, we notice a clear jump in Figure 2, which plots the trends in the log of total expenses reported. Since we find that both reported revenue and reported expense increased after the treatment, it is difficult to separately identify whether the increase in expense was a result of more income being reported and thus more expense associated with that income being reported as well, or whether the taxi services shifted from evading taxes by underreporting income to overreporting expense, as expenses are not yet subject to third-party reporting. One possible way to investigate this is to examine the ratio of expenses to receipts. Figure 3 presents the trend in the ratio of expenses to receipts around the treatment year. Figure 3 suggests a modest increase in the ratio of expenses to receipts.

These simple trends suggest that Form 1099-K implementation was associated with higher reported receipts, but also higher reported expenses and higher expenses for each dollar of reported revenue. However, we need to account for omitted variables that might be correlated with the Form 1099-K introduction and taxpayer filing behavior; we also need to account for any national trends in tax filing behavior or credit card usage that may confound the results. The next section presents our framework for disentangling the impact of Form 1099-K on taxpayer behavior.







FIGURE 2. The Trend in Log of Total Expenses of Taxi Services in the Treated Cities Around the Treatment Year

FIGURE 3. The Trend in the Ratio of Total Expenses and Total Receipts for Taxi Services in the Treated Cities Around the Treatment Year



Our methodology exploits the natural experiment created by the interaction of the introduction of Form 1099-K in 2011 and the introduction of laws requiring taxicabs to install credit card readers in various cities in the U.S. We use a difference-in-differences research design where we compare the trends in the receipts, expenses, and the ratio of expenses to receipts of the taxi services who operate in cities with mandatory credit card laws (i.e., treated group) and the taxi services who operate in cities without mandatory credit card laws (i.e., control group) before and after the treatment. Our rationale is that the introduction of credit card machines in taxicabs discontinuously increases the share of revenue from credit cards reported in the Form 1099-K. Thus, taxi services operating in cities with such laws will be affected by the third-party reporting more than those operating in cities without such laws. The baseline difference-in-differences specification is given by:

$$Y_{ct} = Treatment_{ct} + FE_c + FE_t + \varepsilon_{ct}$$

where Y_{ct} represents the dependent variable (e.g., receipts, expenses, or the ratio of expenses to receipts for taxi services) in city *c* and year *t*, city fixed effects are represented by FE_c to capture time-invariant differences across cities, and year fixed effects are represented by FE_t to capture changes common to all cities in the same year. We are interested in estimating the coefficient on the indicator variable *Treatment*_{ct}, which equals 1 if cities have implemented mandatory credit card laws and if Form 1099-K is effective (i.e., Tax Year≥2011). Standard errors are clustered at the city level.

Note that we also evaluate the dynamic nature of the treatment effects by running an event study difference-in-differences methodology, given by:

$$Y_{ct} = \sum_{t=-5}^{t=4} Treatment_{ct} + FE_c + FE_t + \varepsilon_{ct}$$

where $\sum_{t=-5}^{t=4} Treatment_{ct}$ denotes 5 leads before the treatment and 4 lags after the treatment. This specification also allows us to test for the "parallel trends" assumption, which is the identifying assumption of difference-in-differences research design. These results are not presented here.

4. Preliminary Results

Table 2 presents the causal impact of Form 1099-K on receipts, expenses, and the expenses/receipts ratio from our basic difference-in-differences specification. We find an economically meaningful and statistically significant impact on all of the outcomes. The total receipts reported increases by 16 percentage points in the cities with credit-card-in-taxicab laws compared to similar cities without such laws, and the estimate is significant at the 1-percent level. We find even larger and statistically significant responses for expenses (20 percentage points). Note, however, that the increase in expenses more than offsets the increase in receipts, which implies that Form 1099-K was not successful in improving overall tax compliance in the taxicab industry. Similarly, we find that the ratio of expenses to receipts increased by 2 percentage points in cities with credit card laws compared to similar cities without such laws. This represents a shift in the share of expense for each dollar in receipts after Form 1099-K was introduced.

Preliminary results for the dynamic effects of Form 1099-K on receipts, expenses, and the expenses/ receipts ratio are broadly similar, again suggesting that Form 1099-K affected both reported receipts and reported expenses. These estimates also largely support the parallel trend assumption of the difference-indifferences models. These results are preliminary and are not reported here.

TABLE 2. Difference-in-Differences F	Results for Taxicab	Services in the Top	o 100 U.S. Cities
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	Receipts	Expenses	Expenses/Receipts Ratio
Treatment (Post-1099-K X Post-2011)	0.160***	0.198***	0.024*
	(0.03)	(0.04)	(0.01)

NOTES: All specifications included year and city fixed effects. Standard errors are in parenthesis and are clustered at the city level. * p < 0.1 and *** p < 0.01.

5. Conclusions

In this paper we analyze taxpayer responses to the introduction of Form 1099-K. We exploit a unique natural experiment in the taxicab industry using a difference-in-differences research design, where we compare the trends in the receipts, expenses, and the ratio of the receipts and expenses of taxi services that operate in cities with mandatory credit card laws (i.e., the treated group) to the taxi services that operate in cities without mandatory credit card laws (i.e., the control group) before and after the treatment. We find that firms report more receipts after the introduction of Form 1099-K. However, we also find that the increase in reported revenues was accompanied by an offsetting increase in expenses. Thus, we conclude that taxpayers respond to information reporting, but in offsetting ways.

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Do Audits Deter Future Noncompliance? Evidence on Self-Employed Taxpayers

Sebastian Beer (Austrian National Bank), Matthias Kasper and Erich Kirchler (University of Vienna), and Brian Erard (B. Erard and Associates)

1. Introduction

The IRS audits roughly 1.5 percent of all self-employed individual income taxpayers annually. In Fiscal Year 2014, the direct effect of these audits was over \$3 billion in recommended additional tax assessments, although not all of the recommended amount will ultimately be collected (Internal Revenue Service, 2015).¹ Less is known, however, about the impact of audits on subsequent taxpayer reporting behavior. Behavioral changes may either undermine immediate gains in tax collections or amplify the overall revenue returns of audits. Depending on risk attitudes, norms, moral perceptions, and (perhaps most importantly) the subjective appraisal of the audit, enforcement activity has the potential to increase or decrease the willingness to comply with the law and to cooperate with the IRS in the future.

In this paper we summarize our recent research on the impact of enforcement activity on subsequent compliance behavior of nonfarm sole proprietors.² By combining administrative data for a random sample of 2,204 Schedule C filers who were audited after filing their Tax Year 2007 returns with data for a control sample of 4,705 Schedule C filers who were not audited, we are able to estimate the short- and medium-term impact of audits on reported income. In our empirical analysis, we distinguish between (seemingly) compliant and (seemingly) noncompliant taxpayers, as the audit response likely differs between these groups. A "direct deterrent effect" (Alm, Jackson & McKee, 2009) of additional tax assessments potentially increases the compliance of caught evaders, though it's possible that an audit could embolden an evader by confirming what the auditors tend not to detect. The response of compliant taxpayers to enforcement activity is similarly ambiguous. Audits could be seen as a justified means to enforce the law, increasing trust in the state and the willingness to comply voluntarily. A coercive experience, however, might have the opposite outcome.

Kirchler, Hoelzl, and Wahl (2008), for instance, argue that tax compliance results from a combination of effective enforcement and mutual trust between taxpayers and the authorities. While audits are crucial to enforce compliance among noncooperative taxpayers, a favorable climate between taxpayers and the tax authority likely promotes voluntarily compliance.

Ayres and Braithwaite (1992) classify taxpayers according to their motivational postures. While the majority of taxpayers are committed to the system and therefore willing to comply, some are disengaged or even oppositional towards the state. Effective enforcement regimes should thus consider taxpayers' motivations and apply different regulatory strategies accordingly (Braithwaite, 2003). Taxpayer services, for instance, are expected to build trust and strengthen compliance among committed taxpayers, while audits are necessary to detect and prosecute noncompliance among disengaged taxpayers. But if the nature or frequency of audits is perceived as disproportionate, audits might erode trust and thus undermine compliance in the aggregate. Following this line of thought, Mendoza, Wielhouver, and Kirchler (2015) explore the impact of audit frequency. In line with their expectations, they find that audits tend to "backfire," by weakening voluntary compliance, if they are conducted excessively.

¹ These figures include both farm and nonfarm business returns; however, returns claiming the Earned Income Credit are excluded as audit coverage statistics for this category do not distinguish between business and nonbusiness returns.

² This research was conducted for the National Taxpayer Advocate (NTA) under contract TIRNO-14-E-00030 with technical support from NTA Technical Advisors Tom Beers and Jeff Wilson. Any opinions expressed in this report are those of the authors and do not necessarily reflect the views of the National Taxpayer Advocate. For more details on this project, refer to Beer, *et al.* (2015).

2. Methodology

In line with earlier work (Gemmel and Ratto, 2012), we distinguish compliant from noncompliant taxpayers on the basis of their audit outcomes. More specifically, we classify taxpayers as compliant if the examination did not result in a recommended additional tax assessment, and as noncompliant otherwise. This categorization procedure has two important drawbacks. One is that we may only classify audited taxpayers. The second is related to classification errors. Some truly noncompliant taxpayers are likely to go undetected during an audit and are not assessed additional tax. Conversely, some additional tax assessments may be unwarranted and disputed later on. The examination result therefore does not unambiguously signal the subjective inclination to pay taxes voluntarily. We rely on a range of nonexperimental estimators to refine the comparison between "compliant" taxpayers and quantify the magnitude of the short-run and medium-run audit impact. These include the standard difference-in-differences estimator, variants of this method that account for sample selection and attrition,³ and propensity score matching methods. While propensity score matching overcomes observable differences between our experimental groups, the difference-in-differences approach accounts for unobservable, time-constant effects. It is reassuring that these two alternative approaches yield similar results.

3. Results

Our empirical results provide robust evidence that audits have important medium-term revenue implications. Three years after an audit, the average small-business taxpayer reports around 20 percent more income.⁴ The indirect medium-term effect thus clearly adds to the static gain of additional tax assessments. However, by differentiating the response of compliant and noncompliant taxpayers, we are able to draw a more nuanced picture.

We find an enduring effect of audits on taxpayers who receive a positive recommended additional tax assessment. On average, such taxpayers increase their reported taxable income by 250 percent following an audit. Three years after the audit, the effect is still substantial and statistically significant, with an average increase of 120 percent. Importantly, the results also indicate that audits have a detrimental impact on the reporting behavior of taxpayers who do not experience an additional tax assessment. While the short-term impact is measured imprecisely, the estimated medium-term impact is statistically significant and implies a 35-percent reduction in reported taxable income 3 years after the audit.

The positive impact of audits on the former group might be due to some kind of specific deterrent effect (Alm, *et al.*, 2009). Understanding the observed reduction in reported income among taxpayers in the latter group is probably even more important. There are several plausible explanations for this finding. First, an experience of coercive enforcement activity could reduce tax morale among honest taxpayers, leading to the observed detrimental impact of audits on those receiving no additional tax assessment. Second, even if tax morale were unaffected by the examination experience, the audit process might provide currently compliant taxpayers with a "window" on potential opportunities for both legal and illegal tax avoidance. In addition, such taxpayers may infer that the risk of a future examination is low given that no adjustments were made during the recent audit. This newfound awareness of opportunities for reporting and paying lower taxes combined with a low perceived future audit risk could drive some taxpayers to understate their income on subsequent tax returns. A third possibility is that the observed reduction in reported income might be attributable to dishonest taxpayers within this group whose misreporting was not detected during the audit. The experience of having undergone an audit without experiencing any sanction for noncompliance may have emboldened such taxpayers, resulting in even more aggressive future reporting behavior.

Based on the available data, we are unable to pinpoint which of the above explanations prevails. The observed reduction in compliance behavior suggests, in any case, that there is scope for improving the efficiency

³ We find that enforcement activity reduces the future likelihood of filing Schedule C by almost 7 percent among taxpayers who receive a positive recommended additional tax assessment.

⁴ This estimate is substantially larger than that obtained by DeBacker, et al. (2015), perhaps owing to our focus on operational rather than random audits.

of audits. On the one hand, improved targeting of noncompliant returns and an improved capacity to detect noncompliance would seem likely to improve deterrence among cheaters. On the other hand, a better understanding of the psychological impact of audits on compliant taxpayers may lead to enhanced examination approaches that mitigate the erosion of tax morale and maintain their incentives to comply.

4. Limitations and Scope for Future Work

A central concern of any quasi-experimental study is that nonrandom and unobservable factors may play a role in determining whether an observation is assigned as a treatment or a control. In our context, this concern is clearly justified. Ultimately, the choice of which returns to audit is at the discretion of experienced IRS examiners ("classifiers"). If the audit selection decision is driven in part by factors that we do not observe, but which are correlated with reported income, our estimated treatment effect may be biased. We aim at reducing the potential for such bias by accounting for a vast range of control variables, such as the IRS internal risk score (the "DIF" score) and the prior reported values of income sources and offsets. Furthermore, given that propensity score matching does not impose a specific functional form regarding the influence of these variables on reported income, we are confident that we are able to capture most of the systematic components of the selection process.

A limitation of our analysis is that our sample period was subject to a good deal of economic volatility. Although both our treatment and control groups experienced the same shocks, which helps to mitigate the potential impact of these economic fluctuations, it would be useful in future work to replicate the analysis using a more stable sample period. It also would be constructive to explore the differential impact of alternative audit techniques (such as face-to-face vs. correspondence) or the differential response of low- and high-income taxpayers. Finally, more sophisticated propensity score matching methods would provide further evidence on the robustness of our results and could improve the representativeness of our findings.

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Resolving Unpaid Taxes and the Notice of Federal Tax Lien: Evidence from the Fresh Start Initiative

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Introduction

When taxpayers fail to pay Federal tax assessments, a lien is established to give the government certain rights to collect the delinquent amounts. Typically, only the IRS and the taxpayer are aware of the lien. A notice of Federal tax lien (NFTL) can be filed to make the lien public information. The NFTL is an important collection tool in resolving delinquent tax accounts. The NFTL helps to secure the government's right to the value embodied in the taxpayer's assets and provide creditors with important information on the creditworthiness of taxpayers. However, U.S. legislation, Internal Revenue Service (IRS) policy, and IRS budgetary challenges can alter the degree to which this collection tool is used. Over the years, the number of NFTLs filed by the IRS has varied considerably. The obvious question is what impact this has had on the collection of delinquent accounts and what impact the NFTL has on taxpayers with debt.

Numerous studies over the years have looked into the effects of the NFTL on payment compliance behavior (both direct and indirect effects), the resource costs involved in filing and resolving the NFTL, and alternative treatments to the NFTL. Many of these studies have struggled with the endogenous nature of NFTL filing. That is, the NFTL may influence taxpayer behavior, but the determination to file the NFTL may also be *influenced by* the taxpayer's behavior. There have been a limited number of studies using randomized field experiments, but these have lacked breadth in terms of the taxpayer population studied.

In this paper, we used the "Fresh Start" changes in the NFTL filing thresholds for cases being transferred from the IRS Automated Collection System (ACS) to the Field Collection Queue (or "the queue") as a "natural experiment" in NFTL filing. As part of this initiative, the threshold for NFTL determinations was increased from \$5,000 to \$10,000, and the threshold for NFTL filing was increased for cases systemically² transferred from ACS to the queue. Our paper uses this policy change to examine taxpayers' response to the filing of NFTLs. We compare cohorts of cases with unpaid balances within the policy change parameters that were transferred from the ACS sites 6 months before and 6 months after the policy change. We model both the likelihood that the taxpayer will fully or partially resolve their unpaid balances and the expected change in the unpaid balance. We follow case outcomes for 2 years after the transfer to the queue with the NFTL or the forgone NFTL. We use our models to estimate the marginal impact of the NFTL in resolving unpaid taxes and the impact of the Fresh Start NFTL policy change.

Background

In 2011, the Internal Revenue Service introduced several Fresh Start initiatives to help delinquent taxpayers to pay back taxes and avoid tax liens. As part of this initiative, the threshold for NFTL determinations was increased from \$5,000 to \$10,000, and the threshold for NFTL filing was increased for cases systemically transferred from the IRS's Automated Collection Sites to the Field Collection Queue. Thus, after these policy changes there were more cases in the IRS's collection inventory where an NFTL had not been filed.

¹ The views and opinions presented in this paper reflect those of the authors. They do not necessarily reflect the views or the official position of the Internal Revenue Service.

² That is, in a generally automated way.

The IRS relies on the NFTL as a means of protecting its security interest in the assets of taxpayers who owe delinquent taxes. Without the protection afforded by the NFTL, the IRS may not adequately establish its priority over financial institutions and other secured creditors for the equity that taxpayers have in their assets and that may be liquidated in order to satisfy their debts. In addition, the NFTL is a public document that can show up on the taxpayer's credit history.

A single NFTL document may list amounts associated with several tax returns or assessments. The NFTL is in force until all the unpaid amounts have been resolved or the collection statute has expired (typically 10 years). Thus, unlike sending a taxpayer a letter or issuing a levy, the NFTL may have a longer and/or delayed effect in terms of facilitating resolution of the unpaid amounts.

Figure 1 shows trends in NFTL filing based on data from the *IRS Data Book*, published by Statistics of Income. The number of NFTLs filed in the last 20 years hit a high of just over 1 million in 2010. The number of NFTLs filed each year has steadily decreased since 2010 to approximately 515,000 in 2015. While the number of NFTLs filed decreased, the inventory of delinquent accounts has continued to increase, with over 12 million delinquent accounts in 2015.



FIGURE 1. Number of Notice of Federal Tax Liens and Taxpayer Delinquent Accounts Per Year

Figure 2 provides information on taxpayers with unpaid assessments for Calendar Years 1995–2016 using data from the IRS Accounts Receivable Dollar Inventory. The charts show the number of taxpayers at the beginning of each calendar year with at least one unpaid assessment, along with the percentage of those taxpayers with an NFTL. In 1998, the same year as the IRS Restructuring and Reform Act, the percentage of Business Master File (BMF) and Individual Master File (IMF) taxpayers with an NFTL was at 23.1 percent and 15.5 percent, respectively. The rate of taxpayers with an NFTL dipped after 1998, with a slight upswing until about 2011, but has never rebounded to the levels observed prior to the IRS Restructuring and Reform Act. Recall that in 2011 the IRS introduced the Fresh Start initiative increasing the NFTL filing thresholds. After that change, the percentage of taxpayers with an NFTL decreased for both BMF and IMF taxpayers to 16.1 percent and 11.8 percent, respectively. As of the beginning of 2016, we have observed the number of BMF taxpayers remains relatively stable over time while the number of IMF taxpayers with delinquent accounts is increasing.



FIGURE 2. Taxpayers with Unpaid Assessments and the Percentage with a Notice of Federal Tax Lien, Beginning of Calendar Years 1995–2016

Previous Research

We organize the discussion of the previous research on the NFTL around the direct and the indirect impacts on resolving unpaid delinquent tax liabilities, the impact of the NFTL on the taxpayer, the impact of the NFTL on IRS resources, and comparing the NFTL treatments.

Impact on Delinquent Tax Liabilities

What impact does the NFTL have on resolving a taxpayer's delinquent tax liabilities both in terms of reducing amounts currently owed and/or reducing additional unpaid assessments? Most of the empirical research has focused on addressing the direct impacts of NFTL filing on resolving delinquent liabilities. Most of the studies have taken an "entity approach," looking at total entity unpaid amounts and estimating the impact that a filed NFTL has on reducing the entity's unpaid balance. An exception is the Taxpayer Advocate Service (TAS) (2012) study, which both estimates and separates the impact of the NFTL on resolving current amounts from the impact on payments of future amounts/accrual of additional unpaid assessments.

The majority of the empirical evidence suggests that NFTL filing increases the number of cases resolved and/or dollars collected or resolved. SB/SE Research-St. Paul (2002) is a broad empirical study. That study looked at the NFTL filing impact on all types of unpaid assessment and did not focus specifically on one treatment status or population segment. The authors use historical data from 1996 to 1999 to estimate the impact of the rate and timing of NFTL filing on all types of unpaid assessments. The study uses an instrumental variable approach to create exogenous measures of the NFTL filing rate and also controls for how early the NFTL is filed in the life of an unpaid account. This study has the advantage that the data used were from a time period when policy and enforcement budgets were controlled at the local district level. This provides variation in the use of the NFTL over time and across the different districts' offices. Thus, the authors use district office and the year as instruments for NFTL filing. The authors find that NFTL filing increases the likelihood of taxpayers resolving their delinquent tax liabilities. The results suggest a larger NFTL impact on business taxpayers and taxpayers with income generated from assets. The study results suggest that the impact of the NFTL is larger the earlier the NFTL is filed. The authors use the estimated models to simulate a 10-percent increase in the NFTL filing rate. Based on the simulation, the authors calculate that filing an additional 100 NFTLs would result in about 11 more taxpayers resolving (fully or partially) their balances and just under an additional \$3,000 dollars resolved per additional filed NFTL.

Studies subsequent to SB/SE Research—St. Paul (2002), looking at both historical and experimental data, have, for the most part, been consistent with the hypothesis that NFTLs have a positive impact on resolving delinquent balances. The results from the two previous field studies using randomized NFTL filing have been consistent with the notion that NFTLs have a positive impact on resolution. As typical with field experiments, these studies focus on a narrow population and may not generalize well to other populations.

SB/SE Research—St. Paul (2006) studies the impact of the NFTL on cases identified by a predictive model as likely to be Currently Not Collectible (CNC). The findings support the notion that NFTLs have a larger impact on cases that are more collectible and have a lower balance. Specifically, the authors find a significant impact of NFTL filing on the potential CNC cases with balances under \$25,000. The authors found that in IMF cases in the study that had lower CNC scores (i.e., were more collectible) and a balance due between \$5,000 and \$25,000, the NFTL resulted in 10 percent more cases fully or partially resolving their outstanding balance due, with the average change in balance due decreasing by roughly \$160. For BMF employment tax cases, the authors found that 7 percent more cases fully or partially resolved their outstanding balance due, with the average change in balance due decreasing by roughly \$160. The study also helps to validate the estimates from the 2002 SB/SE study. The authors used estimated NFTL marginal effects from SB/SE Research—St. Paul (2002) as a predictor variable. The authors found that the higher NFTL estimated marginal effect from SB/SE Research—St. Paul (2002) was associated with a larger impact of the NFTL.

SB/SE Research—Denver (2014) is another field experiment that finds NFTL filing positively affects resolution. This study is relevant (to the ACS cases being transferred to the queue) as it looks at cases that are in the queue and not being actively worked. The results suggest that filing an NFTL on cases generates taxpayer contacts and resolutions. The study finds that, per additional filed NFTL, 2.7 percent more IMF and 0.2 percent more BMF taxpayers fully or partially resolved their outstanding balance due. The study also finds an increase in dollars resolved of roughly \$11,000 for IMF taxpayers and a decrease in dollars resolved of roughly \$1,100 for BMF taxpayers. However, the study failed to take into account case age for BMF taxpayers (e.g., defunct businesses), biasing the estimates. In addition, these cases had balances in excess of \$100,000, and are not as relevant to the cases impacted by the Fresh Start initiatives.

Other studies have shown that the impact of NFTLs on getting taxpayers to resolve their unpaid assessments is, arguably, larger on a case with a smaller balance. This would seem to support the notion that the NFTLs would be effective on those cases in the \$10K-\$25K range. The field experiment on the queue cases also demonstrates that NFTLs are more effective on taxpayers who have income and/or assets, consistent with the findings from SB/SE Research—St. Paul (2002). Also, the 2014 field study provides evidence that using codes set up to classify the reason for a payment (Designated Payment Codes) will not capture the impact of the NFTL. The authors defined several "NFTL-related" Designated Payment Codes. They found that there were fewer payments with NFTL-related Designated Payment Codes associated with the test cases where the NFTL was filed than with the control group cases where the NFTL was not filed.

There have been additional studies that have used historical data to estimate the direct impacts of the NFTL, each with varying success. SB/SE Research—Denver (2011, DEN0113) re-estimated the models in the 2002 study with new data, but also with a different method of data construction. The endogeneity of NFTL filing was problematic because the authors used data from more recent times where NFTL filing policy and budgets were more centrally controlled and varied less. Thus, finding appropriate instruments for the NFTL filing model was difficult. Also, the data were constructed as a hybrid of a cross section and a cohort study, thus making it more difficult to apply the results to the population of taxpayers with delinquent tax liabilities. The study finds results similar to the 2002 study. However, the variables to control for when the NFTL was filed were not consistently included, so inferences on the impact of delay or acceleration of NFTL filing are incomplete.

The TAS (2011) study provides some evidence for IMF taxpayers that contradicts the historical econometric studies and the field test studies. The authors break the impact of NFTL filing into the impact on the current liabilities and the impact on the taxpayer's accruing additional liabilities, rather than on the total liabilities, as most of the other studies do. The TAS (2011) study finds that NFTL filing decreases the likelihood of resolving the current liabilities, but reduces the taxpayer propensity to accrue new liabilities. The authors don't assess the net effect on payment compliance, so it is difficult to compare this to the other studies that examined resolution at the entity level.

There are a couple of issues with the methodology used in TAS (2011) that should be kept in mind. One is that the propensity score methodology is appropriate to control for selection bias, but may not necessarily ensure that we have an exogenous measure of NFTL filing. This is problematic, as the population studied was

limited to a single cohort of IMF taxpayers who did not have previous unpaid assessments, and thus were new cases. The subsequent accrual of additional modules is likely a major factor in the determination to file the NFTL. Thus, the endogeneity of NFTL filing might be driving the results.

In addition, TAS (2011) defined the resolution of the current liabilities as a reduction in assessed tax, penalty, and interest on the current modules. This implies that if a taxpayer had multiple modules and was making payments, it is possible that the payments were being applied to the older module accruals. One would not see a reduction in the assessed amounts, but the entity unpaid balance could be going down. This is a minor issue in this study since the authors started with a cohort of taxpayers who did not have prior unpaid assessments; thus it is unlikely that this is significantly impacting the result since most taxpayers in this study would not have had multiple modules. However, it would impact the findings if the methodology were expanded to taxpayers with multiple assessments. Also, the impact of the NFTL may not be captured fully if the taxpayer is directing the payments to a specific, more recent module.

A study conducted by the IRS Office of Program Evaluation and Risk Analysis (OPERA) (2013) closely relates to our study as it also looks at the Fresh Start period. This study uses the policy changes that occurred as part of the Fresh Start initiative as a "natural experiment" or pilot regarding NFTL filing. As in our study, the authors use data from ACS transfers to the queue 6 months before and 6 months after the policy change and then compared resolution. Prior to the policy change the majority of ACS cases with balances between \$10,000 and \$25,000 had NFTLs filed when they were transferred to the queue. After the Fresh Start policy change, almost none of the cases had NFTLs filed. Policy changes were also implemented for the field, resulting in fewer NFTLs being filed. However, the data suggest that these NFTLs were filed on (arguably) the more problematic cases. This fact exacerbates the endogeneity problem and makes it difficult to view the field changes as a "natural experiment." However, the results for the ACS cases are relevant.

Table 1 summarizes simple comparisons of pre- and post-Fresh Start for cases that ACS transferred to the queue. The simple comparison shows a decline in the percentage of taxpayers resolving their balances after Fresh Start. Arguably, this decline resulted from a lack of NFTL filings on these cases.

	Balance Level	Pre-Fresh Start with NFTL	Post-Fresh Start without NFTL
	\$5K–\$10K	26%	19%
	\$10K–\$25K	26%	18%
DME	\$5K–\$10K	35%	22%
	\$10K–\$25K	34%	21%

TABLE 1. Summary of Results from Fresh Start Initiative ACS Lien Policy Changes: PercentFully or Partially Resolving, Pre- vs. Post-Initiative

Source: Office of Program Evaluation and Risk Analysis, 2013, Fresh Start Lien Analysis Executive Summary, Figures 1 and 2.

In OPERA (2013), the authors use an econometric model to estimate the impact of the forgone NFTLs for the ACS cases. The regression analysis used the percentage change in the balance as the dependent variable. For the BMF cases, the estimates are consistent with the simple comparison: fewer cases are resolving their balances because of not filing the NFTLs. However, they find the opposite for IMF cases. This result is puzzling, as the simple comparison suggest that a higher percentage will resolve when the NFTL is filed. Our analysis helps to reconcile the regression results to the before-and-after comparison. It could be that some cases have very large percentage increases in the pre-Fresh Start era, so that more cases are resolved, but the average percentage increase is larger. We modify this research by backing-out additional assessments stemming from already identified delinquent returns. It could be that filing the NFTL results in the taxpayer making contact, and this can result in additional assessments from secured returns. In such a situation the taxpayer is not accruing additional liabilities. Rather, the balance is going up due to already identified filing noncompliance, and the taxpayer is becoming "more complaint." This narrative is supported by the SB/SE Research—Denver (2014) field test that NFTL generated taxpayer response, especially on cases with "Substitute for Return" assessments. Thus, we don't include new assessments for previous tax periods when we analyze resolution of the balance.

Impact on Payment Compliance Behavior

What impact does NFTL filing policy have on overall payment compliance behavior among taxpayers where the NFTL is not yet filed? There is very little research that has addressed general indirect effects. Most of experimental methodologies essentially preclude the estimation of indirect effects by isolating the impact of the treatment in a small test group. One can argue that SB/SE Research—St. Paul (2002) includes indirect effects. The NFTL filing rate captured through the instrumental variable equation, all else equal, is the same value for cases with or without an NFTL. This arguably captures indirect effects of NFTL filing, and thus direct effects were captured by the age of the case when filing the NFTL. Furthermore, the variation in NFTL filing policy over time and across the district offices is used in the 2002 study to identify the NFTL effects.

Many of the other studies use a single cohort of cases or a very limited sample and have limited variation in filing policy. This makes the indirect effect hard to identify. Clearly this is an area where more research is needed. Variation in NFTL filing over time could be further leveraged to estimate indirect effects, perhaps focusing on the NFTL filing rate in subsequent treatment streams and estimating the impact on resolution "upstream." However, small-scale studies involving randomized test and control groups will not likely be successful in estimating indirect effects since the study design minimizes contamination between test and control groups.

Impact on the Taxpayer

How does the NFTL impact the taxpayer? The filing of an NFTL can impact the taxpayer in many ways. The filing makes the tax debt public information, so it can impact the taxpayer credit report and credit score. Various reports from the National Taxpayer Advocate have referenced an unpublished estimate of as much as a 100-point reduction in a taxpayer credit score due to an NFTL being on file. This reported impact is somewhat large given the range of credit scores (e.g., 300 to 850 for a FICO score). However, OPERA (2014) reports a much smaller impact. OPERA contracted with Experian to calculate the impact of the NFTL on the Experian Advantage score. Experian calculated an average drop of less than 5 points. Those with no previous NFTL had an average drop of just less than 7 points. Also, for the taxpayers with higher scores, there was less of an impact. The larger impacts were for taxpayers in subprime and deep subprime range. These taxpayers would have very little access to credit. Another interesting finding is that Experian reported that for about 40 percent of the cases with an NFTL filing, the NFTL did not show up on the credit report within 90 days. Obviously, the NFTL will not influence the credit score until the NFTL shows up on the credit report. The results of the study also show that cases where an NFTL was filed tended to have lower scores than cases where an NFTL was not filed. In other words, other factors on the credit report are driving the taxpayer credit score irrespective of the NFTL.

A few studies have explored Collection Due Process (CDP) appeals resulting from NFTL filing. Studies find a modest rate of appeal filing, in the neighborhood of 2 to 3 percent. SB/SE Research—St. Paul (2006) finds that in 2.5 percent of cases where NFTLs were filed, the taxpayer filed a CDP appeal. SB/SE Research—Denver (2011) also finds about a 2-percent rate of taxpayers filing a CDP appeal.

One hypothesis that has been explored is that the NFTL limits the taxpayer's ability to earn income in the future and thus reduces the taxpayer's ability to pay delinquent tax liabilities. TAS (2011) estimates the impact of NFTL filing on subsequent income (Total Positive Income) for IMF taxpayers. TAS found the NFTL filing was associated with a 5.2-percent to 7.9-percent decline in income, depending on the period studied. It is not clear if this estimate is an annual rate of decline or aggregate over the years studied. Thus, it is not clear how to interpret this estimate. If it is an annual rate of decline, the estimate seems quite large. Based on the estimates and the assumption that the reported amount is the total impact, the interpretation is that the NFTL is associated with an initial negative impact on income, and then income rises in the later years. This presupposes that the NFTL filing causes the income decline, and not vice versa. It is quite possible that the decline in income preceded or coincided with the NFTL filing.

Costs of Filing the NFTL

What are resource costs of filing the NFTL, and how do those costs compare to the direct and indirect benefits of NFTLs? The NFTL fees average around \$25 per NFTL based on data from IRS collection reports. In Fiscal Year 2014, the IRS spent just over \$15 million on filing fees. Most NFTLs are generated either systemically or electronically. Filing NFTLs creates the potential for CDP appeals in about 2 percent of the cases.³ While the total costs have not been fully quantified, average direct resource costs of NFTLs are likely in the "ball park" of \$100 per NFTL. The SB/SE Research—St. Paul (2002) study calculates almost an additional \$3,000 resolved per NFTL, which would put the direct benefit-to-cost ratio in the neighborhood of 30 to 1. SB/SE Research—St. Paul (2006) estimates that IMF-refiled NFTLs⁴ provided an additional \$40.6 million in payments while generating an estimated \$2.9 million in costs (fees, staff, and overhead). This corresponds to an average return of about 14 to 1. It seems reasonable that the return on investment would be lower for refiled NFTLs than for original NFTLs, as these NFTLs are being refiled to cover a few years of the extended statute, whereas the original NFTL filing covered the majority of the (10-year) collection statute period. Refiling is most often associated with cases in bankruptcy or litigation.

Comparison of the NFTL to Other Treatments

How does the NFTL compare to or complement other treatment alternatives? The NFTL is a tool for various potential treatment streams of unpaid assessments and is used in combination with a multitude of treatment paths through the collection process. The NFTL is different than many other treatments in the sense that, once filed, it remains in place until the underlying balances are resolved or expire. Many other treatments (notices, levies, field visits) have to be periodically "reapplied" if the taxpayer does not respond or the taxpayer's ability to pay changes over time.

SB/SE Research—Denver (2014) tested, for large dollar cases in the Field Collection Queue, the impact of sending an additional letter to taxpayers warning them of a potential NFTL filing. For both IMF and BMF cases, sending the notice before the NFTL resulted in an increase in the number of taxpayers resolving their liabilities (approximately a 1-percentage point difference for IMF and a 3-percentage point difference for BMF). For IMF, there is also a larger percentage reduction in the balance when sending a letter before an NFTL filing (3.5 percent with an NFTL alone vs. 4.8-percent reduction in the balance with a letter sent before an NFTL filing). For BMF, the average balances increased across study groups, but actually increased more with an NFTL alone and the most with a letter sent before an NFTL filing. The cases in this study differed from ACS systemic transfers. ACS would have most likely had a recent attempt to contact the taxpayer with one or more ACS treatments, whereas cases in the queue may not have been contacted recently.

Empirical Model

We develop an empirical model of accounts receivable resolution using an approach similar to previous studies for the purpose of evaluating different policies for NFTL filing.⁵ The resolution model is defined as a function of, among other things, characteristics of the NFTLs that are in force on the returns with outstanding balances. The resolution is measured at the taxpayer (case) level, as opposed to the aggregate balance for individual tax years. Modeling the behavior of the entity more accurately reflects the experience of ACS and Collection Field Function personnel as they receive and process their casework. More importantly, a single NFTL can cover a number of outstanding balances for different tax years.

Accounts receivable can be measured in both the dollar value and the number of taxpayers involved. Thus, resolution is defined in two ways for the purpose of this research. First, we define resolution as an ordinal variable representing the change in the entity balance for the given time period. This dependent variable takes on three discrete values that represent: (a) an increase in the entity balance; (b) a decrease in the entity balance that is not sufficient to fully resolve all modules; and (c) a decrease in the entity balance that fully resolves all

³ Taxpayers can file a CDP appeal only the first time a statutory lien is listed on an NFTL document. An NFTL document can have up to 15 statutory liens listed, and a statutory lien may be listed on multiple NFTLs.

⁴ NFTLs are refiled to cover the extended or suspended collection status of a particular lien for an assessment.

⁵ SB/SE Research—St. Paul (2002), Turk and Ashley (2002), SB/SE Research—St. Paul (2006), SB/SE Research—Denver (2011), SB/SE Research—Denver (2014), OPERA (2013).

modules. Second, we define resolution as the change in a taxpayer's outstanding balance for a given time period. We model the change in dollar value of the entity balance due in IRS accounts receivable.

Specifications

We specify models for resolution, r_i , and the change in the (natural log) entity balance due, Δb_i .

Let b_{it} be the natural log of the entity balance for taxpayer *i* at time *t*, and let b_{it-1} be the natural log of the entity balance⁶ for taxpayer *i* at time *t*-1. We define the ordinal variable r_{it} as

$$r_{it} = \begin{cases} 0 & \text{if } b_{it} \ge b_{it-1} \\ 1 & \text{if } b_{it} < b_{it-1}, b_{it} \ne 0 \\ 2 & \text{if } b_{it} = 0 \end{cases}$$
(1)

We assume that the probability of r_{it} is determined by assignment values for r_{it} ,

$$P(r_{it} = 2) = F(x_{it-1}\alpha),$$
(2)

$$P(r_{it} = 1) = F(x_{it-1}\alpha + c) - F(x_{it-1}\alpha),$$
(3)

$$P(r_{it} = 0) = 1 - F(x_{it-1}\alpha + c).$$
(4)

where x_{it-1} again is a vector of characteristics for taxpayer *i* including an indicator of an NFTL being filed, α is a vector of associated parameters, *c* is a threshold value, and *F* is the logistic cumulative distribution function. The parameters α and *c* are unknown but can be estimated using the logistic model procedure. Since we are treating the change in the NFTL threshold as a natural experiment, we include an NFTL dummy variable to capture the impact of the NFTL, and we don't need to employ methodology to make the NFTL filing measures exogenous (e.g., an instrument variable approach).

We can define the change in entity balance due as

$$\Delta b_{it} = b_{it} - b_{it-1}. \tag{6}$$

We assume that the change in the entity balance can be modeled as

$$\Delta b_{it} = x_{it-1}\beta + \varepsilon_{it} \,. \tag{7}$$

The balance at time *t* cannot be less than zero. This results in left censoring of the change in balance at $-b_{it-1}$. In such a situation, the Ordinary Least Squares (OLS) estimates are inconsistent, the slope is upward biased, and the intercept is downward biased. A Tobit estimate using maximum likelihood estimation is consistent.

The parameters β_i reflect the marginal impacts of each variable on the latent variable. The marginal impact on the change in natural log of the balance is given by:

$$\frac{\partial \Delta b_{it.}}{\partial x_{i:t-1}} = \beta_j \Phi\left(\frac{(X_{it-1}\beta)}{\sigma_U}\right)$$

Where x_{ijt-1} is a specific element of the X_{ijt} , $\Phi()$ is the normal distribution function, and σ_U is the scale parameter.

⁶ We add \$1 to the balance so that the natural log is defined.

We follow a similar approach to look at the change in the balance over a 2-year time horizon, resolution, and the change in the balance between t-1 and t+1.

Data

The data for this research were constructed from IRS Accounts Receivable Dollar Inventory (ARDI) data. The data were compiled for cases where ACS requested a transfer to the Field Collection Queue within 6 months of the Fresh Start changes. In addition, the cases were limited to those without an existing NFTL at the time of transfer. Using these criteria, we identified 56,116 IMF taxpayers and 4,488 BMF taxpayers. Of these taxpayers, 51 percent of IMF and 62 percent of BMF cases resulted in a new NFTL filed at the time of transfer.

The balance in each subsequent year was merged back to the data to determine the annual amount of change in the total balance. The balance computed at each subsequent year omitted any new assessments after transfer coming from previously delinquent returns (any tax periods ending prior to December 31, 2009). These assessments likely came from noncompliance (delinquent returns) that already existed prior to the transfer. Figure 3 provides the percentage of IMF and BMF cases that had at least one assessment omitted from the calculation of outstanding balance, and Figure 4 illustrates the distribution of the omitted balance due.



FIGURE 3. Percentage of Taxpayers with New Assessments After Transfer from Previous Tax Years

Source: Compliance Data Warehouse, Accounts Receivable Dollar Inventory Individual and Business Module Tables. Data Extracted May 2016.

The distribution of the omitted balance due is consistent within each population. The average amounts are higher than the median and 75th percentile values, suggesting there are some outliers with large amounts of omitted balance due.



FIGURE 4. Summary of the Omitted Balance Due

Source: Compliance Data Warehouse, Accounts Receivable Dollar Inventory Individual and Business Module Tables. Data Extracted May 2016.

Resolution is defined as decreasing the outstanding balance. The outstanding balance may go up because of any of the following reasons: 1) the taxpayer is making no payments, or the payments don't cover the additional interest and penalties for the year; 2) the tax due on previously filed returns may have been increased as a result of an audit, but not have been fully paid at the conclusion of the audit; or 3) the taxpayer may be filing current returns without paying all the tax reported.

Figure 5 provides the percentage of cases that resolved, partially resolved, or increased their balance due 1 and 2 years after ACS transferred the case to the queue. For both IMF and BMF, cases that received an NFTL at transfer had a higher percentage of cases reducing their balance due. For example, 29 percent of the IMF cases receiving an NFTL reduced their balance due 1 year after transfer, compared to 25 percent without an NFTL. Two years after transfer, the difference for IMF remains the same, with both categories seeing an increase of 7 percent in cases reducing their balance due. We found similar results for BMF; after 1 year, 35 percent of the BMF cases receiving an NFTL reduced their balance due, while only 23 percent without an NFTL reduced their balance due. Similar to IMF, after 2 years, the difference for BMF remains the same, with both categories seeing an increase of 7 percent in cases reducing their balance due.



FIGURE 5. Change in Balance Due After ACS Systemic Transfer to the Queue

Source: Compliance Data Warehouse, Accounts Receivable Dollar Inventory Individual and Business Module Tables. Data exported May 2016. NOTE: Percentages may not add to 100 percent due to rounding. As mentioned before, the balance due may have been reduced after transfer via payments and/or abatements. Figure 6 provides the percentage of cases that made a payment or had an abatement within 1 or 2 years after ACS transferred the case to the queue. Cases receiving a new NFTL had a higher percentage of payments and abatements after transfer. The percentages are higher for all taxpayers within the first year following transfer. Both payments and abatements are important in resolving the outstanding balance, and we treat them equally in our analysis. Abatements are typically the result of the taxpayer corresponding with IRS and providing information that can be used to adjust the tax, interest, and/or penalties on the account (e.g., the taxpayer submits a return for a tax period where the IRS made a "substitute for return" assessment).



FIGURE 6. Payments and Abatements After ACS Systemic Transfer to the Queue

Cases receiving an NFTL were similar to those that did not. Figure 7 provides the number of days the taxpayer had been in Accounts Receivable at the time of transfer (with an outstanding balance due), by type of case and NFTL. For IMF, the median and average days in Accounts Receivable are similar, while the BMF cases have a slight difference between those with or without an NFTL.



FIGURE 7. Number of Days in Accounts Receivable at Transfer

Source: Compliance Data Warehouse, Accounts Receivable Dollar Inventory Individual and Business Module Tables. Data Exported May 2016.

Source: Compliance Data Warehouse, Accounts Receivable Dollar Inventory Individual and Business Module Tables. Data extracted May 2016.

In addition, the types of taxpayers or entities across groups were consistent. Figure 8 provides a summary of the types of taxpayers for IMF and BMF along with those with or without a new NFTL. Percentages were similar between those with or without a new NFTL for each type of taxpayer.





Source: Compliance Data Warehouse, Accounts Receivable Dollar Inventory Individual and Business Module Tables. Data Exported May 2016. NOTES: For IMF, "Other" includes taxpayers filing a Schedule F (Farm Income), Schedule D (Capital Gains), and other. For BMF, "Other" includes Estate/Gift tax, exempt organizations, Federal filers, State or Local Governments, and other.

Along with taxpayer type, we also looked at the variety of major sources of assessment each taxpayer had at the time of transfer. A taxpayer may have one or many types of assessments; therefore, in Figure 9, a taxpayer may be in one or more of the assessment categories. For both IMF and BMF, the rates of each assessment are similar between those with and without a new NFTL. For IMF, Balance Due and ASFR/SFR assessments were most common. We found 47 percent of those with no NFTL and 51 percent of those with a new NFTL had at least one ASFR or SFR assessment. For BMF, Balance Due and Penalty assessments were most common. We found 40 percent of those with no NFTL and 50 percent of those with a new NFTL had at least one Balance Due assessment.



FIGURE 9. Major Sources of Assessment at the Time of Transfer

Source: Compliance Data Warehouse, Accounts Receivable Dollar Inventory Individual and Business Module Tables. Data Extracted May 2016.

Model Estimates

Based on the methodology and the data description provided in the previous sections, we estimate and report the results of Logistic, OLS, and Tobit regressions in this section. The objective of this research paper is to determine the impact of the NFTL on outstanding tax balances for both Individual and Business taxpayers. Therefore, we report the parameter estimates corresponding to the NFTL indicator in the following table. The regression coefficients for other control variables are reported in the appendix.

		Individual (Cases (IMF)	Business Cases (BMF)		
Model	Time Period	Parameter Estimate	Marginal Effect	Parameter Estimate	Marginal Effect	
	1.000	0.304	0.056	0.438	0.084	
Logistic Model of Full, Partial, or	ryear	(0.020)		(0.074)		
No Resolution	2 1/20172	0.278	0.059	0.421	0.090	
	2 years	(0.019)		(0.069)		
	1 year	-0.224		-0.383		
OLS Model of the change in the Ln(Balance)		(0.017)		(0.094)		
	2 years	-0.331		-0.597		
		(0.023)		(0.113)		
	1.000	-0.231	-0.231	-0.406	-0.404	
Tobit Model of the change in the	i year	(0.017)		(0.103)		
Ln(Balance)	2 1/00/0	-0.355	-0.355	-0.672	-0.649	
	2 years	(0.025)		(0.133)		

TABLE 2. Parameter Estimates and Marginal Effects for the Notice of Federal Tax Lien

NOTES: Standard Errors are provided in parentheses. All estimates significant at the 0.01 level. Marginal effects are calculated as the average marginal effect for the cases in the study.

In Table 2, we find all the regression coefficients corresponding to the NFTL indicator have a positive and significant impact on reducing the balance. These results suggest that an NFTL has a consistent positive impact in reducing or resolving the taxpayer's outstanding balances. These estimates are generally consistent with many of the econometric studies and most of the field experiments relating to NFTL filing. The estimates are directionally consistent with SB/SE Research—Denver (2014), SB/SE Research—St. Paul (2006), and SB/SE Research—St. Paul (2002). The reduction in balance may be due to partial or full payment of the outstanding balance. The estimated magnitude of the effect is consistently larger for BMF cases when compared to IMF across all of the models. Additionally, the impact is greater over the longer time horizon (2 years after filing an NFTL compared to 1 year) for both the IMF and BMF cases.

Based on the logistic regressions, the likelihood of full or partial resolution due to the filing of an NFTL for IMF and BMF cases increases by 6 and 8 percentage points respectively, within the 1-year time frame. In addition, the observed positive impact on the percentage of taxpayers fully or partially resolving their balance for IMF and BMF remains fairly constant between the 1-year and 2-year time frames.

The OLS estimates suggest that the filing of an NFTL reduces the taxpayer's balance by a substantial amount over both time horizons. IMF taxpayer balances are 22 percent lower over 1 year and 33 percent over 2 years. The impact on BMF taxpayers is larger, 38 percent over 1 year and 60 percent over 2 years. While these estimated impacts seem large, they appear to be reasonable given the simple comparison between those with and without an NFTL in Figure 5. Estimated dollar impacts per NFTL are provided in Table 3.

As stated earlier, there is left censoring of the change in balance variable at the initial observed balance. Therefore, we estimate Tobit regressions in addition to the OLS regressions. The marginal effects computed from the Tobit regressions are negative and slightly larger than the OLS estimates.

In general we see a persistent effect of the NFTL over time. However, a small subset of taxpayers may be "robbing Peter to pay Paul": resolving their liabilities where the NFTL is filed by not having appropriate withholding and payments on their current tax years. The 2-year time window more fully accounts for that behavior. It is worth noting, however, that part of the 2011 Fresh Start included provisions for expanding the situations where the NFTL could be withdrawn. Typically, liens are released after the unpaid balances have been satisfied, but the fact that the NFTL was filed may still be public record. A withdrawal essentially removes the NFTL as if it was never filed. Fresh Start included a provision where the NFTL could be withdrawn after the balances were satisfied or if the taxpayer owed less than \$25,000 and entered into a direct debit payment plan (and made three payments).⁷ There is the possibility that the new withdrawal provision changed the impact of the NFTL, or possibly changed the dynamics of the taxpayer's response to IRS filing the NFTL. We do see taxpayers who resolve their balances within 1 year but then end up with unpaid taxes by the end of the second year. However, our data do not lend themselves to studying that impact since the NFTLs were filed shortly before the Fresh Start changes.

In order to illustrate the impact of the NFTL, we calculate what would have happened if the NFTLs were filed on cases (in our sample) that were transferred to the queue without an NFTL. These estimates are reported in Table 3. The estimates are derived from the Logistic and Tobit model parameters for the models of the resolution outcomes 2 years after the transfer. The estimates illustrate the marginal effects of the NFTL. We choose the 2-year observation period to display a more complete picture of the impact of the NFTL on payment compliance behavior. We calculate the marginal impact of filing an NFTL for each case without an NFTL and report the average estimated increase in taxpayers fully and partially resolving the balance (per 100 NFTLs) and the average estimated increase in the dollars resolved (per NFTL). For IMF, we estimate that for every 100 NFTLs filed, an additional 1.8 taxpayers would fully resolve their balance within 2 years, and an additional 4.1 would have reduced their balance. For BMF, those estimates are 4.4 and 4.5 additional taxpayers fully and partially resolving, respectively. In addition, the dollars resolved would increase on average by \$3,379 for IMF cases and \$4,103 for BMF cases if the NFTL would have been filed. Although not for the same population, the estimated dollar impacts are very similar to the increase in dollars resolved of just under \$3,000 that was reported in SB/SE Research—St. Paul (2002). In addition, the increase in the number of taxpayers fully or partially resolving is only slightly lower than the additional 11 taxpayers fully and partially resolving that were reported in the 2002 study.

TABLE 3. Forgone Liens: Estimated Impact on Cases and Dollars Resolved of Filing the NFTL on the Forgone Lien Cases—Two-Year Models

	Individual Cases (IMF)	Business Cases (BMF)
Increase in Taxpayers Fully Resolving per 100 NFTLs	1.8	4.4
Increase in Taxpayers Partially Resolving per 100 NFTLs	4.1	4.5
Increase in Dollars Resolved per NFTL	\$3,379	\$4,103

Source: Logistic and Tobit model estimates for the resolution and the change in the balance 2 years after the transfer to the Collection Field Queue, applied to the forgone lien cases.

Conclusions and Direction for Further Research

The models developed here support the hypothesis that increases in the NFTL filing thresholds (for cases that have not been resolved in the IRS call site, and are being transferred to the field queue for potential contact by a Revenue Officer) have a negative impact on the resolution of unpaid assessments for the individual and business accounts.

The results from this analysis are consistent with the majority of previous research that has reported the NFTL being an effective tool in resolving unpaid balances. The results are also consistent with other studies that suggest the NFTL has a persistent effect over time, but that even within a 1-year time horizon a reasonable estimate of the NFTL impact can be obtained.

While this research does not provide a broad base of evidence about the effectiveness of the NFTL, it provides incremental knowledge of the effectiveness of the NFTL and corroborates previous research. There are broader questions regarding the impact of the other Fresh Start changes and the impact of budget challenges within the IRS collection operations; however, those are beyond the scope of this paper, but are areas where additional research could be fruitful. Additional research on the impact of the withdrawal provisions, in par-

⁷ For more information and the complete criteria see "Understanding a Federal Tax Lien" at https://www.irs.gov/businesses/small-businesses-self-employed/ understanding-a-federal-tax-lien. Accessed May 2016.

ticular, is probably warranted. A larger-scale econometric study of all collection treatment options would allow the exploration of the relative effectiveness of treatment paths and also estimate direct and indirect effects of policy. Future research will also need to take into consideration that NFTLs are no longer being included on credit reports as of June 2016, which could alter their impact.⁸

The IRS initiated a pilot in March 2016, which will provide additional information regarding the effectiveness of the NFTL as a tool in resolving unpaid balances.⁹ The pilot is testing three collection notice approaches in lieu of filing an NFTL in ACS. The pilot results should help to identify which approach produces the greatest impact, and the relative impact of an NFTL compared to the piloted collection notice approaches.

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⁸ Equifax e-mail to All Data Furnishers. "Furnisher Data Reporting and Process Requirement Changes." http://www.insidearm.com/wp-content/uploads/032016-Data-Furnisher-Communication.pdf?d323c3. Accessed August 2, 2016.

⁹ Tax Notes Today. "IRS to Start Collection Letter Pilot Program in March." http://irweb.irs.gov/AboutIRS/Nwsctr/ExtIRSNews/ITN/48638.aspx. Accessed July 29, 2016.

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Appendix

TABLE A1. IMF Parameter Estimates (with Standard Errors in Parentheses)
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Madal	1 year	2 years	1 year	2 years	1 year	2 years
Model	OLS		Tobit		Logit	
R-Squared / Log Likelihood	0.037	0.048	(118,001)	(134,698)		
	-0.224**	-0.331**	-0.231**	-0.355**	-0.304**	-0.278**
NFIL Requested at Transfer	(0.017)	(0.023)	(0.017)	(0.025)	(0.020)	(0.019)
Intercept	-0.503**	-1.010**	-0.359**	-0.868**	1.461**	1.007**
(For Logit, Level 0)	(0.028)	(0.038)	(0.030)	(0.043)	(0.048)	(0.044)
Intercept	. ,				3.886**	3.003**
(For Logit, Level 1)					(0.053)	(0.047)
Number of Years in Accounts	0.013*	-0.004	0.009	-0.010	-0.011	-0.040**
Receivable	(0.005)	(0.007)	(0.005)	(0.007)	(0.006)	(0.005)
Most Recent Taxpayer Income/	-0.010**	-0.010**	-0.054**	-0.073**	-0.035**	-0.035**
Total Balance Due	(0.001)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)
Taxpayer Income at Time of		. ,			0.165**	0.176**
Transfer					(0.049)	(0.046)
Net Payments in the Year Prior to					-0.000**	-0.000**
Transfer					(0.000)	(0.000)
Log of Net Payments in the Year	-0.062**	-0.095**	-0.060**	-0.097**	, ,	, ,
Prior to Transfer	(0.003)	(0.003)	(0.003)	(0.004)		
	0.114**	0.218**	0.094**	0.201**	0.063**	0.100**
Number of Modules Transferred	(0.007)	(0.010)	(0.007)	(0.010)	(0.009)	(0.008)
Interest & Dividends Major	-0.246**	-0.440**	-0.203**	-0.404**	-0.488**	-0.501**
Source of Income	(0.020)	(0.028)	(0.021)	(0.031)	(0.029)	(0.026)
Schedule C Maior Source of		(, , ,	-0.125**	-0.106**
Income					(0.039)	(0.036)
	-0.129**	-0.264**	0.003	-0.092*	-0.429**	-0.413**
Wages Major Source of Income	(0.025)	(0.034)	(0.027)	(0.038)	(0.042)	(0.039)
	0.062	0.094	0.058	0.096	-0.077	-0.139*
Sole-Proprietor Indicator	(0.051)	(0.070)	(0.053)	(0.076)	(0.060)	(0.055)
Self-Reported Balance Due Major	0.129**	0.231**	0.185**	0.322**	0.010	0.043
Source of Assessment	(0.024)	(0.033)	(0.025)	(0.036)	(0.032)	(0.030)
Exam and AUR Major Source of	-0.015	-0.044	-0.042	-0.085*	-0.120**	-0.116**
Assessment	(0.024)	(0.033)	(0.025)	(0.035)	(0.030)	(0.028)
Substitute for Return Major	0.111**	0.191**	0.005	0.056	-0.012	0.027
Source of Assessment	(0.026)	(0.036)	(0.028)	(0.040)	(0.037)	(0.035)
Nonfiler Major Source of					-0.140**	-0.101**
Assessment					(0.031)	(0.030)
Trust Fund Recovery Penalty	-0.429**	-1.012**	-0.500**	-1.164**	-1.622**	-1.546**
Major Source of Assessment	(0.051)	(0.070)	(0.053)	(0.076)	(0.062)	(0.059)
Other Major Source of					-0.199**	-0.199**
Assessment					(0.041)	(0.039)
	0.217**	0.269**	0.222**	0.286**	-0.062*	-0.006
Entity Had a Defaulted IA at 10	(0.023)	(0.031)	(0.024)	(0.034)	(0.026)	(0.024)
Entity had a module in the Queue	0.001	0.044	0.005	0.054	0.088**	0.113**
prior to T _o	(0.023)	(0.031)	(0.024)	(0.034)	(0.029)	(0.026)
Entity had a module in CFf prior	0.058	0.078	0.068	0.096	0.060	0.027
to T _o	(0.038)	(0.052)	(0.039)	(0.056)	(0.047)	(0.043)
Entity had a Combo Case	-0.031	0.014	-0.037	0.012		
,	(0.019)	(0.026)	(0.019)	(0.028)		
Sigma			1.990**	2.843**		
1	1		1 (0.006)	(0.009)		

NOTES: Sample size: 56,116. Regression coefficients are rounded to the nearest three decimal places. *Indicates significance at the 0.05 level in a two-tailed t-test. ** Indicates significance at the 0.01 level in a two tailed t-test.

Model	1 year	2 years	1 year	2 years	1 year	2 years
Model	OLS		Tobit		Logit	
R-Squared/ Log Likelihood	0.064	0.076	(11,107)	(11,636)		
NETL Poquested at Transfer	-0.383**	-0.597**	-0.406**	-0.672**	-0.438**	-0.421**
IN TE Requested at Transier	(0.094)	(0.113)	(0.103)	(0.133)	(0.074)	(0.069)
Intercent (For Logit Level 0)	-1.707**	-2.403**	-1.773**	-2.641**	1.171**	0.802**
	(0.181)	(0.219)	(0.200)	(0.259)	(0.130)	(0.120)
Intercent (For Logit Level 1)					2.796**	2.187**
					(0.138)	(0.124)
Number of Years in Accounts	0.059*	-0.038	0.068*	-0.036	-0.007	-0.073**
Receivable	0.029	0.035	0.032	0.042	0.022	0.020
Most Recent Taxpayer Income/	-0.032**	-0.033**	-0.091**	-0.127**	-0.036**	-0.043**
Total Balance Due	(0.005)	(0.006)	(0.013)	(0.019)	(0.008)	(0.009)
Log of Net Payments in the Year	-0.080**	-0.140**	-0.082**	-0.157**	-0.123**	-0.118**
Prior to Transfer	(0.012)	(0.015)	(0.014)	(0.018)	(0.009)	(0.009)
Number of Medules Transferred					0.031*	0.022
					(0.015)	(0.014)
Corporation Major Source of	-0.046	0.088	-0.047	0.107		
Income	(0.114)	(0.138)	(0.125)	(0.162)		
Solo Dropriotor Indicator	-0.297*	-0.420*	-0.338*	-0.517**		
	(0.136)	(0.164)	(0.149)	(0.193)		
Exam Major Source of	0.991**	1.216**	1.074**	1.381**	0.587**	0.757**
Assessment	(0.242)	(0.293)	(0.266)	(0.344)	(0.212)	(0.200)
Fed Tax Deposit Credit Discrep					-0.147	-0.191*
Major Source of Assessment					(0.087)	(0.082)
Nonfiler Major Source of	0.296**	0.381**	0.295*	0.401**	-0.015	-0.003
Assessment	(0.108)	(0.131)	(0.119)	(0.154)	(0.086)	(0.081)
Other Major Source of	0.208	0.142	0.230	0.164	0.075	0.105
Assessment	(0.110)	(0.133)	(0.121)	(0.157)	(0.087)	(0.081)
Penalties Major Source of	0.350**	0.450**	0.384**	0.528**	0.080	0.166*
Assessment	(0.093)	(0.113)	(0.102)	(0.132)	(0.074)	(0.069)
IRC 6020(b) Major Source of	0.484**	0.426**	0.491**	0.451*	0.133	-0.056
Assessment	(0.132)	(0.159)	(0.145)	(0.188)	(0.121)	(0.110)
Self-Reported Balance Due Major	0.816**	1.143**	0.835**	1.249**	0.313**	0.395**
Source of Assessment	(0.104)	(0.126)	(0.115)	(0.149)	(0.086)	(0.080)
Entity Had a Defaulted IA at T	0.492**	0.785**	0.508**	0.872**	0.412**	0.478**
	(0.163)	(0.198)	(0.179)	(0.231)	(0.133)	(0.124)
Entity Had a Module in CNC, CFf,	-0.081	-0.135	-0.089	-0.165		
or the Queue Prior to T_0	(0.130)	(0.158)	(0.143)	(0.185)		
Entity Had a Combo Casa	0.446**	0.594**	0.459**	0.653**	0.331**	0.341**
Entity Flad a Combo Case	(0.090)	(0.109)	(0.099)	(0.128)	(0.070)	(0.065)
Entity Had a Module with 041 Tax	0.131	0.493**	0.128	0.543**	-0.076	0.035
	(0.132)	(0.160)	(0.145)	(0.189)	(0.109)	(0.100)
Sigma			3.165**	4.073**		
			(0.036)	(0.049)		

TABLE A2. BMF Parameter Estimates (with Standard Errors in Parentheses)

NOTES: Sample Size: 4,488. Regression coefficients are rounded to the nearest three decimal places.

*Indicates significance at the 0.05 level in a two-tailed t-test.

**Indicates significance at the 0.01 level in a two-tailed t-test.
$\frac{2}{\sqrt{2}}$

Nonfiling: IRS-Census Data Comparisons

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What Drives Income Tax Filing Compliance?¹

Brian Erard (B. Erard & Associates) and John Guyton, Patrick Langetieg, Mark Payne, and Alan Plumley (IRS, Research, Applied Analytics, and Statistics: Office of Research)

his paper summarizes the findings from a recent effort to better understand what drives households to comply with their Federal income tax filing obligations.² The decision whether to file a tax return is essentially a participation decision, and there is a long history in empirical research of applying qualitative choice models, such as logit and probit specifications, to model the determinants of participation behavior. However, standard qualitative choice models assume that one has access to a representative data sample of participants and nonparticipants, including an indicator for the participation status of each subject in the sample.

Although IRS has detailed tax return information for filers, it lacks comparable information on nonfilers. To fill this void, we supplement IRS information on filers with survey information from the general population of filers and nonfilers. However, this latter data source does not identify which respondents are filers and which are nonfilers. We therefore apply a novel econometric methodology (calibrated probit analysis) to estimate the drivers of filing compliance.³

Calibrated Probit Analysis

We apply a calibrated probit analysis (Erard, 2017) to our combined data sample to estimate the drivers of filing compliance. Intuitively, whereas a standard probit analysis relies on differences between the characteristics of participants (filers) and nonparticipants (nonfilers) to infer what drives behavior, the calibrated probit methodology relies on differences between the characteristics of a representative sample of participants and the characteristics of a supplementary sample that (when weighted) is representative of the overall population of participants and nonparticipants. We estimate our calibrated probit model by solving the following constrained optimization problem:

$$\max_{\beta} \sum_{i=1}^{n_f} ln[\Phi(\beta'X_i)]$$

s.t. $\sum_{i=1}^{n_o} w_i \Phi(\beta'X_i) = N$

where n_f represents the number of filers in our filer-only data sample, n_o is the size of our supplementary sample of filers and nonfilers, X is a vector of explanatory variables, β is a vector of coefficients to be estimated, $\Phi(z)$ represents the value of the standard normal cumulative distribution function evaluated at z, w refers to sample weights in the supplementary sample, and N_f is the population number of returns filed. The solution to this problem is the value of β that maximizes the predicted likelihood of filing among households in the filer-only data sample subject to the constraint that the weighted aggregate predicted number of filers in the supplementary sample based on this solution is consistent with the actual number of filers in the population. In other words, the estimated value of β is calibrated to be consistent with the population count of filed required returns (hence the name "calibrated probit analysis").We estimate our model using the constrained maximum likelihood application (CML) in GAUSS[@].

¹ The views expressed in this paper reflect those of the authors, and they do not necessarily represent the position of the Internal Revenue Service. This research was funded under IRS contracts TIRNO-10-D00021-D0004, TIRNO-14-P-00157, and TIRNO-15-P-00172.

² For readers interested in more details, a full presentation of our methodology and findings is provided in Erard, et al. (2016).

³ Prior research on this topic includes the aggregate longitudinal analysis of filing compliance across states by Plumley (1996) and the micro-level analysis of filing behavior by Erard and Ho (2001).

To account for variations in behavior both across households and over time, we have extended the above estimation framework to permit an analysis of a time series of cross sections. This extended framework imposes a separate constraint equation for each time period in the data sample. To ensure that all restrictions can be satisfied, a set of tax-year dummies is included among the explanatory variables in this specification.

Data Description

Our IRS data source on filers is the Individual Returns Transaction File (IRTF). Many households have no legal filing obligation because their income is below the filing threshold, and they do not meet certain other filing criteria, such as a need to report self-employment tax or taxes on tip income. Some of these households do file, however, to claim refunds of withheld earnings or to claim a refundable tax credit, such as the Earned Income Credit. Since our focus is on filing compliance, we restrict our IRTF sample to households with a legal filing obligation for income tax or self-employment tax purposes. This is achieved by applying an algorithm to check whether a given return satisfies any of the various conditions (such as gross income above the relevant filing threshold or net self-employment earnings in excess of \$400) that trigger a filing requirement. Our supplementary sample of filers and nonfilers is drawn from the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC), which is compiled annually by the Census Bureau. In past research, we have found that certain income sources are understated in this survey. Therefore, in order to more accurately identify households with a legal filing obligation, we follow Erard, Langetieg, Payne, and Plumley (2014) in imputing additional income across the sample (in many cases, so that the Census data become consistent with third-party information return data reported to the IRS). To assign household members to tax returns, we also impute tax filing status. The CPS-ASEC is a stratified random sample; however, the stratification criteria are not publicly available. A desirable feature of our econometric methodology is that we are able to effectively control for the stratified nature of the sample simply by applying the sample weights.⁴

For both data sources, we have large cross-sectional samples for each tax year over the period from 2000 through 2012. On average, the data include a simple random sample of approximately 113,000 filed required returns per year from the IRTF and a stratified random sample of approximately 76,000 required returns per year from the CPS-ASEC.

Estimation Results

In this section, we present the results of our calibrated probit analysis of the drivers of filing compliance based on our time series of cross sections over the period from TY2000 through TY2012. Because our estimation methodology relies on a comparison of variables from two separate data sources (IRTF and CPS-ASEC), it is important to restrict the set of regressors to those variables that are comparably measured in the two sources. So, for instance, while the IRTF provides information on whether a taxpayer is owed a refund or has a balance due (which is likely to be relevant to the filing decision), comparable information is not available in the CPS-ASEC. It also would be desirable to include some indicators of filing status as explanatory variables. However, a nontrivial number of taxpayers claim the incorrect status on their return. For instance, the percentage of filers claiming head of household status greatly exceeds the estimated percentage of required returns with this status based on the CPS-ASEC. Instead of filing status indicators, we include an indicator for marital status in our specifications. Similarly, we would like to account for Earned Income Credit eligibility in our analysis. However, a claims-based measure from the IRTF would be misleading, owing to a nontrivial number of Earned Income Credit claimants who are not truly eligible. Ultimately, we have selected the following explanatory variables for our analysis, which we believe are measured reasonably comparably (and generally accurately) across our two data sources:

CONST: Constant term.

AGE 65: Dummy for primary or secondary filer age 65 or over.

⁴ Other existing models for use with supplementary samples (Lancaster and Imbens (1996); Manski and McFadden (1981)) require knowledge of the stratification criteria, which are not provided in public use samples of Census surveys. An exception is the Steinberg-Cardell (1992) approach, which can be adapted for use with sample weights. However, this estimator produces relatively inefficient estimates and is subject to convergence issues.

MARRIED: Dummy for married taxpayer.

CHILD3UP: Dummy for three or more children.

TY2009UP*CHILD3UP: Dummy for three or more children and TY2009 or later.

LN(GROSSINC): Natural log of gross income, where gross income is computed as the sum of the positive amounts of wages and salaries, interest, taxable dividends, pensions, rents, unemployment compensation, taxable social security benefits, alimony, and gross self-employment earnings.

NO TAX STATE: Dummy variable for residence in a State with no individual income tax (AK, FL, NH, NV, SD, TN, TX, WA, WY).

SEFILREQ: Dummy variable for a filing requirement triggered by having net profit from farm and non-farm self-employment in excess of \$433.

NEARTHRESH: Dummy variable for gross income less than 1.10 times the filing threshold, where the filing threshold for nondependent joint filers is applied for married joint filing status and the filing threshold for single filers is applied to all other nondependent filers. The lower statutory thresholds are applied to single and married dependent filers.

LN(BURDEN): Natural log of taxpayer burden.⁵

LN(BURDEN)*NEAR THRESHOLD: Interaction between LN(BURDEN) and NEARTHESH.

MIDATL: Dummy variable for residence in the Middle Atlantic division.

EASTNC: Dummy variable for residence in the East North Central division.

WESTNC: Dummy variable for residence in the West North Central division.

SOUTHATL: Dummy variable for residence in the South Atlantic division.

EASTSC: Dummy variable for residence in the East South Central division.

WESTSC: Dummy variable for residence in the West South Central division.

MOUNTAIN: Dummy variable for residence in the Mountain division.

PACIFIC: Dummy variable for residence in the Pacific division.

TY2001-TY2012: Tax year dummies.

The omitted Census division is New England and the omitted tax year is 2000.⁶ Our measures of taxpayer burden and gross income have been converted to real 2010 amounts based on the CPI-U price index.

Table 1 breaks down the average of the weighted mean values of our explanatory variables (excluding the year dummies) over the 13-year estimation period separately for the IRTF and CPS-ASEC samples. Over this period, filers were relatively more likely to be of age 65 or older, reside in States without an income tax as well as in the Middle Atlantic or East North Central divisions, and have gross income near the filing threshold. They were relatively less likely to be married, have three or more children, receive nontrivial self-employment earnings, or reside in the Mountain or Pacific divisions. On average, their gross earnings were somewhat lower than the overall population of households with a filing requirement, and they faced a somewhat lower filing burden.⁷

⁵ Monetized value of time and out-of-pocket expenses incurred to meet one's filing obligation, estimated using IRS methodology applied to the limited set of explanatory variables available in this analysis.

⁶ Census divides the country into four "regions" (Northeast, Midwest, South, and West), each of which is further broken down into two or more "divisions." In this study, we control for possible variations in behavior across the eight Census divisions (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific).

⁷ Technically, our estimate of burden (i.e., compliance cost) reflects the time and money expense that filers actually expend, not the amount that they would have to expend to be fully compliant.

Verieble	Data Source		
Variable	IRTF	CPS-ASEC	
AGE 65	0.6352	0.6059	
MARRIED	0.4396	0.4646	
CHILD3UP	0.0653	0.0658	
LN(GROSSINC)	10.7026	10.7395	
NO TAX STATE	0.1984	0.1972	
SEFILREQ	0.1200	0.1266	
NEARTHRESH	0.0565	0.0537	
LN(BURDEN)	5.9386 5.9689		
LN(BURDEN)*NEARTHRESHOLD	0.2922	0.2798	
MIDATL	0.1406	0.1383	
EASTNC	0.1582	0.1550	
WESTNC	0.0695	0.0689	
SOUTHATL	0.1908	0.1910	
EASTSC	0.0559	0.0557	
WESTSC	0.1065	0.1073	
MOUNTAIN	0.0670	0.0694	
PACIFIC	0.1594	0.1636	
NEW ENGLAND	0.0520	0.0508	

TABLE 1. Average Values of Explanatory Variables Over theTY2000-TY2012 Period, by Data Source

Our specification includes a dummy variable (TY2009UP*CHILD3UP) equal to one if both the household has three or more children and the tax year is 2009 or later to explore whether the introduction of a larger earned income credit amount in Tax Year 2009 for families with three or more children induced more households to file their (required) tax returns. Table 2 compares the average shares of households in the IRTF and CPS-ASEC samples before and after Tax Year 2009. Whereas filers were relatively less likely to claim three or more children prior to Tax Year 2009, the opposite was true from Tax Year 2009 on, even though such families appear to have become less common in the general population. Our econometric analysis explores whether this pattern continues to hold after controlling for other factors related to the filing decision.

Tax Voor Poriod	Data Source		
	IRTF	CPS-ASEC	
TY2000-TY2008	6.42%	6.76%	
TY2009–TY2012	6.79%	6.18%	

TABLE 2. Average Share of Households With Three or MoreChildren, by Tax Year Period and Data Source

Formulas for estimating taxpayer burden were developed through regression analyses involving four different IRS surveys performed for Tax Years 2007, 2010, 2011, and 2012. A separate burden estimation formula was developed from each survey based on a set of explanatory variables that was common to our IRTF and CPS-ASEC samples. In principle, the burden estimate for a given tax year could be based on any of the four alternative formulae. In practice, the alternative formulae yield burden estimates that are extremely highly correlated, so the choice of which formula to use is not of much importance. In the results presented below, we rely on the Tax Year 2007 survey formula for Tax Years 2000–2008, the Tax Year 2010 survey formula for Tax Years 2009 and 2010, the Tax Year 2011 survey formula for Tax Year 2011, and the Tax Year 2012 survey formula for Tax Year 2012. We have confirmed that our results are very similar when the Tax Year 2007 survey formula is employed for all tax years. Table 3 presents the estimated coefficients of our calibrated probit analysis along with their associated t-statistics.⁸ Remember that the data were restricted to those having a filing requirement. A positive estimated coefficient indicates that, after controlling for other factors, the variable is positively associated with filing compliance. The results indicate that filing compliance tends to be positively associated with gross income, being age 65 or older, and being married. On the other hand, filing compliance tends to be negatively associated with self-employment. The results also indicate significant variations in filing compliance across Census divisions with high compliance (relative to those who live in New England) among residents of the Middle Atlantic and East North Central states and relatively low compliance among those living in the West South Central, Mountain, and Pacific States. However, residence in a State that does not administer an income tax does not appear to have any significant impact on Federal income tax filing compliance.

The positive estimated coefficient of the interaction term TY2009UP*CHILD3UP supports notion that the introduction of a larger Earned Income Credit for households with three or more children in Tax Year 2009 had a positive impact on filing compliance. The tax-year dummies indicate that filing compliance declined between Tax Year 2000 and Tax Year 2006, rebounded in Tax Year 2007 to around the Tax Year 2000 level, and then declined again in Tax Year 2009.

Variable	Coefficient Estimate	t-statistic
CONST	-0.8135	-6.81
AGE 65	1.3090	40.25
MARRIED	0.2025	4.72
CHILD3UP	-0.1453	-5.50
TY2009UP*CHILD3UP	0.5032	8.09
LN(GROSSINC)	0.5124	36.67
NO TAX STATE	0.0034	0.15
SEFILREQ	-0.2735	-13.74
NEARTHRESH	-1.0188	-8.96
LN(BURDEN)	-0.5721	-26.35
LN(BURDEN)*NEARTHRESH	0.1843	9.01
MIDATL	0.1048	2.02
EASTNC	0.0746	1.69
WESTNC	-0.0463	-0.19
SOUTHATL	-0.0706	-0.29
EASTSC	0.0812	0.24
WESTSC	-0.0852	-1.83
MOUNTAIN	-0.2766	-6.47
PACIFIC	-0.2869	-7.27
TY2001	-0.0224	-0.46
TY2002	-0.1629	-3.54
TY2003	-0.1518	-3.31
TY2004	-0.1637	-3.56
TY2005	-0.2103	-4.71
TY2006	-0.1537	-3.37
TY2007	0.0618	1.26
TY2008	0.0372	0.76
TY2009	-0.3490	-7.19
TY2010	-0.3188	-6.46
TY2011	-0.3991	-7.98
TY2012	-0.5022	-10.10

TABLE 3. Calibrated Probit Estimation Results

⁸ The standard errors of the estimated coefficients and marginal effects were computed using the generalized moment conditions implied by the first-order conditions of the constrained maximization problem.

This rise in filing compliance in Tax Year 2007 is presumably at least partially attributable to the Economic Stimulus Act of 2008. In order to claim a stimulus payment in 2008, households were required to file a Tax Year 2007 income tax return. The stimulus payment was rather substantial, ranging from \$300 to \$600 for eligible individuals and from \$600 to \$1,200 for joint filers, plus an additional \$300 for each qualifying child.⁹ Households that did not claim the stimulus for Tax Year 2007 were permitted to file a return and claim it the following tax year. The estimated decline in filing compliance beginning in Tax Year 2009 indicates that the stimulus-induced boost in compliance was temporary in nature. This is a noteworthy finding as it contrasts with the commonly held view that once a taxpayer enters the system, the taxpayer tends to remain in the system.

Taxpayers who have income near the filing threshold are relatively less likely to file a return. As well, burden is negatively associated with filing compliance. However, this burden effect is partially mitigated for households with gross income near the filing threshold. This may reflect a relatively high degree of filing compliance among households near the threshold who are eligible for benefits such as the Earned Income Credit. Although claiming such benefits is associated with an additional filing burden, this represents a "voluntary burden" that many households would find acceptable in relation to the benefits to be received.

Concluding Remarks

We have applied a novel econometric methodology to examine the drivers of filing compliance across households and over time. This methodology allows us to draw inferences based on a primary sample that includes only return filers and a supplementary survey sample from the overall population of filers and nonfilers. We have found evidence that filing compliance is linked to a variety of factors, including taxpayer burden, age, and self-employment. The results also indicate a positive role for various tax benefits, such as the Economic Stimulus Act of 2008 and the Earned Income Credit. We are currently working to extend the estimation framework to permit an analysis of how one's filing history impacts subsequent filing choices. In addition, we have recently discovered that our estimates of the number of required returns in the population based on the CPS-ASEC tend to be understated, despite our imputations of additional income to the data base. Preliminary estimation results for our model based on improved measures of the required return population are qualitatively similar to those presented here. However, further work is needed to refine these measures and extend them over a longer time span.

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⁹ The value of this payment was phased out for households with high levels of AGI.

The Individual Income Tax and Self-Employment Tax Nonfiling Gaps for Tax Years 2008–2010

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Introduction

Taxpayers are required by the Internal Revenue Code to file income tax returns with the IRS by the established due date, on which they are to report all of their tax liability; it also requires them to pay that tax liability on time. However, not all taxpayers file required tax returns on time (or at all), and some of their tax liability is therefore not paid on time. The nonfiling gap is the amount of true tax liability not paid on time by those who do not file on time. Since some nonfilers pay some or all of their true tax liability on time (e.g., through withholding), not all nonfilers actually contribute to the tax gap. Nonetheless, the nonfiling gap is comprised of two major components: the portion associated with those who file late ("late filers"), and the portion associated with those who never file at all ("not-filers"). Thus, from a tax gap perspective, nonfilers include both late filers and not-filers. With the passage of time, some not-filers file late returns, so the distinction between these two groups is merely a pragmatic one for estimating the gap. It is easier to estimate the contribution that late filers make to the nonfiling gap since we have their tax return; it is much harder to estimate the gap associated with those who have not filed any return by the time the estimate is made.

We estimate that the average annual individual income tax nonfiling gap over the TY 2008 through TY 2010 period was \$26 billion, and the corresponding self-employment tax nonfiling gap was \$4 billion. We have estimated the individual income tax nonfiling gap and the self-employment tax nonfiling gap together (since self-employment tax is reported and reconciled on the Form 1040 individual income tax return), but we report them separately. Our estimates of the not-filer portion of the gap are based on two different methodologies— one based primarily on IRS data (the Administrative Data Method), and the other based primarily on Census data matched with a limited amount of IRS data (the Census Method).

The Administrative Data Method is based on IRS administrative data (providing income from third parties paid to individuals who were not accounted for on filed returns), but uses aggregate information from Census data about the grouping of individuals into families and tax units. The Census Method is based on annual Census demographic surveys that have been linked to the limited IRS administrative data that the Census Bureau receives by law and regulation. Both methods have strengths and weaknesses, so it is helpful to derive estimates of the gap (and related tax return amounts) both ways. This paper provides details about these estimates and the methodologies used to produce them.

Section 1 below explains the two methods used to estimate the gap associated with not-filers; Section 2 explains the steps for estimating the gap associated with late filers; Section 3 summarizes the resulting nonfiling gap estimates; Section 4 compares the two sets of estimates introduced in Section 1, accounting for late filers; and Section 5 examines some of the distributional characteristics of nonfilers.

1. Not-Filers

Since not-filers do not file income tax returns, this is the most difficult portion of the nonfiling gap to estimate. Several methods have been employed in the past to estimate this portion of the tax gap. For example, in the early 1990s, the IRS estimated the nonfiling gap using a special study of Tax Year 1988 nonfilers under the Taxpayer Compliance Measurement Program (TCMP). This study selected a random sample of nonfilers, and attempted to contact them and secure delinquent returns from them when possible; those secured returns were then subjected to line-by-line examinations to determine the true tax liability.¹ This approach is not only very costly but still requires estimating the gap associated with any not-filers for whom the IRS could not secure a delinquent return.

For the Tax Year 2001 tax gap estimates, the IRS turned to a different method: an "Exact Match" between Census and IRS data. This approach involved identifying respondents in the annual Current Population Survey who appeared not to have filed an income tax return, then estimating their income tax liability. This approach is much simpler, but yields uncertain results because the Census data do not capture all income, it is not always possible to determine whether a Census respondent filed on time, and there was not a good method available to estimate the extent to which nonfilers paid at least some of their tax liability on time.

To estimate the Tax Year 2006 tax gap associated with not-filers, the IRS assembled a sample of individuals not appearing on filed tax returns, identified the income reported to the IRS for them by third parties, grouped them into family (tax) units (guided by Census data), imputed some additional income, deductions, and credits to them, then estimated their tax liability less credits and withholding. However, this approach (which we call the Administrative Sample Method) lacked information on income not reported to the IRS by third parties, and starting with a sample of individuals created challenges for grouping people together into presumed tax units.²

The current estimates are based on improvements to the last two of those three methods. We call these the Administrative Data Method and the Census Method. We estimate the not-filer portion of the gap using each of these two distinct methods, then add in the appropriate amounts for late filers, and compare the estimates. We average our estimates over Tax Years 2008 through 2010 to correspond with the individual income tax underreporting gap estimates provided in the combined tax gap report.

1.1 Administrative Data Method

The main improvement we made to the methodology used for Tax Year 2006 was to apply the approach to population data, rather than to a sample, thus avoiding the disadvantages inherent in the sample approach. The method involved the following steps:

- Identify all individuals who appeared on a third-party information return for the tax year in question, but who did not appear on a filed return as a primary or secondary taxpayer that year;³
- Identify the known income, prepayments, and state of residence for these "not-filers" from third-party information documents and other administrative tax data sources (e.g., Master File). In addition, the Social Security master file (DM-1) was used to obtain the age and gender of each individual. Finally, the individuals were matched to filed returns to determine which ones had been claimed as dependents.
- Impute self-employment income to the individual not-filer records;
- Assign a marital status (and filing status and spouse in the case of married-joint returns) and a number
 of dependents to the remaining not-filers using their age and gender, so that the total age and filing
 status distribution of timely filers, late filers, and not-filers matches the corresponding distributions of
 singles, marrieds, heads of households, and dependents in Census data;
- Impute adjustments, deductions, and credits to the tax units;
- Compute the tax liability of the not-filers; and

¹ See Internal Revenue Service (1996) and Erard and Ho (2001).

² See Internal Revenue Service (2012).

³ Note that this treats all dependents as potentially required to file a return in their own right. This approach excludes people who had income only from sources not subject to third-party reporting (such as self-employment income).

• Deduct allowable credits and all prepayments made by these taxpayers, as reported on third-party information documents or found in IRS transactional history data, to derive their contribution to the tax gap.

The methods we developed for imputing self-employment income, deductions, and credits to the administrative dataset, and our methods for grouping individuals into tax units, are described in greater detail below.

1.1.1 Imputing Income

The basic method described above takes into account nonemployee compensation from Forms 1099 *Miscellaneous*, but this is only a small share of self-employment income reported on tax returns. Since other self-employment income is not reported to the IRS on third-party information documents, we used regression models to impute some of this income to not-filers based on the characteristics of taxpayers who reported self-employment income on filed returns. We developed the imputation model using a large sample of individuals from the Social Security master file and then matching these individuals to tax returns and information returns. Our imputations were restricted to net sole proprietorship income reported on Schedule C, and followed the method we employed for imputing self-employment income to Census records. Thus, we estimated the likelihood that a not-filer has self-employment earnings falling into one of the following three categories: (a) negative net self-employment earnings; (b) net self-employment earnings between \$1 and \$433; and (c) net self-employment earnings in excess of \$433 (since taxpayers with more than \$433 in net self-employment earnings are required to file a tax return).

The econometric framework involved three separate models. The first was a probit specification for the likelihood that a filing unit has nonzero self-employment earnings:

$$SE^* = \gamma' x + \mu \tag{1}$$

where SE^* is a latent variable describing the propensity for net self-employment earnings to be present, *x* is a vector of explanatory variables, and γ is a vector of coefficients to be estimated. The explanatory variables include gender, the log of age, region, indicators for the presence of key income types (wages, interest, Social Security, pension, unemployment compensation, and nonemployee compensation), and the log of each of these income amounts. The error term μ is assumed to follow the standard normal distribution. Estimation of this model permits us to develop a prediction equation for the unconditional likelihood that an individual has net income from self-employment. Each individual was assigned a random number from a uniform distribution, and, if the value of this number was below the predicted probability, then the person was determined to have some net self-employment income.

Our second model was an ordered probit specification for the dollar amount category that net self-employment earnings fall into when they are present (negative, \$1 to \$433, or over \$433):

$$I_{SE}^{*} = \delta' x + \nu \tag{2}$$

where Γ_{SE} is a latent variable for the propensity for net self-employment earnings to fall into one of these categories, *x* is the same set of explanatory variables used in the probit model, δ is a coefficient vector to be estimated, and *v* is a standard normal random disturbance. The model also includes a limit parameter *l* to be estimated.⁴ The indicator I_{SE} for the net self-employment earnings category is assigned as follows:

$$I_{SE} = \begin{cases} 1 & net \ earnings < \$0 \\ 2 & \$0 < net \ earnings \le \$433 \\ 3 & net \ earnings > \$433. \end{cases}$$
(3)

⁴ This parameter serves as a threshold for separating the various levels of the response variable.

Our third model is a regression specification for the magnitude of net self-employment earnings when they exceed \$433. Our specification is:

$$\ln(SE) = \beta' x + \varepsilon, \tag{4}$$

where $\ln(SE)$ represents the natural log of net self-employment earnings, *x* is the same set of explanatory variables used in the preceding models, β' is a vector of coefficients to be estimated, and ε is assumed to be a normal random error term with mean zero and standard deviation σ . Under this specification, the distribution of self-employment earnings is assumed to be log normal. Furthermore, we have imposed the constraint that the imputed self-employment income amount cannot exceed the amount corresponding to the 99.99 percentile of self-employment income on filed returns.

There are other income line items that are incomplete or missing from our income calculations for notfilers, such as capital gains, rental income, etc. However, these are either absent from information returns or it is difficult to estimate the net income that should be reported if a tax return were required.

1.1.2 Forming Tax Units

The next task was to allocate these individual not-filers into tax units (families), which we did using the overall demographic profile of the CPS-ASEC. Specifically, this took the following steps:

- 1. Tabulate the population counts of persons in the CPS-ASEC in cells defined by gender, age group, marital status, and the number of dependents;
- 2. Tabulate the corresponding counts of persons present on filed returns for each cell (from IRS administrative data);
- 3. Subtract the IRS counts from the Census counts in each cell. This generates the target count of not-filers in each cell;⁵
- 4. Randomly allocate the not-filer individuals in each age group to the cells identifying married vs. single people and the number of dependents (0, 1, or 2 dependents). Persons assigned to a married status were randomly matched to other persons assigned to a married status. Persons assigned a dependent were randomly assigned characteristics of dependents from the CPS-ASEC population; and
- 5. Add the individual income and prepayment data among spouses to derive total amounts for each tax unit.

1.1.3 Estimating Elective Benefits and Prepayments

The estimation of tax liability for each tax unit involved calculating and/or imputing adjustments, exemptions, deductions, refundable credits, and nonrefundable credits.

Statutory Adjustments

The adjustment for self-employment was calculated as one half of the self-employment tax associated with the imputed self-employment income amount for the taxpayer(s) on the return. Then the rest of the adjustments were imputed based on formulas estimated from the National Research Program (NRP) sample of returns for the specific tax year.

Once again, a probit model, with the same form and assumptions as for self-employment income, was used to predict the likelihood that a given return would have some positive amount of total adjustments (other than the self-employment tax deduction). For this model, the explanatory variables included the age category and gender of the primary taxpayer, filing status (restricted to married-joint or single), region, number of dependents, indicators for the presence of various types of income (wages, interest, dividends, business, farm, Social Security, pension and IRA distributions, and unemployment compensation) and the log of these same

⁵ In practice, it was necessary to collapse the age and dependent categories for the CPS-ASEC counts in order to avoid having too few observations. Also, no notfiler Head of Household returns resulted from this procedure.

income amounts. In all cases, the values after correction during the NRP audit were the ones used in the estimation.

This model provided a prediction equation for the unconditional likelihood that an individual could have claimed some adjustments. Once again, each tax return was assigned a random number from a uniform distribution and, if the value of this number was below the predicted probability, then the person was determined to have been able to claim some amount of adjustments.

For those returns predicted to have adjustments, we predicted the amount by regressing the log of total adjustments on the same independent variables as in the probit model.

Deductions

The standard deduction was calculated for all returns based on whether their filing status was single or married-joint, whether either or both taxpayers were 65 years of age or older, and whether either or both taxpayers were or could have been claimed as a dependent on a filed return.⁶

In addition to the standard deduction, we once again used the NRP sample for the same year to estimate a probit model to choose which of the not-filers would be most likely to file a Schedule A to itemize deductions. We used the same independent variables in this probit specification as in the case of adjustments. We then used the predicted probability for each return from this estimated equation and a random number assignment to select those who might choose to itemize. Then we used a regression model to predict the magnitude of itemized deductions for those who were predicted to itemize. Like the specification for adjustments, this model included the variables age category, gender, filing status, region, number of dependents, and indicators for the presence of the different income types, but in this case the log of total income is used rather than the log of each income type separately. The larger of the standard deduction amount and the itemized deduction amount is the one used in the tax calculation.

Exemptions and Credits

The total exemption amount was calculated in a straightforward manner based on the number of taxpayers on the return, whether either was claimed on another return or under 21 years of age, and the number of dependents.

Nonrefundable credits were calculated in two parts: (1) the child tax credit; and (2) all other credits. The child tax credit was calculated following the worksheets on the Form 1040 instructions using the information available in the not-filer file on the number of dependents of eligible age, filing status, adjusted gross income and earned income. All other types of credits were imputed based on probit and OLS regression equations estimated from the NRP sample for the same year.

Once again the imputation followed a two-step process. First, the incidence of tax returns claiming these other types of credits was estimated using a probit model. Second, for those predicted to claim these credits, a regression model was used to develop prediction equations for the amount of the credits that could be claimed. The same independent variables were used in both of these models as in the probit model for itemized deductions.

The Earned Income Credit and Additional Child Tax Credit were also calculated from the worksheets on the Form 1040 instructions using the information on the not-filer file for the age and number of dependents, filing status, and income. These estimated amounts were used solely to offset unpaid tax balances. Since the portions of these credits that could have been refunded have no bearing on the tax gap, they were ignored.

⁶ An indicator for being claimed as a dependent was created for those who actually were claimed on a filed return in the tax year in question or who were 21 or under.

Prepayments

Withholding amounts were summed for each taxpayer from all of the withholding reported in third-party information documents and then combined to a return-level aggregate. Any estimated payments reported in the IRS administrative transaction history file are also added to the prepayments made by the tax unit.

1.1.4 Calculating the Tax Gap

Based on these imputed and calculated amounts of income, credits, and deductions, we estimated the total balance due for each tax unit. Our estimate of the not-filer tax gap using this IRS administrative data approach is the sum of all non-zero balances due. For this initial component, our final estimates are based on the average of five replicates, each of which used different family unit files and imputation processes for sole proprietor income and for adjustments, deductions, and credits, including a new set of random number draws to determine incidence. In order to control for the presence of unusually large values for income amounts on a small number of information documents in each tax year,⁷ two steps are taken in the calculation of the estimate for each of the five replicates. First, observations are removed where total income exceeds the 99.99 percentile of the amount of total income on filed returns for the given tax year. Second, each estimate is calculated by drawing 25 one-percent samples of the population of not-filers having a tax liability, and sorting these by the estimated balance due. Then the average of the middle seven of these samples (weighted by a factor of 100) is the basis for the estimates.

The resulting average estimates for not-filers for Tax Years 2008 through 2010 are summarized in Table 1, with their contribution to the combined income tax and self-employment tax gap amounting to just under \$18 billion. This estimate is not completely comparable to the estimate from the Census Method since the matched Census-IRS data include late filers who file by December 31 of the normal filing year. Once we account for late filers (see Section 2), we will be able to compare the two sets of estimates.

Key Items	Amount
Total income	\$216.3
Total adjustments that offset income*	\$7.1
Total personal and dependent exemptions that offset income*	\$27.3
Total deductions that offset income*	\$58.5
Total taxable income	\$123.2
Tentative tax	\$20.1
Tax offset by nonrefundable credits*	\$0.4
Self-employment tax	\$6.9
Net tax due	\$26.6
Tax offset by prepayments*	\$8.5
Tax offset by refundable credits*	\$0.5
Total payments of tax	\$9.0
Total contribution to the nonfiling gap	\$17.6

TABLE 1. Administrative Data Method Estimates of the Not-Filer Gap (\$ in Billions), Tax Years $2008-2010^{+}$

† Estimates averaged over Tax Years 2008 through 2010

* Income (and tax) offsets were limited to the amount needed to reduce income (or tax) to zero.

1.2 Census Method

We improved on the old "Exact Match" method in several important ways:

Census has improved their ability to assign an anonymous Protected Identification Key (PIK) to most
respondents in the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC)
and to all of the records Census receives from the IRS for the population (including selected data from
income tax returns and from third-party information documents). This allows them to create a better

⁷ This is often the case in raw population data due both to data errors and genuine outliers.

matched dataset, allowing us to identify not-filers more accurately.⁸ However, there are some ASEC records that could not be matched to the IRS data because a PIK could not be assigned to them with adequate certainty. We therefore restricted our analysis to the records that could be matched, and reweighted them to represent the entire population of not-filers.

- We used the third-party information associated with the not-filers, together with demographic information about them contained in the ASEC, to make better imputations of certain income, deduction, and credit amounts.
- We estimated the tax liability of the not-filers using a more detailed tax calculator than had been used in prior Exact Match studies.
- We estimated the aggregate amount of withholding and other prepayments made by the not-filers in the matched dataset based on rates of withholding derived from tabulations of late filers and not-filers identified in the Administrative Data Method.
- We supplemented this estimate of the gap associated with not-filers with a separate estimate for late filers using IRS administrative data (see Section 3).

The Census Method therefore involves a five-step process to estimate the not-filer portion of the nonfiling gap: (1) impute income that either does not exist in the CPS data or was grossly underreported; (2) create tax units according to CPS household relationships; (3) re-weight the CPS data in order to account for survey respondents who could not be assigned a unique PIK identifier and for records whose income was completely imputed; and (4) impute tax return level line items not observed in the CPS; and (5) calculate tax and balance due. These five steps are described in greater detail below.

1.2.1 Imputing Income at the Individual Level

Impute Retirement, Pension, and Social Security Income

Individuals in the matched dataset who had a Form 1099-R but did not report any Form 1099-R income were assigned the gross distribution amount from Form 1099-R. In order to determine what portion of the gross distribution is taxable, a series of models were estimated on IRS data. The following models were estimated and applied in the following order: (a) an incidence model to determine if *any* of the distribution is taxable; (b) an incidence model to determine is taxable; and (c) a regression model to determine the taxable portion of the distribution.

Additional Pension and Social Security income were imputed using a set of models developed on IRS data. The models were estimated and applied in the following order: (a) a multinodal model to determine if an individual had no retirement income, only pension income, only Social Security income, or pension and Social Security income; and (b) regression models to impute the amount of pension and/or Social Security income given the outcome of the multinodal model. IRS data were used to determine the total number of individuals who should have reported receiving pension and Social Security income. The multinodal model probabilities were adjusted so that the CPS totals were proportional to the IRS totals in application. Variation was applied to the regression estimates using the mean squared error and a random normal draw. In order to ensure the imputations stayed within a realistic range, a cap (upper limit) was established using observed IRS data. Any imputation that exceeded the cap was re-imputed.

Impute Schedule C Income

Schedule C (nonfarm sole proprietor) income was imputed using a set of models developed on IRS data. The models were estimated and applied in the following order: (a) an incidence model to determine if an individual had Schedule C income; (b) a multinodal model to determine if Schedule C income was negative, between \$1 and \$433, or greater than \$433; and (c) regression models to impute the amount of Schedule C income given the outcome of the multinodal model. IRS data were used to determine the total number of individuals that

⁸ See Jones and O'Hara (2014), and Wagner and Layne (2012).

should have reported receiving Schedule C income. The incidence and multi-nodal model probabilities were adjusted so that the CPS totals were proportional to the IRS totals in application. Variation was applied to the regression estimates using the mean squared error and a random normal draw. In order to ensure the imputations stayed within a realistic range, a cap was established using IRS data. Any imputation that exceeded the cap was re-imputed.

Impute Additional Self-Employment (SE) Income

Additional SE income is the net SE income remaining after accounting for net Schedule C income (described above) and Schedule F income (from the Census data).⁹ Additional SE income was imputed using two models developed on IRS data. The models were estimated and applied in the following order: (a) an incidence model to determine if an individual had additional SE income; and (b) a regression model to impute the amount. Variation was applied to the regression estimate using the mean squared error and a random normal draw. In order to ensure the imputations stayed within a realistic range, a cap was established using IRS data. Any imputation that exceeded the cap was re-imputed.

Impute Unemployment Compensation

Unemployment compensation was imputed using two models developed on IRS data. The models were estimated and applied in the following order: (a) an incidence model to determine if an individual had unemployment compensation; and (b) a regression model to impute the amount. IRS data were used to determine the total number of individuals that should have reported receiving unemployment compensation. The incidence model probabilities were adjusted so that the CPS total matched the IRS total in application. Variation was applied to the regression estimate using the mean squared error and a random normal draw. In order to ensure that the imputations stayed within a realistic range, a cap was established using IRS data. Any imputation that exceeded the cap was re-imputed.

Impute Dividends and Qualified Dividends

Total dividend income was imputed using two models developed on IRS data. The models were estimated and applied in the following order: (a) an incidence model to determine if an individual had dividend income; and (b) a regression model to impute the amount. IRS data were used to determine the total number of individuals that should have reported receiving dividend income. The incidence model probabilities were adjusted so that the CPS total matched the IRS total in application. Variation was applied to the regression estimate using the mean squared error and a random normal draw. In order to ensure that the imputations stayed within a realistic range, a cap was established using IRS data. Any imputation that exceeded the cap was re-imputed.

The portion of total dividends that are qualified was imputed using three models developed on IRS data. These models were estimated and applied in the following order: (a) an incidence model to determine if any portion of the dividend is qualified; (b) an incidence model to determine if the entire dividend is qualified; and (c) a regression model to determine the qualified portion of the dividend.

1.2.2 Forming Tax Units

The following steps were used to create tax units using CPS data:

Step 1: Combine married individuals into one record.

Step 2: Assign dependents to taxpayers.

Check 1—Individuals under age 19 (or age 24 and a full-time student) who are children of someone in the household are assigned as dependents of their parents.

Check 2—Remaining individuals under age 19 (or age 24 and a full-time student) who are related to an eligible person in the household are randomly assigned as a dependent to an eligible related person.¹⁰

⁹ So, the additional SE income reflects any income reported on: (1) Schedule K-1 (Form 1065), box 14, code A (other than farming); and (2) Schedule K-1 (Form 1065-B), box 9, code J1.

¹⁰ Note: An eligible person is someone with income who is not claimed as a dependent.

Check 3—All remaining individuals under the age of 19 are randomly assigned to an eligible person in the household.

Check 4—All remaining individuals with no income, but who have an eligible relative in the house-hold, are randomly assigned to an eligible relative.

1.2.3 Re-weighting the CPS Data

Roughly 10 percent of the CPS records cannot be matched to a PIK and/or contain income amounts that were all imputed. The records without a PIK or with completely imputed income were dropped from the sample. The remaining records were re-weighted at the strata level to account for the dropped records. The strata weights were re-weighted using a multiplicative adjustment factor that makes the sum of the adjusted strata weights equal the sum of the original strata weights.

1.2.4 Imputing Offsets at the Tax Return Level

Adjustments Other Than the Self-Employment Tax Deductions

Our tax calculator derived the adjustment for one-half of the self-employment tax paid. The sum of other adjustments was imputed using two models developed on the NRP sample of returns for the relevant tax year. The models were estimated and applied in the following order: (a) an incidence model to determine if an individual had other adjustments; and (b) a regression model to impute the amount. Variation was applied to the regression estimate using the mean squared error and a random normal draw.

Itemized Deductions

Itemized deductions were imputed using two models developed on NRP data. The models were estimated and applied in the following order: (a) an incidence model to determine if an individual itemized; and (b) a regression model to impute the amount. Variation was applied to the regression estimate using the mean squared error and a random normal draw. Only tax units who would have had taxable income after using the standard deduction were eligible for the itemizer imputation.

Nonrefundable Credits Other Than Child Tax Credit

Our tax calculator derived the Child Tax Credit applicable to each return. Other nonrefundable credits were imputed using two models developed on NRP data. The models were estimated and applied in the following order: (a) an incidence model to determine if an individual had other nonrefundable credits; and (b) a regression model to impute the amount. Variation was applied to the regression estimate using the mean squared error and a random normal draw. Only tax units who had tentative tax were eligible for the other nonrefundable credit imputation.

1.2.5 Calculating Tax and Balance Due

Based on these imputed and calculated amounts of income, credits, and deductions, we estimated the net tax due for each tax unit, and subtracted from this any prepayments (such as withholding) and estimated refundable credits.

Prepayments and Refundable Credits

We estimated prepayments and refundable credits in the aggregate using the ratio of each aggregate amount to the aggregate total amount of tax among the population of later late filers and the not-filers in the Administrative Data Method. This population corresponds to the population of not-filers in the matched Census-IRS dataset. This is especially important because IRS administrative data indicate that the ratio of these amounts to tax liability appears to be determined jointly with filing behavior¹¹ and because we have no way of knowing which

¹¹ For example, the ratio of prepayments is much larger among early late filers than it is among the later late filers, and it is much larger among the later late filers than it is among not-filers.

not-filer "returns" in the matched Census-IRS dataset were actually filed after December 31 of the primary filing year.

Contribution to the Tax Gap

The resulting average estimates for not-filers for Tax Years 2008 through 2010 are summarized in Table 2, with their contribution to the combined income tax and self-employment tax gap amounting to just over \$26 billion.

Key Items	Amount	
Total income	\$421.4	
Total adjustments that offset income*	\$9.8	
Total personal and dependent exemptions that offset income*	\$45.2	
Total deductions that offset income*	\$88.5	
Total taxable income	\$278.0	
Tentative tax	\$48.7	
Tax offset by nonrefundable credits*	\$2.1	
Self-employment tax	\$8.6	
Net tax due	\$55.2	
Tax offset by prepayments*	\$26.2	
Tax offset by refundable credits*	\$2.6	
Total payments of tax	\$28.8	
Total contribution to the nonfiling gap	\$26.4	

TABLE 2. Census Method Estimates of the Not-Filer Gap (\$ in Billions), Tax Years $2008-2010^{\dagger}$

† Estimates averaged over Tax Years 2008 through 2010.

* Income (and tax) offsets were limited to the amount needed to reduce income (or tax) to zero.

1.3 Imputing Tax Benefits to Not-Filers

The tax gap is a fairly simple concept to understand, but it's not so simple to define operationally. The complication arises from the fact that the Internal Revenue Code doesn't define "true tax liability." One reason for this may be that the tax liability imposed by the Code depends on taxpayer choices; taxpayers are *required* by the law to report their income, but they are *not required* to claim all the tax benefits¹² for which they are eligible.¹³ Perhaps the simplest example of this is the election to claim the standard deduction in lieu of itemizing. Some taxpayers avoid itemizing for rational reasons (e.g., to avoid the recordkeeping and filing burden, or to avoid disclosing information to the government or to an estranged spouse)—even if they could lower their tax liability by itemizing. So, what is "true tax liability" in that case? Should we estimate unclaimed itemized deductions (and the corresponding reduction in tax) when estimating the tax gap? We have never done so in the past (except to the extent that the TCMP or NRP data include cases in which some taxpayers become itemizers as a result of the audit). Other taxpayers undoubtedly choose not to claim other benefits (such as credits) because of the effort (and/or out-of-pocket cost) it would take to determine how much, if any, they could legitimately claim, or due to fear that claiming such items would subject them to a higher probability of audit.

This is an even bigger issue when estimating the nonfiling gap, since not-filers—by definition—didn't claim *any* tax benefits. Should we define their "true tax liability" by assigning them assumed offsets to income that they haven't claimed? Should we determine their timely payments as including credits that they haven't claimed?

The nonfiling gap estimates presented in Tables 1 and 2 reflect the imputation of straightforward exemptions, adjustments, deductions, and credits. These imputations are based on the auditor-corrected amounts

¹² We use the term "tax benefits" in a fairly broad sense to include all opportunities allowed by the Tax Code to reduce one's taxable income or tax. Perhaps we can think of them as tax expenditures that are subject to taxpayer choice.

¹³ It uses terms like "may claim" and "allowed."

among the random sample of filers included in the National Research Program for the same year.¹⁴ However, if we didn't impute *any* benefits that involve a choice on the part of the taxpayer, we estimate that the gap would be on the order of \$5 billion (which is 17 percent) larger.¹⁵

2. Late Filers

In addition to not-filers, who don't file a tax return at all, late filers also make a significant contribution to the nonfiling gap since they have a lot of unpaid tax, but did not meet the filing deadline. As in the case of notfilers, however, they do not contribute to the tax gap to the extent that they pay their tax liability on time, such as through withholding and tax credits. Unlike not-filers, of course, we have tax returns for the late filers, so estimating their contribution to the gap is much more straightforward. On the surface, the gap is their aggregate balance due. However, we adjust this amount to take into account income and payments that are not reported on the late returns, but are reported to the IRS on third-party information documents.¹⁶ All of the data needed to estimate the nonfiling gap due to late filers is present in IRS administrative data, and we estimate it from multiple large samples drawn from population data (to mitigate the effects of data errors). Our estimates are provided in Table 3. The reason there are separate estimates for the Census Method and the Administrative Data Method is that the matched Census-IRS data include late returns filed by December 31 of the ordinary filing year, but they do not allow us to identify which returns were filed on time. We could have estimated this, but it's easier to treat all filed returns in the matched data as timely. However, that means that the later late filers (those who file after the IRS extract provided to Census¹⁷) appear as "not-filers" in the matched dataset, causing us to overstate the true not-filer portion of the gap. To avoid double-counting, we need to add only the *early* late filers to the Census Method estimate of not-filers. So, the total nonfiling gap is still the sum of the not-filer and late filer portions. See Figure 1. As shown in Table 3, the gap due to early late filers is less than half of the full amount associated with late filers. The difference between the two sets of estimates is due to those who file after December 31, and most of the dollars on those are identified through enforcement.

Key Items	Census Method (Early Late Filers)	Administrative Data Method (All Late Filers)
Total income	\$183.2	\$375.4
Total adjustments that offset income*	\$3.3	\$6.5
Total exemptions that offset income*	\$17.9	\$40.0
Total deductions that offset income*	\$42.1	\$86.8
Total taxable income	\$119.9	\$242.2
Tentative tax	\$25.3	\$48.8
Tax offset by nonrefundable credits*	\$1.4	\$2.6
Self-employment tax	\$1.5	\$4.0
Net tax due †	\$25.6	\$50.7
Tax offset by prepayments*	\$18.9	\$35.1
Tax offset by refundable credits*	\$2.3	\$4.3
Total payments of tax	\$21.3	\$39.4
Total contribution to the nonfiling gap	\$4.4	\$11.3

TABLE 3. Tax Gap Due to Late Filers (\$ in Billions), Tax Years 2008–2010§

§ As of November 2015; estimates averaged over Tax Years 2008 through 2010.

* Income (and tax) offsets were limited to the amount needed to reduce income (or tax) to zero.

† Includes other miscellaneous taxes reported.

¹⁴ Since many taxpayers overstate the amount of elective benefits to which they are entitled, basing these imputations on the amounts claimed by filers would project to not-filers the same degree of overstatements. The NRP audits correct both overstatements and understatements, but the overall net effect is to reduce most elective benefits.

¹⁵ This assumes that "true tax liability" for not-filers is always based only on the standard deduction, personal (not dependent) exemptions, and the adjustment for self-employment tax (but no other statutory adjustments), and that payments against that liability exclude credits since none were claimed. It also makes the same filing status assumptions reflected in Tables 1 and 2 since the Tax Code determines filing status based on a person's characteristics rather than his choice of status.

¹⁶ We do not impute other kinds of income to them (such as from self-employment). However, late filers already report a significant amount of these kinds of income.

¹⁷ That extract is created during the last posting cycle of the calendar year for filing, generally around December 31.



FIGURE 1. The Role of Late Filers in the Census Method

Since we observe fairly complete information about late filers, we can analyze how their portion of the nonfiling gap is distributed across various income categories as well as by the extent of lateness. As documented in Table 4, in Tax Years 2008 through 2010, low-income late filers (those with total incomes of less than \$25,000) account for \$0.7 billion (or 5.8 percent) of the late filer portion of the nonfiler gap. In contrast, high-income late filers (those with total incomes of \$200,000 or more) account for \$4.8 billion (or 42.3 percent) of the late filer portion of the nonfiler gap among lower-to-middle-income taxpayers (those with less than \$100,000 of total income) is associated with returns that are filed over 12 months late, while for high-income late filers (those with \$100,000 or more of total income), this is just 28 percent. Indeed, a large share of the late filing gap among high-income late filers is associated with returns that are filed less than 3 months late.

While it is true that we observe substantially complete information about late filers, this is true only after sufficient time has passed for most of the late filers to file. Some of them file in response to IRS enforcement actions, which can take place years after the filing deadline has passed. This means that we have less complete information about late filers for more recent tax years than we have for much older tax years. As Table 4 indicates, 36 percent of the late filing gap is associated with returns that are filed over 12 months late. This lag means that any estimate of the nonfiling gap based solely on data compiled shortly after the close of the filing year will need to include an estimate of the gap due to later filers, while much later estimates can take advantage of their actual late returns.

Total Income		Extent o	Row	Share of			
Total Income	< 3	3 to < 6	6 to < 9	9 to < 12	12 +	Total	Total
		Contribution	n to the Nonfi	iling Gap (\$B)			
< \$25,000	0.09	0.08	0.07	0.07	0.35	0.66	5.8%
\$25,000 to < \$50,000	0.17	0.17	0.15	0.14	0.67	1.30	11.5%
\$50,000 to < \$100,000	0.34	0.32	0.29	0.25	1.02	2.23	19.7%
\$100,000 to < \$200,000	0.43	0.38	0.35	0.27	0.91	2.34	20.7%
\$200,000 or more	1.69	0.84	0.72	0.45	1.09	4.79	42.3%
Column Total	2.72	1.78	1.59	1.17	4.05	11.31	100.0%
		Sh	are of Row T	otal			
< \$25,000	13.0%	12.5%	10.7%	10.0%	53.8%	100.0%	
\$25,000 to < \$50,000	13.5%	12.9%	11.4%	10.5%	51.7%	100.0%	Heavily
\$50,000 to < \$100,000	15.4%	14.4%	13.2%	11.2%	45.8%	100.0%	months
\$100,000 to < \$200,000	18.3%	16.1%	15.0%	11.5%	39.1%	100.0%	monulo
\$200,000 or more	35.3%	17.5%	15.1%	9.4%	22.7%	100.0%	Earlier
Column Total	24.1%	15.8%	14.0%	10.4%	35.8%	100.0%	
Average Contribution to the Gap Per Late Return (\$)							
< \$25,000	683	800	863	799	839	808	
\$25,000 to < \$50,000	1,604	1,932	2,109	1,896	1,984	1,920	
\$50,000 to < \$100,000	3,213	3,806	4,005	3,893	4,065	3,844	
\$100,000 to < \$200,000	7,390	8,621	8,664	8,492	9,579	8,687	
\$200,000 or more	59,430	43,311	41,556	39,727	42,621	46,941	
Column Total	6,374	5,302	5,604	4,477	3,576	4,635	

TABLE 4. Average Nonfiling Gap and Share of Returns Among Late Filers by Total Income and Extent of Lateness, Tax Years 2008 to $2010^{\$}$

 * Number of months between official (extended) return due date and the filing date.

 $\$ As of November 2015. Cells with bold borders are the largest ones in each row.

2.1 Method for Incorporating Third-Party Information for Late Filers

Like filers, some late filers do not report amounts consistent with the information reported on their behalf by third parties. We accounted for this for each late filer using the logic summarized in Table 5 for each line item on the return.

After accounting for additional income using the logic presented in Table 5, we recalculated tax and the balance due for each return. We assumed that the total of all withholding for a given taxpayer that was documented by third parties on information returns was not more accurate than the amount reported by the taxpayer on his or her Form 1040.

2.2 Method for Handling Outliers in Population Data

A sampling method was applied to the late filer estimates in order to minimize the impact of administrative transcription errors and other outlier data issues that exist in the raw administrative data. The sampling method consisted of tabulating results for 100 to 125 one percent samples. The samples were ordered by aggregate balance due, and the middle 10 were selected and averaged to create our final estimates.

	Form	Line	Item	Adjustment Logic
А	1040	7	Wages	
В	W-2	1	Wages	$L = L = M_{2} \times I/D = L = C \cdot (1 + 1 + H + E) = 0$
С	W-2	8	Allocated tips	• If A>0 and (B+C)>0 and GIC>0 and -150<(B+C+I -GIC)<150
D	Schedule C	1	Gross receipts	then:
E	Schedule C	2	Returns & allowances	Wages = (B+C) and
F	Schedule C	4	Cost of goods sold	Schedule C net income = Max[K-(B+C), 0]
G	Schedule C	6	Other income	• Else, if A>0 and (B+C)>0 and GIC=0 and -150<(A-(B+C))<150,
Н	Schedule C	28	Total expenses	Wages = Max[A-I (B+C) 0] and
Ι	Schedule C	30	Business use of home	Schedule C net income = L
J	Schedule C	31	Net profit (loss)	• Else:
К	1040	12	Schedule C net income	Wages = Max[A, $(B+C)$, 0] and
L	1099 MISC	7	Non-employee compensation	Schedule C het income = Max[K, (L-GiC)+K]
М	1040	8a	Taxable interest	
Ν	1099-INT	1	Interest income	
_	4000 INIT		Interest on savings	
0	1099-IN I	3	bonds	Interest income = Max[M, (N+O+P+Q+R)]
Р	K-1 (1041)	1	Interest income	
Q	K-1 (1120S)	4	Interest income	
R	K-1 (1065)	5	Interest income	
S	1040	9a	Ordinary dividends	
Т	1099-DIV	1a	Ordinary dividends	
U	K-1 (1041)	2a	Ordinary dividends	Ordinary taxable dividends = Max[S, (T+U+V+W)]
V	K-1 (1120S)	5a	Ordinary dividends	
W	K-1 (1065)	6a	Ordinary dividends	
Х	1040	9b	Qualified dividends	Qualified dividends = Min[X, Y]
Y	1099-DIV	1b	Qualified dividends	(The qualified dividends amounts from the Forms K-1 are not in our data.)
Z	1040	10	State tax refunds	
AA	1099-G	2	State tax refunds	State tax refund = Max[Z, Min[AA, AB]]
AB	Schedule A	5	Prior year deduction for S&L income taxes	
AC	1040	13	Capital gain (loss)	
AD	1099-DIV	2a	Cap. gain distribution	
AE	K-1 (1041)	3	Net ST cap. gain (loss)	
AF	K-1 (1041)	4a	Net LT cap. gain (loss)	IRFCG - (ADTAETAFTAGTAFTAITAJ)
AG	K-1 (1120S)	7	Net ST cap. gain (loss)	Capital gain = Max[AC, IRPCG]
AH	K-1 (1120S)	8a	Net LT cap. gain (loss)	
AI	K-1 (1065)	8	Net ST cap. gain (loss)	
AJ	K-1 (1065)	9a	Net LT cap. gain (loss)	
AK	1040	15a	IRA distributions	IRA and pension income combined to account for
AL	1040	15b	Taxable IRA distrib'n	misclassification.
AM	1040	16a	Pensions & annuities	If AM=0, then AM=AN
AN	1040	16b	Taxable pension, annuity	IRA + Pension income = Max[(AL+AN), (AO-AK+AL),
AO	5498	3	Roth conversion amount	(AP-AM+AN)]
AP	1099-R	2a	Taxable pension	AP=0 (to avoid double-counting pension income)
AQ	1040	18	Farm income or loss	
AR	1099-G	7	Agricultural subsidy	Farm income = Max[AQ, (Max[AR.0] + Max[AS.0]]
AS	1099-MISC	10	Crop insurance proceeds	
AT	1040	19	Unemployment comp.	Linemployment compensation = MaxIAT ALI
AU	1099-G	1	Unemployment comp.	

TABLE 5. Logic for Using Information Return Data To Adjust Items Reported on Late Returns

Table continued on next page.

	Form	Line	Item	Adjustment Logic
AV	1040	20a	Social Security benefits	Operiol Operative lange 6th Mars 6AV ANAD
AW	1099-SSA	3	SS benefits	Social Security benefits = Max[AV, AVV]
AX	1040	21	Other income	Line21Calc = AY+AZ+BA
AY	W-2G	1	Gross winnings	If (AX<0 and Line21Calc=0) or (Schedule C net income \neq 0) or
AZ	1099-C	2	Amt. of debt cancelled	(Farm income ≠ 0), then: Other income = AX;
BA	1099-G	5	ATAA payment	Else: Other income = Max[AX, Line21Calc]
BB	1040	17	Schedule E net income	
BC	Schedule E	23c	Total rents received	
BD	Schedule E	23d	Total royalties received	
BE	Schedule E	29a (g)	Passive income from partnership or S corp.	
BF	Schedule E	29a (j)	Non-passive inc. from partnership or S corp.	
BG	Schedule E	30	Passive + non-passive inc. from partn. or S corp.	
BH	Schedule E	35	Estate & trust income	
BI	Schedule E	40	Farm rental net income	
BJ	Schedule E	41	REMIC net income	If BB > GrossE, then GrossE = BB
BK	K-1 (1065)	1	Ordinary business inc.	
BL	K-1 (1065)	2	Net rental real estate inc.	Note: Any negative amount from any of the following compo- nents is set to zero:
BM	K-1 (1065)	3	Other net rental income	Line17Calc = BK+BL+BM+BN+BO+BP+BQ+BR+BS+BT+BU+B
BN	K-1 (1065)	4	Guaranteed payments	V+BW+BX+BY
BO	K-1 (1065)	7	Royalties	Schedule E net profit (loss) = MaxIBB_BB + (Line17Calc
BP	K-1 (1041)	5	Other portfolio income	– GrossE)]
BQ	K-1 (1041)	6	Ordinary business inc.	
BR	K-1 (1041)	7	Net rental real estate inc.	
BS	K-1 (1041)	8	Other rental income	
BT	K-1 (1120S)	1	Ordinary business inc.	
BU	K-1 (1120S)	2	Net rental real estate inc.	
BV	K-1 (1120S)	3	Other rental income	
BW	K-1 (1120S)	6	Royalties	
BX	1099-MISC	1	Rents	
BY	1099-MISC	2	Royalties	
BZ	1040	64	Tax withheld	
CA	1040	65	Estimated tax payments	
CB	W-2	2	Income tax withheld	
CC	W-2G	2	Income tax withheld	
CD	K-1 (1120S)	13(Q)	Backup withholding	
CE	1099-B	4	Income tax withheld	
CF	1099-SSA	6	Income tax withheld	Iotal withholding = CB+CC+CD+CE+CF+CG+CH+CI+CJ+CK+
CG	1099-RRB	10	Income tax withheld	
СН	1099-G	4	Income tax withheld	Total prepayments = Total withholding + CA
CI	1099-DIV	4	Income tax withheld	-
CJ	1099-INT	4	Income tax withheld	
CK	1099-MISC	4	Income tax withheld	
CL	1099-OID	4	Income tax withheld	
CM	1099-PATR	4	Income tax withheld	
CN	1099-R	4	Income tax withheld	

 TABLE 5. Logic for Using Information Return Data To Adjust Items Reported on Late

 Returns—Continued

3. Nonfiling Gap Estimates

Our overall estimates of the individual income tax nonfiling gap, averaged over Tax Years 2008 through 2010, are provided in Table 6—adding the gap associated with late filers and not-filers. We average the estimates over the TY2008–2010 period to arrive at an estimate that is comparable to the underreporting gap estimates. We also average the estimates derived from the Census Method and the Administrative Data Method since each method has its own strengths and weaknesses. In particular, the Census Method benefits from much richer demographic microdata on family composition, but it is based on a sample of individuals and families, and has weaker information on incomes, which forced us to rely on imperfect imputations of many income types based on IRS data. In contrast, the Administrative Data Method takes advantage of population data and much stronger data on income from third-party information returns, but it relies on a very rough assignment of not-filers into tax units as primary taxpayers, spouses, and dependents, guided by Census tabulations. Since there are multiple—but different—approximations employed in the two methods, averaging the estimates produced by them may result in a better estimate than either of the two methods produces by itself.

	TY 2005	Average 2008–2010
Final Nonfiling Gap Estimate*		29.8
Census Method		30.8
Not-Filers		26.4
Late Filers		4.4
Administrative Data Method	24.7	28.9
Not-Filers	13.6	17.6
Late Filers	11.1	11.3
Administrative Sample Method	25.0	
Not-Filers	13.0	
Late Filers	12.0	

TABLE 6. Individual Income Tax and Self-Employment Tax Nonfiling GapEstimates (\$ in Billions)

* The portion of this attributable to self-employment tax is \$3.8 billion, assuming that payments are allocated to income tax and self-employment tax proportional to the magnitude of tax liability.

Table 6 also compares our estimates for Tax Year 2005 using the Administrative Data Method (which is based on population microdata) vs. the Administrative Sample Method, which was the basis for the Tax Year 2006 nonfiling gap estimate. Although one might expect the Administrative Data Method to produce a larger estimate (since, in contrast with the Administrative Sample Method, it includes imputations of self-employment income), the estimate for late filers is somewhat smaller and the estimate for not-filers is only slightly larger than were estimated using the Administrative Sample Method. There are two primary reasons for this: (1) the Administrative Sample Method was based on one simple sample of individuals from the overall population, taking as correct even the outlier values in the information document data, while the Administrative Data Method is based on a multi-step process to mitigate against the records with implausibly high dollar amounts; and (2) the Administrative Data Method excludes individuals with overseas addresses (in part to get closer to the population represented in the Census data), while the Administrative Data Method because we didn't impute self-employment income to late filers. In any case, the growth in the nonfiling gap, as estimated by both methods, appears to be due to growth in the population and the economy (and possibly changes in taxpayer behavior), but not to the change in methodology.

In Figure 2 we compare Administrative Data Method estimates of the not-filer portion of the nonfiler tax gap for Tax Year 2010 using three different sets of assumptions about family unit construction and three different levels of imputations. Assuming all not-filers are single results in larger estimates of this gap than the approach followed in making the tax gap estimate—a random allocation guided by CPS demographics—as

well as an approach that uses prior year and subsequent year tax return information and CPS demographics to construct tax units. At each level of imputation, the more informed method for building family units leads to a slightly lower estimate. In addition, as would be expected, for each method of building tax units the largest tax gap estimates results when self-employment income is imputed but adjustments, deductions and credits are not. The lowest estimates occur when neither self-employment income nor adjustments, deductions, and credits are imputed.





4. Comparing the Census Method and the Administrative Data Method

It is helpful to have two methods to estimate the same concept. Each has its own strengths and weaknesses, which we discuss below. Our decision to average the two nonfiling gap estimates produced by these methods is admittedly a judgment call, recognizing the strengths and weaknesses of each. In the absence of an objective way to quantify (or weight) those strengths and weaknesses, we believe that averaging them is warranted—particularly since the estimates are quite close anyway.

Table 7 compares the two sets of estimates at the line-item level. The Administrative Data Method identifies slightly more nonfilers, but slightly less Total Income, Total Tax, and nonfiling gap among them. Wages in the Census are slightly greater than in the administrative data, which suggests that Census respondents may be characterizing certain other income types as wages. More dividends and pension income is imputed to the Census records than appears in the administrative data for the nonfilers. In the case of pensions, the inability to distinguish taxable IRAs from pensions in the Census data may contribute to the difference. The Census Method results in close to \$13 billion more income than the Administrative Data Method, an amount that was very similar to the difference in wage income. We also estimate a much larger aggregate deduction amount in the Administrative Data Method, possibly reflecting the presence of standard deductions among its slightly larger population of nonfilers. Nonetheless, the Total Tax and nonfiling gap estimates are quite close between the two methods, illustrating the benefit of estimating the gap both ways.

Key Items	Administrative Data Method	Census Method	\$ Difference	% Difference
Number of required returns (millions)	14.2	14.0	0.2	1.7%
Wages	\$356.2	\$368.8	-\$12.6	-3.5%
Interest	\$11.5	\$13.2	-\$1.7	-14.9%
Dividends	\$10.9	\$29.8	-\$18.8	-171.9%
Taxable refunds	\$2.9	\$1.2	\$1.7	58.2%
Alimony received	\$0.5	\$0.7	-\$0.2	-54.9%
Schedule C net income	\$70.2	\$60.7	\$9.5	13.5%
Form 4797 income	-\$2.3	-\$0.6	-\$1.7	74.1%
Schedule D net income	\$18.0	\$9.4	\$8.6	47.9%
Taxable IRA and pension income	\$61.3	\$63.6	-\$2.3	-3.7%
Schedule E net income	\$21.3	\$18.8	\$2.4	11.4%
Schedule F net income	-\$1.0	\$0.4	-\$1.5	142.2%
Unemployment compensation	\$14.1	\$11.9	\$2.2	15.4%
Taxable SSI income	\$12.7	\$12.2	\$0.5	4.2%
Other income	\$3.9	-\$1.1	\$5.0	128.0%
Additional self-employment income **		\$4.9	-\$4.9	
Total income†	\$591.8	\$604.7	-\$12.9	-2.2%
Adjustments that offset income *	\$13.6	\$13.1	\$0.5	3.7%
Deductions that offset income *	\$145.5	\$130.6	\$15.0	10.3%
Exemptions that offset income *	\$67.3	\$63.1	\$4.2	6.2%
Taxable income	\$365.4	\$397.9	-\$32.5	-8.9%
Tentative tax	\$68.8	\$73.9	-\$5.1	-7.4%
Tax offset by nonrefundable credits*	\$3.0	\$3.4	-\$0.4	-12.8%
Self-employment tax	\$10.9	\$10.1	\$0.8	7.5%
Net tax due	\$77.3	\$80.8	-\$3.6	-4.6%
Tax offset by prepayments*	\$43.6	\$45.1	-\$1.5	-3.4%
Tax offset by refundable credits*	\$4.8	\$5.0	-\$0.2	-4.0%
Total payments of tax*	\$48.4	\$50.1	-\$1.7	-3.5%
Total nonfiling gap	\$28.9	\$30.8	-\$1.9	-6.5%

TABLE 7. Comparison of Estimates From the Two Methods: Late Filers and Not-Filers Combined (\$ in Billions), Tax Years 2008–2010[§]

§ Estimates averaged over Tax Years 2008 through 2010.

† The Total Income amount is slightly larger than the sum of the components because Total Income cannot be less than zero on any given return.

* Income (and tax) offsets were limited to the amount needed to reduce income (or tax) to zero.

** The net self-employment income remaining after accounting for net Schedule C and F income in the Census imputations.

5. Characteristics of Nonfilers

In this section we use Tax Year 2010 nonfiler data to examine the types of taxpayers who make up the nonfiler population. In this year, we estimate that not-filers accounted for about 51 percent of all nonfiler required returns and late filers accounted for 49 percent. Of those returns submitted late, about half were filed during the 2011 filing year, while the other half were filed after December 31, 2011. In addition, about 18.8 percent of all late required returns were submitted after the IRS sent a notice reminding the taxpayer of the requirement to file a tax return.

The nonfiling tax gap is concentrated in a relatively small share of the total population of nonfilers. Focusing on Tax Year 2010 data, the top decile of nonfilers is responsible for about 64 percent of the nonfiling tax gap, and the top 20 percent, 78 percent (Table 8). The Tax Year 2010 nonfiling tax gap is estimated by this method to be about \$31 billion spread among taxpayers with a balance due. The mean balance due amount is \$3,819, and the median amount is \$1,023 (Figure 3).

Percentile	Balance Due by Decile, All Nonfilers (\$Billions)	% Share of Balance Due by Decile, All Nonfilers
10	0.0	0.1%
20	0.2	0.5%
30	0.2	0.8%
40	0.4	1.4%
50	0.7	2.2%
60	1.0	3.4%
70	1.5	5.3%
80	2.4	8.2%
90	4.3	14.4%
100	18.7	63.7%

TABLE 8. Nonfiling Tax Gap by Decile, Tax Year 2010

The nonfiling tax gap is computed as the sum of the balance due for all taxpayers with a positive balance due amount. A large number of nonfilers are owed refunds since the sum of their prepayments and refundable credits exceeds their total tax liability. Following the IRS administrative method for Tax Year 2010, we estimate that if all not-filers and late-filers (i.e., taxpayers with a filing requirement) who had a balance due or refund filed a tax return on time, the net increase in revenues would be \$7.4 billion, since \$23.7 billion would be paid out in refunds (Figure 3). The mean refund amount is \$1,279, and the median amount is \$104. Not-filers had a net *balance due* of \$13.8 billion, while late filers were due a net *refund* of \$6.4 billion.



FIGURE 3. Distribution of Balance Due and Refund Amounts Among Nonfilers, TY2010

Consistent with the relative concentration of balance due, the distribution of total income is also highly skewed (Figure 4). Of those with a balance due, the 20 percent with the lowest total income have less than 2.5 percent of the income of all nonfilers. By contrast, the top 20 percent have almost half of total income. Roughly 600,000 nonfilers have more than \$100,000 in total income, while almost 300,000 nonfilers have more than \$150,000 in total income.



FIGURE 4. Distribution of Total Income Among Nonfilers, TY2010

Using the IRS Administrative Data Method nonfiler data, we can examine how the nonfiler tax gap estimate is distributed geographically. Figure 5 shows the relationship between the nonfiler tax gap and the number of required returns contributing to that gap for the nine Census regions. The slope of the line represents the overall average tax gap per required return—about \$2,000. The regions above the line have a larger-thanaverage nonfiling gap per required return, while those below it have a smaller-than-average nonfiling gap per return. In particular, the tax gap per required return is estimated to be fairly large in the South Atlantic and Mid-Atlantic regions, while it is estimated to be relatively small in the West South Central, Mountain, and West North Central regions.

Figure 6 shows the relationship between the total balance due and the total tax of filers and nonfilers. The slope of the line represents the overall average of the nonfiling tax gap as a percent of total tax—about 2.7 percent. Regions above the line, such as the South Atlantic, Pacific, and West South Central regions, are estimated to have larger nonfiling tax gaps as a share of total tax. By contrast, the Mid-Atlantic, East North Central, New England, and West North Central regions are estimated to have smaller nonfiling tax gaps.



FIGURE 5. Nonfiler Tax Gap vs. Nonfiler Returns, TY2010



FIGURE 6. Nonfiler Tax Gap vs. Total Tax of Filers and Nonfilers, TY2010

As discussed above, a significant share of nonfiler returns, both late and not-filed, would be due a refund. Figure 7 shows that the later a return is filed past the filing deadline, the greater is the likelihood that it will have a balance due. Returns that are submitted after receipt of an IRS nonfiler notice are also more likely to have a balance due. The median balance due amount for such enforcement returns is also higher than for returns that are submitted without an enforcement treatment (Figure 8).

FIGURE 7. Percent of Late Required Returns with a Balance Due by Posting Date, Enforcement vs. Non-Enforcement, TY2010





FIGURE 8. Median Balance Due of Late Returns by Posting Date

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Handling Respondent Rounding of Wages Using the IRS and CPS Matched Dataset

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1. Introduction

Every year, the Internal Revenue Service (IRS) collects wage information from employers for services performed by employees. Employers are required to file a W-2 form for each employee from whom income tax, Social Security tax, or Medicare tax was withheld; and for each employee who would have been subject to income tax withholding had he or she not avoided withholding by claiming additional allowances or exemption from withholding (Internal Revenue Service (2010)).

The Current Population Survey (CPS) also collects information on wage income. The CPS, a monthly household survey conducted by the U.S. Census Bureau for the U.S. Bureau of Labor Statistics, is the primary source of monthly labor force statistics and provides information on the economic and social well-being of the population of the United States. The target population is the civilian noninstitutionalized population 16 years of age and older. The CPS March Annual Social and Economic Supplement collects supplemental data on health insurance coverage, previous year's income from all sources, work experience, receipt of noncash benefits, and other topics (U.S. Census Bureau (2012)).

The CPS respondents are asked to report income from various sources. The CPS wage income is calculated from the responses to questions about earnings from an employer of their longest job and any other wage and salary earnings in the previous year. Figure 1 shows a weighted histogram of the 2011 CPS reported total wage income. The survey weights are used to calculate the estimated frequencies of reported total wage income in the histogram bins of [\$0.01-\$1,000], [\$1,000.01-\$2,000], [\$2,000.01-\$3,000], ..., and [\$148,000.01-\$149,000], [\$149,000.01+]. Persons with wages above \$150,000 are topcoded into the highest bin. The estimated frequencies exclude the CPS respondents with imputed wage income. They also exclude CPS respondents who reported no wage income (54 percent of the CPS respondents). Since the CPS wage income is self-reported by respondents, it is subject to measurement errors. In particular, some respondents may round the reported wage to a multiple of \$5,000, \$10,000, or some other "round number." The spikes in the histogram in Figure 1 represent a mixture of true values (some persons in the \$60,000 bin have actual wage income between \$59,000 and \$60,000) and rounded values (e.g., a person with wages of \$57,314 may round that value to \$60,000).



FIGURE 1. Weighted Histogram of CPS Reported Wages in the 2011 CPS March Supplement (Excluding \$0 Wages)

CPS Wage (thousands of dollars)

On the other hand, the histogram for the IRS W-2 wage income of Tax Year 2010 in Figure 2 does not have the same pattern of spikes because the wage income from a W-2 form is unrounded.

FIGURE 2. Histogram of W-2 Wages in the W-2 Population, Tax Year 2010



The populations for the CPS and the IRS data are not the same. The CPS is intended to produce statistics on the U.S. civilian noninstitutionalized population ages 16 and older living in housing units. The IRS W-2 data contain information for everyone with reportable wages, including persons under age 16, in institutions, or outside the United States. The CPS data contain many records for persons not represented in the IRS data because they have no reportable income. Some, but not all, of these persons report zero wages on the CPS.

However, it is possible to match records from the CPS to the IRS data using the unique Protected Identification Key (PIK) assigned to each person by the Census Bureau.¹ Table 1 shows the number of records in the 2011 CPS that were matched vs. not matched to the IRS data (rounded to the nearest 1,000), as well as the number of records with no wage amount reported. Table 1 suggests that the wage distribution of the non-matched cases is quite different from the wage distribution of the matched cases. Matching the two datasets provides an opportunity to check the validity of assumptions pertaining to the CPS data. For this paper, only the wages of the matched respondents were used for the analysis, and our attention is restricted to possible rounding of wages reported on the CPS. We do not consider other types of potential measurement errors.

We thus consider two dataset. The first consists of wage data for all W-2 forms for Tax Year 2010, which we call the W-2 population. No weights are used for estimates from this dataset because it contains the entire population. The second consists of CPS respondents whose records can be linked to a W-2 form, which we call the CPS-IRS matched cases. For the second dataset, the CPS weights are used to calculate histogram frequencies. There are two sources of wage information for the matched cases: the W-2 wage information, and the CPS self-reported wages.

TABLE 1. 2011 CP3 (Tax Teal 2	o io) Responden	is by Fir and wi	atching Statuse	5

CPS respondents	Number of respondents	Percentage (unweighted)	Number of respondents reporting 0 wage	Percentage of respondents reporting 0 wage
Have a PIK	164,000	92%	88,000	53%
PIK matched to IRS	78,000	44%	8,000	10%
PIK not matched to IRS	86,000	48%	80,000	93%
No PIK	15,000	8%	9,000	61%
Total	179,000	100%	97,000	54%

¹ The Census Bureau assigns the PIKs to both Census and IRS data based on name, address, age, and other characteristics. See Jones and O'Hara (2014) and Wagner and Layne (2012).

Many researchers have studied problems of estimating the underlying distribution of unobserved unrounded values when the reported data have heaping in the context of: reporting the number of cigarettes smoked (Heitjan and Rubin (1991)), where some respondents may round to the nearest 20, which is the number of cigarettes in a pack; age (Heitjan and Rubin (1990)), where children's ages may be rounded to a multiple of 6 or 12 months; job-search duration (Torelli and Trivellato (1993)), in which respondents tend to report durations that are a multiple of 12 months; or medical measurements, which may be rounded to the nearest integer (Wright and Bray (2003)). Various methods have been developed for estimating the original distribution of values from rounded data (Riddles and Lohr (2015a,b); Zhang and Heitjan (2007); Drechsler, *et al.* (2015); Zinn and Wurbach (2015)).

The goals of this research are to: (1) find a density to fit the histogram of the W-2 wages from the W-2 population; (2) model the rounding mechanism for the self-reported wage income in the CPS and estimate a smoothed density for the CPS self-reported wages that accounts for the rounding; and (3) compare the distribution of CPS self-reported wages with the distribution of W-2 wages for the matched cases.

In Section 2, we explore the W-2 wage distribution in the W-2 population in order to find a model for the underlying distribution of unrounded wages. We present the distribution of the W-2 wages for the CPS-IRS matched cases in Section 3 and check if the model found in Section 2 also fits the W-2 wages for the CPS-IRS matched cases. Section 4 describes the model for how CPS respondents round and presents the results using the underlying distribution of unrounded wages and the model for the rounding mechanism. Section 5 summarizes the findings.

2. W-2 Wage in the W-2 Population

The W-2 wage income in the Tax Year 2010 W-2 population (N = 150,963,474) was explored to find a model capturing the distribution of W-2 wage income. Only 0.0003 percent of the W-2 population have zero W-2 wage income. W-2 wages of zero were excluded from this analysis. To preserve the confidentiality of records, the information on W-2 wages was summarized by IRS as the frequency distribution shown in Figure 2. The values were categorized in bins of width \$1,000 up to \$150,000 and bins of width \$5,000 for wage income greater than \$150,000 and topcoded at \$300,000. For this analysis, high wages were topcoded at \$150,000.

Let *Y* represent the maximum value of the bin for each value in the W-2 dataset. For example, each point in the first histogram bin, representing W-2 wages in [0.01-1,000], is given a *Y* value of 1,000. The variable *Y* has a discrete distribution, and we are interested in the smooth distribution that would fit the distribution of true wages (before binning), *X*. Assuming a parametric distribution for the true wage income (*X*) of $f(x|\theta)$, the density of *Y* can be written by integrating the density of *X* over each histogram bin, giving

$$g(y | \mathbf{\theta}) = \begin{cases} F(y | \mathbf{\theta}) - F(y - 1,000 | \mathbf{\theta}) & \text{if } y \le 150,000 \\ 1 - F(y - 1,000 | \mathbf{\theta}) & \text{if } y = 150,000, \end{cases}$$

where $y \in \{\$1,000, \$2,000, \dots, \$149,000, \$150,000\}$ and $F(\cdot \mid \theta)$ is the cumulative distribution function of $f(\cdot \mid \theta)$.

We assume that the true wages, X, are from a three component log-normal mixture distribution as follows:

$$f(x|\mathbf{\theta}) = \lambda_1 f_l(x|\mu_1, \sigma_1) + \lambda_2 f_l(x|\mu_2, \sigma_2) + (1 - \lambda_1 - \lambda_2) f_l(x|\mu_3, \sigma_3),$$
(1)

where $\boldsymbol{\theta} = (\lambda_1, \lambda_2, \mu_1, \sigma_1, \mu_2, \sigma_2, \mu_3, \sigma_3)$ and $f_i(\cdot | \mu, \sigma)$ is the probability density function of a lognormal distribution with parameters μ and σ . This model was selected after considering simpler models such as a single lognormal distribution and a two-component lognormal mixture distribution: neither of these was flexible enough to capture the density of W-2 wages between \$10,000 and \$30,000. Throughout this paper, $f(\cdot | \boldsymbol{\theta})$ in (1) is used as the distribution of the underlying "true" wage income. Given the underlying distribution, $f(\cdot | \boldsymbol{\theta})$ in (1), the distribution of *Y* can be rewritten as:

$$g(y|\boldsymbol{\theta}) = \begin{cases} \sum_{j=1}^{3} \lambda_j \left\{ F_l(y|\mu_j, \sigma_j) - F_l(y-1,000|\mu_j, \sigma_j) \right\} & \text{if } y \le 150,000 \\ \sum_{j=1}^{3} \lambda_j \left\{ 1 - F_l(y-1,000|\mu_j, \sigma_j) \right\} & \text{if } y = 150,000, \end{cases}$$
(2)

where $\lambda_3 = 1 - \lambda_1 - \lambda_2$ and $F_l(\cdot | \mu, \sigma)$ is the cumulative distribution function of a lognormal distribution with parameters μ and σ . The maximum likelihood estimates for $\boldsymbol{\theta}$ are found using computational methods described in Riddles and Lohr (2015a). The parameter estimates for all models are given in Table 2 in Section 5. Figure 3 presents the distribution of the W-2 wages in the Tax Year 2010 W-2 population with the fitted lognormal mixture distribution and its three estimated mixture components. This suggests that the distribution in (1), $f(\cdot | \boldsymbol{\theta})$ fits the W-2 wage population distribution very well.

FIGURE 3. Histogram of W-2 Wages in W-2 Population, With Fitted Lognormal Mixture Distribution and Its Three Mixture Components, Tax Year 2010



3. W-2 Wages for the CPS-IRS Matched Cases

In this section, we use the model described in Section 2 to estimate the distribution of W-2 wages for the CPS-IRS matched cases (n = 78,199). Note that the CPS weights are incorporated in the analysis in this section, because the binned frequencies are calculated using the weights. Although the weighted distribution (Figure 4) is not as smooth as the distribution in the Tax Year 2010 W-2 population (Figure 3), the two distributions appear similar. The distribution $g(y|\theta)$ in (1) is fitted for this dataset by finding the maximum likelihood estimates of θ . Figure 4 presents the distribution of the W-2 wages for the matched cases with the fitted lognormal mixture distribution and its three mixture components. The parameter estimates differ slightly from those for the entire W-2 population, but Figure 4 shows that the general form of the three-component lognormal mixture model also fits the W-2 wage distribution for the CPS-IRS matched cases.

FIGURE 4. Weighted Histogram of W-2 Wages Among CPS-IRS Matched Cases, With Fitted Lognormal Mixture Distribution and Its Three Mixture Components, Tax Year 2010 (March 2011 CPS Supplement)



4. CPS Reported Wages for CPS-IRS Matched Cases

Not surprisingly, the distribution of CPS reported wages for CPS-IRS matched cases is not smooth and its weighted histogram (Figure 5) shows heaping at multiples of \$5,000, \$10,000, and \$50,000. Also, some heaping at \$12,000 and \$18,000 is present; perhaps this is from persons who round their monthly income to the nearest \$1,000 or \$1,500. In order to take into account heaping at multiples of \$5,000, \$6,000, \$10,000, and \$50,000 in the CPS reported wages, we specify a rounding mechanism as follows:

$$G = \begin{cases} 0 & \text{if rounded to nearest } b_0 = 1,000 \\ 1 & \text{if rounded to nearest } b_1 = 5,000 \\ 2 & \text{if rounded to nearest } b_2 = 6,000 \\ 3 & \text{if rounded to nearest } b_3 = 10,000 \\ 4 & \text{if rounded to nearest } b = 50,000. \end{cases}$$

Using the methodology developed in Riddles and Lohr (2015a), we assume that heaping is caused only by rounding, and the rounding mechanism, G, depends on the true value, X, with a nonproportional odds cumulative logit model as follows:

$$\begin{aligned} \pi_0(x \mid \boldsymbol{\gamma}) &= \frac{1}{1 + \exp(\gamma_1 + \gamma_2 x)}, \\ \pi_1(x \mid \boldsymbol{\gamma}) &= \frac{\exp(\gamma_1 + \gamma_2 x)}{1 + \exp(\gamma_1 + \gamma_2 x)} - \frac{\exp(\gamma_3 + \gamma_4 x)}{1 + \exp(\gamma_3 + \gamma_4 x)}, \\ \pi_2(x \mid \boldsymbol{\gamma}) &= \frac{\exp(\gamma_3 + \gamma_4 x)}{1 + \exp(\gamma_3 + \gamma_4 x)} - \frac{\exp(\gamma_5 + \gamma_6 x)}{1 + \exp(\gamma_5 + \gamma_6 x)}, \\ \pi_3(x \mid \boldsymbol{\gamma}) &= \frac{\exp(\gamma_5 + \gamma_6 x)}{1 + \exp(\gamma_5 + \gamma_6 x)} - \frac{\exp(\gamma_7 + \gamma_8 x)}{1 + \exp(\gamma_7 + \gamma_8 x)}, \end{aligned}$$

and

$$\pi_4(x \mid \boldsymbol{\gamma}) = \frac{\exp(\gamma_7 + \gamma_8 x)}{1 + \exp(\gamma_7 + \gamma_8 x)}$$

where $\pi_g(x | \gamma) = P(G = g | x, \gamma)$.

The goal of this section is to estimate the underlying (unrounded) distribution of CPS-reported wages, when only the reported rounded values are available in the data. We assume that the underlying distribution of the true values, X, can be fit by a mixture of three lognormal density functions of the form in equation (1). We also assume that the value reported by a respondent, Z, is obtained because the respondent uses one of the possible rounding mechanisms on the true value, X. This results in a density for the reported values, Z, that depends on the parameters $\boldsymbol{\theta}$ from the assumed density of the true values, $f(x | \boldsymbol{\theta})$, and also depends on parameters used to estimate the rounding mechanism, $\gamma = (\gamma_1, \gamma_2, ..., \gamma_8)$, as follows:

$$h(z \mid \boldsymbol{\gamma}, \boldsymbol{\theta}) = \begin{cases} \sum_{g=0}^{4} \int_{z-b_g/2}^{z+b_g/2} \pi_g(t \mid \boldsymbol{\gamma}) f(t \mid \boldsymbol{\theta}) dt & \text{if } z = 0 \\ \sum_{g=0}^{4} I_g(z) \int_{z-b_g/2}^{z+b_g/2} \pi_g(t \mid \boldsymbol{\gamma}) f(t \mid \boldsymbol{\theta}) dt & \text{if } 0 < z \le 150,000, \\ \sum_{g=0}^{4} \int_{z-b_g/2}^{\infty} \pi_g(t \mid \boldsymbol{\gamma}) f(t \mid \boldsymbol{\theta}) dt & \text{if } z = 150,000, \end{cases}$$

where $f(\cdot | \mathbf{\theta})$ is defined in (1) and $I_g(z)$ is equal to 1 if z is a multiple of b_g and 0 otherwise.

Figure 5 shows the fitted distribution for $h(\cdot | \gamma, \boldsymbol{\theta})$ using the maximum likelihood estimate of $(\gamma, \boldsymbol{\theta})$. This is the estimated distribution of the rounded, self-reported values. Figure 5 suggests that the assumed model $h(\cdot | \gamma, \boldsymbol{\theta})$ fits the distribution of the CPS-reported wages well and captures heaping at multiples of \$5,000, \$6,000, \$10,000, and \$50,000.

Figure 6 shows the estimated density of the unrounded values for the CPS wages, superimposed on the histogram. The assumed rounding mechanism smooths out the spikes in the histogram, allowing comparison of the estimated density with the density fit to the W-2 wages.

FIGURE 5. Weighted Histogram of CPS Reported Wages Among CPS-IRS Matched Cases, With Fitted Distribution, Tax Year 2010 (March 2011 CPS Supplement)






5. Summary

Table 2 presents the three sets of parameter estimates for **0** in the underlying distribution, $f(x | \mathbf{0})$. The parameter estimates are very similar but not identical across the three sets (from W-2 wages in the W-2 population, W-2 wages for the CPS-IRS matched cases, and CPS reported wages for the matched cases). All of these estimated distributions have three lognormal components, as in equation (1). Note that a lognormal distribution has mean $\exp(\mu + \sigma^2/2)$, median $\exp(\mu)$, and mode $\exp(\mu - \sigma^2)$, and this allows us to identify the components of the mixture distributions on the graphs. For the W-2 wage population data, the first component has $\mu = 8.1$ and $\sigma = 1.762$ and corresponds to the blue line in Figure 3, accounting for approximately 21 percent of the total density. The second component, with $\mu = 10.043$ and $\sigma = 1.073$, corresponds to the pink line in Figure 3 and accounts for approximately 45 percent of the total density. The third component, with $\mu = 10.619$ and $\sigma = 0.54$, corresponds to the green line in Figure 3 and accounts for the remaining approximately 34 percent of the density. These are empirical mixtures, designed to fit the empirical data distribution, and they do not correspond to specific subpopulations.

TABLE 2. Parameter Estimates for θ Using W-2 Wages in the W-2 Population, W-2 Wages for CPS-IRS Matched Cases, and CPS Reported Wages for CPS-IRS Matched Cases, Tax Year 2010 (March 2011 CPS Supplement)

	Wage:	W-2 wage	W-2 wage	CPS wage
	Source:	W-2 population	CPS-IRS matched	CPS-IRS matched
Parameters	$\lambda_{_1}$	0.210	0.197	0.197
	λ_2	0.452	0.409	0.409
	λ_3	0.338	0.394	0.394
	μ_1	8.100	8.140	8.144
	σ ₁	1.762	1.792	1.928
	μ2	10.043	10.506	10.407
	σ2	1.073	1.086	1.121
	μ3	10.619	10.616	10.616
	σ_3	0.540	0.542	0.544

The distribution for W-2 wages was estimated using the three sets of parameter estimates in Table 2: (1) using the W-2 wages in the Tax Year 2010 W-2 population from Section 2; (2) using the W-2 wages for the matched cases from Section 3; and (3) using the CPS reported wages for the matched cases from Section 4. Figure 7 shows the distribution of W-2 wage income in the W-2 population with these three estimated distributions. The comparisons of densities show some differences between the estimates of W-2 wages from the W-2 data and the self-reported wage data from the CPS.

To see the effect of these differences on estimated percentiles of wages, we look at the cumulative distribution function (CDF) for each estimate. Figure 8 presents the three estimated CDFs of unrounded wage income: (1) using the W-2 wages in the Tax Year 2010 W-2 population; (2) using the W-2 wages for the matched cases; and (3) using the CPS reported wages for the matched cases. The five horizontal lines in light gray correspond to values of 0.1, 0.25, 0.5, 0.75, and 0.9, respectively. The wage value where the horizontal line meets the estimated CDF is the estimate of the corresponding percentile. For example, the wage values where the horizontal line for 0.5 meets the three estimated CDFs are the three estimated medians.

Figures 7 and 8 consistently show that the two estimated distributions based on W-2 wages are very close to each other, and the estimated distribution based on CPS wages fits the W-2 wages for the matched cases fairly well, but underestimates the density of wages under \$12,000 and overestimates the density of wages of \$150,000 or more. These differences result in differences for the estimated percentiles of the wage distribution. For example, Figure 8 shows that the estimated median wage from the self-reported CPS data is approximately \$4,000 higher than the estimated median wage for the same persons with the W-2 data.

In this paper, we fit a smooth density to the histogram of the W-2 wages from the W-2 population. We then adopted the form of that density for the "true" (before rounding) values in the CPS wage data, and estimated the parameters for that density along with the parameters for the rounding mechanism for the self-reported wage income in the CPS. We have applied a full likelihood-based approach developed in Riddles and Lohr (2015a) to estimate the distribution of unrounded wages using the CPS reported wages with both the model for W-2 wages and the model for the rounding mechanism.

The model smooths out the distribution of the CPS self-reported wages, and allows comparison with the estimated density from the W-2 data. Although the estimated distribution of the CPS self-reported wages is close to that of the W-2 data overall, there are differences that indicate there may be measurement errors that have not been captured by the models. Additional research is needed to investigate sources of differences between the smoothed CPS estimates and the W-2 wage estimates.

FIGURE 7. Histogram of W-2 Wages in W-2 Population, With Estimated Distributions: (1) Using W-2 Wages in W-2 Population (Red); (2) Using W-2 Wages for Matched Cases (Blue); and (3) Using CPS Reported Wages for Matched Cases (Green), Tax Year 2010 (March 2011 CPS Supplement)



FIGURE 8. Estimated Cumulative Distribution Functions of Unrounded Wages: (1) Using W-2 Wages in W-2 Population (Red); (2) Using W-2 Wages for Matched Cases (Blue); and (3) Using CPS Reported Wages for Matched Cases (Green), Tax Year 2010 (March 2011 CPS Supplement)



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∇ Factors Affecting Revenue Estimates of Tax Compliance Proposals

3

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Factors Affecting Revenue Estimates of Tax Compliance Proposals¹

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From 2008 through 2010, the average annual tax gap—the difference between the total amount of Federal taxes that taxpayers should have paid on or before the due date and the amount they actually paid on time—was \$458 billion, according to estimates by the Internal Revenue Service (IRS).² From the perspective of many commentators, closing the tax gap would help reduce the budget deficit, which totaled \$587 billion in Fiscal Year (FY) 2016.

However, savings from compliance initiatives might not reduce the deficit as much as some commentators would hope.³ The effects on both the deficit and the tax gap would be affected by the IRS's ability to implement those initiatives given the agency's available resources and taxpayers' ability to adjust their behavior to continue evading taxes. Some proposals—such as those that would simplify the tax code or establish safe harbors—could increase the deficit even while reducing noncompliance. Budget scorekeeping guidelines also constrain the amount of savings that the Congressional Budget Office (CBO) and the staff of the Joint Committee on Taxation (JCT) include in their estimates of the budgetary effects of compliance initiatives contained in legislative proposals.

Responsibility for estimating the revenue effects of compliance initiatives generally falls to CBO when changes to the IRS's appropriations are being considered and to JCT when proposals involve changes to the Internal Revenue Code. The two agencies often coordinate, in part because of the links between changes to the IRS's authority and its resources.

This paper examines the various factors that affect the two organizations' estimates of the budgetary savings from compliance proposals. Affecting the current law baseline, against which proposed changes are measured, are the size of the tax gap and the amount of IRS resources. Other considerations that affect the revenue estimates for either appropriations proposals or changes to the tax code include the distinction between detection and deterrence, the budget scorekeeping guidelines, and the constraints faced by the IRS when trying to obtain a higher return on investment from new initiatives than from the activities allowed under current law. In addition to those common considerations, there are factors unique to proposals to increase funding and to those that would expand the IRS's enforcement tools allowed under the tax code. Those unique factors are illustrated by two examples: first, the Administration's proposal to increase funding for IRS enforcement actions that was included in its FY 2016 budget submission; and second, legislation enacted in 2016 to reduce identity fraud in the tax system.

Tax Gap

The tax gap includes shortfalls in individual income taxes, corporate income taxes, employment taxes, estate taxes, and excise taxes. The IRS periodically conducts studies to estimate the size of the tax gap. Those studies use data generated by the IRS National Research Program (NRP) and other sources. Findings from the most recent study covered the period from Tax Years (TYs) 2008 through 2010 and were released in April 2016.

¹ This work embodies work undertaken for the staff of the Joint Committee on Taxation, but as members of both parties and both houses of Congress comprise the Joint Committee on Taxation, this work should not be construed to represent the position of any member of the Committee.

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² Internal Revenue Service (2016b)._

³ See, for example, Hanlon (2011).

Size of the Tax Gap

The IRS estimates that the annual gross tax gap, on average, was \$458 billion from 2008 through 2010 (Table 1). In some instances, taxpayers eventually paid some or all of the amounts that they owed to the IRS—either voluntarily but after the due date, or as a result of the IRS's enforcement activities. The annual net tax gap—after accounting for those late payments and enforcement—was \$406 billion, on average. Adjusted for inflation, the gross and net tax gaps were, respectively, \$504 billion and \$447 billion in 2016 dollars.⁴ With total tax liabilities of \$2.5 trillion per year, on average, during that 3-year period, the voluntary compliance rate was 81.7 percent, and the net compliance rate was 83.7 percent.⁵

	Gross Tax Gap			Net Tax Gap		
Tax Year	Current Dollars (Billions)	2016 Dollars (Billions)*	Voluntary Compliance Rate (Percent)	Current Dollars (Billions)	2016 Dollars (Billions)*	Net Compliance Rate (Percent)
2001	345	451	83.7	290	379	86.3
2006	450	526	83.1	385	450	85.5
2008–2010	458	504	81.7	406	447	83.7

TABLE 1. Gross and Net Tax Gap, Selected Years

Source: Internal Revenue Service (2016b), Internal Revenue Service (2007)

* Amounts were adjusted by the authors to 2016 levels using the price index for personal consumption expenditures.

In its analysis, the IRS examined the sources of the gross tax gap by type of tax, by category of error, and by degree of independent verification. The findings were similar to those in past reports:

- The largest source of the tax gap was the individual income tax, followed by employment taxes and the corporate income tax. Those were also the three largest sources of Federal revenues, ranked in the same order of magnitude.
- Underreporting of individual income tax liabilities was the largest component of the tax gap. About 16 percent of the gross tax gap was attributed to unfiled tax returns and underpayment of tax liabilities.
- Compliance was greatest for sources of income—such as wages and salaries—that are reported by employers and other payers to the IRS and for which taxes are also withheld by third parties. Noncompliance was greatest for income—including self-employment income—and tax preferences for which third-party information is not separately reported to the IRS and is very difficult to obtain.

Both gross and net compliance rates fell relative to those in the previous compliance study of TY 2006 tax returns—by 1.4 and 1.8 percentage points, respectively. The two studies were conducted at very different points in the business cycle—near the peak of the cycle for the 2006 study and in the midst of a severe recession during the most recent study—which suggests a relationship between the state of the economy and tax compliance. However, the IRS attributes most of the decline in the estimates of compliance rates to changes in its methodology and inclusion of new tax gap components. As a result, the IRS does not find substantial evidence of an increase in noncompliance. Notably, the compliance rate is little changed from the rate in a similar study of TY 2001 tax returns.

Methodology

Measuring noncompliance presents challenges that the NRP studies cannot fully overcome.⁶ As a result, there probably are errors—in both directions—in the estimation of the tax gap.

⁴ Dollar amounts were adjusted to remove the effects of inflation using the price index for personal consumption expenditures.

⁵ The voluntary compliance rate is the amount of tax voluntarily paid on time divided by total true tax liability. The net compliance rate is the amount of tax paid, after accounting for late payments and enforcement, divided by total true tax liability.

⁶ Brief discussions of the methodology used in the studies are found in Internal Revenue Service (2016a), Internal Revenue Service (2012), Bennett (2006), and Plumley (2006).

Data sources. The IRS researchers used several different types of data to estimate the components of the tax gap. For the major component of the tax gap—underreporting of individual income taxes—the IRS collected information each year from examinations of a random sample of about 13,000 taxpayers under the NRP. The main advantage of a random sample was that it included individuals who would not normally have been selected for a regular IRS audit—thus providing the IRS with more information on compliant taxpayers as well as on noncompliant taxpayers who would not be identified through the existing IRS detection tools.

Some of that advantage, however, was mitigated by the extent of communication with taxpayers. For the most complicated returns (for example, where self-employment income was reported), the IRS conducted a full-scale audit, requiring either an in-office interview or a field audit (possibly at the taxpayer's workplace) with an examiner or revenue agent reviewing most of the return. In many other cases, however, the IRS identified only a few questionable items on the tax return—such as a claim for a tax credit—and sent taxpayers a letter requesting documentation supporting their claim; no office visit was required. In the simplest cases, the IRS compared the taxpayers' returns to information available from third parties and did not contact the taxpayers at all. Varying the degree of taxpayer interaction with the complexity of the return markedly reduced the study's cost to the IRS as well as the burden imposed on taxpayers—especially those who were compliant and who would not typically be selected for an audit.⁷ However, some errors—both overpayments and underpayments—would not have been detected through reliance solely on third-party information and correspondence audits. Relying only on information from third parties, for example, the IRS probably did not observe when taxpayers would have owed less than they paid if they had itemized their deductions rather than used the standard deduction or if they had not claimed tax credits for which they were eligible.

Estimates of other sources of noncompliance were based either on administrative data or the findings of earlier studies. For example, the IRS used administrative data from operational audits to estimate underreporting of corporate income taxes; unlike the examination of individuals, those companies were not selected randomly. Various econometric techniques are used to adjust for the statistical bias resulting from use of a nonrandom sample, but the IRS notes that there is considerable uncertainty about those results because of data limitations. Yet another approach was used to determine underreporting of payroll taxes (other than self-employment income taxes). In the absence of more recent audit data, the IRS applied estimated compliance rates from a study released in 1993 to the reported taxes over the 2008–2010 period. In both of those cases, the findings provide an incomplete picture of current compliance behavior.

Complexity. Some sources of noncompliance are not easily observable because of the complexity of the tax code. For example, income from partnerships and S corporations is passed through to the owners, who are then responsible for paying the taxes owed on that income. To some extent, the IRS can detect underreporting of that income by matching the amounts reported by taxpayers on their tax returns with the totals reported by the business to both taxpayers and the IRS on information returns (K-1s). More challenging is determining the extent to which taxpayers' underreporting of income is a result of receiving erroneous information from the firms.⁸

Tax evasion can also be masked through networks of entities that are linked—either because one taxpayer is the majority owner in each business or because the businesses share common partners or shareholders. Networks can consist of corporations, flow-through firms, sole proprietorships, and tax-exempt entities. The complicated structure of such networks makes it difficult to track income and payments between related entities—especially when IRS researchers focused separately on the different components of the tax system.⁹

⁷ Earlier IRS compliance studies—referred to as the Taxpayer Compliance Measurement Program (TCMP)—were based on comprehensive in-office audits of a random sample of taxpayers. In those audits, taxpayers were required to provide documentation in support of every item on the tax return. The last TCMP examined TY 1988 tax returns. Public opposition to the TCMP grew because of concerns about the burden imposed on taxpayers in the sample. The IRS canceled its plans to conduct another TCMP in 1995. The less burdensome NRP replaced the TCMP, beginning with the TY 2001 study.

⁸ Government Accountability Office (2014b).

⁹ Government Accountability Office (2010).

Auditors' skills. Not all auditors are equal in their ability to detect noncompliance, particularly on each line of the tax form. Some may be hindered by the lack of available information to verify taxpayers' claims. To correct for errors not detected by some auditors, the IRS employs "detection-controlled estimation."¹⁰ An underlying premise of that method is that the best auditors are the ones who identify the greatest amount of noncompliance, and the results of other audits should be adjusted upward to reflect what those superior auditors would have identified if they had conducted the audits themselves. To the extent that some of the auditors with the largest yields are also the most aggressive, however, it is possible that their assessments would be successfully challenged by taxpayers.

Taxpayers' intent. One question unanswered by the NRP was the motives underlying the errors that taxpayers made. The auditors did not probe into the reasons why taxpayers claimed the wrong amounts, although such information could be beneficial in designing strategies to combat noncompliance. For example, simplifying the tax code may be a less costly way to achieve greater compliance than audits, if the source of the error is taxpayer confusion rather than fraudulent intent.

Using data from past compliance studies, some researchers have applied econometric techniques to distinguish between intentional and unintentional errors by claimants of the earned income tax credit (EITC), beginning with the premise that a correlation between the size of the credit and noncompliance suggests errors are intentional. Those studies found that about 30 percent of EITC errors were intentional, with the remaining errors either unintentional or due to other unobserved factors (such as unobserved variations in expected penalties).¹¹ Tax legislation in the 1990s aimed at reducing EITC errors typically combined expansion of IRS enforcement tools with provisions aimed at simplifying the rules applicable to the tax credit.¹²

Taxpayers' disputes with IRS. As a result of an audit, examiners may recommend that taxpayers be assessed additional taxes. But taxpayers can challenge the auditor's recommendation. Over the period from 2008 through 2010, taxpayers disagreed with the IRS on about half of the recommended additional taxes.¹³ To some extent, taxpayers were successful in challenging the IRS and had their assessments reduced. However, because the audits do not detect all errors, the amount ultimately assessed does not reflect the theoretical notion of "true tax liability." Therefore, IRS tax gap estimates are based on the auditors' recommendations—not the final resolution between the IRS and the taxpayer.

IRS Funding

From FY 2001 through FY 2009, funding for the IRS hovered around \$12.2 billion, measured in 2016 dollars (Figure 1). But the relative stability of the tax gap estimates over that period and the IRS's budget is probably a coincidence. The IRS faced different challenges at various points during that period, largely as a consequence of tax legislation enacted in 2001, 2003, 2008, and 2009.¹⁴ For example, the IRS was required to temporarily pay out refundable tax credits within months of passage of tax acts in 2001, 2003, and 2008; no such requirement was in force in the other years for which compliance studies were conducted. Typically, such provisions would not take effect until the year following enactment, giving the IRS more time to develop the systems necessary to support the payment of a new tax credit to millions of taxpayers.

Measured in 2016 dollars, the agency's funding climbed to \$13.2 billion in FY 2010, but by FY 2016, the IRS's appropriations had fallen to \$11.2 billion—15 percent below the 2010 amount. The biggest cutbacks were in enforcement, although that activity still receives the largest share of the IRS's budget: In 2016, more than 40 percent of the funds were allocated to enforcement activities, including investigations, examinations, and collections. About one-third of funding was for operations support, and nearly all of the remaining appropriation financed taxpayer services such as taxpayer assistance programs (Figure 2).

¹⁰ Feinstein (2004).

¹¹ McCubbin (2000) and Liebman (2000).

¹² Holtzblatt and McCubbin (2004).

¹³ Internal Revenue Service Data Book (various years), Table 10.

¹⁴ Public Laws 107–16, 108-27, 110–185, and 111–5.



FIGURE 1. Appropriations for the Internal Revenue Service, FYs 2000–2016

NOTE: Amounts were adjusted to 2016 levels using the price index for personal consumption expenditures.

Without more recent estimates of the tax gap, the relationship between the drop in IRS appropriations and compliance is not observable. With less money, the IRS cut the audit rate (from 0.9 percent in 2010 to 0.7 percent in 2015 for most types of tax returns and from 1.1 percent to 0.8 percent for just individual income tax returns) and answered fewer phone calls from taxpayers seeking help with their tax returns (from 72 million in 2010 to 56 million in 2015).¹⁵ Plus, the IRS picked up more responsibilities following enactment of the Foreign Account Tax Compliance Act (FATCA) and the Affordable Care Act (ACA) in 2010; those included the processing of reports of foreign financial assets under FATCA, the administration of new tax credits for health insurance coverage, and the enforcement of health coverage mandates.¹⁶

As part of its responsibilities for estimating the current-law budget baseline, CBO projects the IRS's budget over the next decade. Funding for all discretionary programs, including the IRS's budget, is set each year by appropriations. CBO does not make any assumptions regarding whether the Congress will continue to cut IRS funding. Section 257 of the Balanced Budget and Emergency Deficit Control Act of 1985 requires CBO to project future funding for discretionary programs solely by applying inflation rates to the most recently enacted appropriations.¹⁷ Under those assumptions, the IRS's total funding is projected to rise to \$15.5 billion (in current dollars) by FY 2026.

Source: Congressional Budget Office

¹⁵ Internal Revenue Service *Data Book* (various years), Table 9a and Table 19.

¹⁶ Beginning in 2013, FATCA (Public Law 111-147) requires certain individuals to report foreign financial assets in excess of specified thresholds. Those thresholds range from \$50,000 for an unmarried filer living in the United States to \$400,000 for a married couple filing a joint return and living abroad. Eventually, some entities will face similar reporting requirements. As a result of the ACA (Public Law 111-148), the IRS is providing tax credits to individuals and small businesses as well as enforcing insurance coverage requirements faced by individuals and large employers.

¹⁷ The law further specifies the type of indexes to be used to adjust for inflation—the employment cost index for personnel costs and the gross domestic product chain-type price index for all other discretionary appropriations.

One challenge in forecasting the IRS's future resources, however, is the caps specified in the Budget Control Act of 2011 for defense and nondefense discretionary budget authority.¹⁸ CBO's projections of total outlays account for the constraints imposed by those caps, including the reductions in the caps that are required under the law's automatic enforcement procedures. Those caps remain at about the 2016 level in both 2017 and 2018 and then rise by about 2.5 percent per year from 2019 through 2021. For years after 2021, total appropriations for programs that are constrained by the caps are assumed to grow with inflation from the amounts projected for 2021. Funding for the IRS is subject to those caps, but CBO does not allocate the effects of the caps to specific programs in its baseline estimates.





Common Considerations for Estimating the Revenue Effects of Compliance Proposals

To a large extent, both CBO and JCT take into account the same considerations when estimating the revenue effects of compliance proposals—whether the proposals would provide more funding or expand the IRS's statutory authority. Those common considerations include the components of compliance savings, the budget scorekeeping guidelines for estimating the budgetary effects of legislative changes, the IRS's goals for tax enforcement, and the constraints the agency faces.

Components of Compliance Savings

Compliance effects of legislative proposals are divided into two components: the detection of erroneous items on tax returns and the deterrence of noncompliant behavior. The two are related: greater detection of noncompliant behavior will, to some extent, spur greater voluntary compliance. Over time, however, taxpayers may find new ways to evade taxes.

Detection and deterrence. The effects of improvements in detection are direct: an increase in funding of compliance activities or an enhancement in enforcement tools can prevent more erroneous refunds from be-

¹⁸ Public Law 112-25, and later amended.

ing paid out and enable the IRS to collect additional unpaid taxes. The increased revenues are observable, even if estimators must control for other changes occurring at the same time. The deterrence effects—the improvement in taxpayer compliance behavior in response to increased audits or enhanced enforcement tools—are indirect and more difficult to measure, although past experience and academic studies can provide useful insight.

Both JCT and CBO take into account detection effects in their estimates of compliance proposals. However, only JCT includes deterrence effects in its estimates of compliance initiatives included in the tax code. The deterrence effects of increases in IRS appropriations are more uncertain than changes to the tax code—especially because appropriations are annual, and funding for an enforcement initiative may not extend to future years.

Learning curves. Both taxpayers and the IRS learn from experience and modify their behavior over time. Observing where the IRS has concentrated its enforcement tools will cause some taxpayers to adopt new methods of tax evasion. Observing how taxpayers adjust their behavior will spur the IRS to adjust its enforcement detection tools to the extent allowed under the tax code.¹⁹ Estimators make a judgment regarding the timing of taxpayer and IRS adjustments.

Budget Scorekeeping Guidelines

Over time, the House and Senate Budget Committees, CBO, and the Office of Management and Budget developed scorekeeping guidelines. Those guidelines were formalized in the conference report for the Balanced Budget Act of 1997. The guidelines are updated upon agreement by the House and Senate Budget Committees, CBO, and the Office of Management and Budget. The purpose of those guidelines is to ensure consistent budgetary treatment across programs and over time.²⁰

Two guidelines are especially relevant to CBO's and JCT's estimates of compliance legislation. First, scorekeeping Rule 3 states the following:

Revenues, entitlements and other mandatory programs (including offsetting receipts) will be scored at current law levels ... unless Congressional action modifies the authorizing legislation.

The second relevant guideline is scorekeeping Rule 14, which states:

No increase in receipts or decrease in direct spending will be scored as a result of provisions of a law that provides direct spending for administrative or program management activities.

Rules 3 and 14 were adopted in part to avoid situations where hoped-for but quite uncertain savings are used to offset near-term certain spending increases or revenue decreases in the same legislation.

Those two rules substantially limit the extent to which CBO and JCT would include savings from a tax compliance initiative in their estimates of the budgetary effects. Giving the IRS additional funding in an appropriations bill to obtain and match information returns from third parties to tax returns, for example, would potentially increase compliance—both directly by enabling the IRS to better identify noncompliance through independent sources and indirectly by encouraging people to comply. CBO's estimate of the bill's cost would include the additional funding for the reporting and matching initiative. Under Rules 3 and 14, however, CBO would exclude any revenue increases from the new initiative in its estimates of the bill's total costs.

Nonetheless, to the extent possible, CBO and JCT provide the Congress with information on revenue savings from compliance proposals. First, even though CBO and JCT would not include revenue effects in their

¹⁹ McCubbin (2004).

²⁰ Conference Report (1997) and Office of Management and Budget (2015).

estimates of a change in IRS appropriations or other legislation providing funding for the IRS, they still may provide the Congress with an estimate of a "nonscorable" effect that is not added to their estimate of the total costs. Second, the scorekeeping rules do not apply to CBO's baseline budget projections or to CBO's and JCT's estimates of the President's budget submission. If an appropriations bill or another bill containing increased funding for IRS enforcement was enacted, CBO would include the revenue effects in its next estimate of the budget deficit under current law. Additionally, the President's budget has often contained compliance initiatives—including "program integrity" proposals to increase IRS funding—and CBO and JCT have added the revenue effects of those proposals in their analysis of the President's budget released every spring.

The IRS's Goals and Constraints

In its estimates of compliance proposals, both CBO and JCT start with the same premise: that IRS allocates its existing resources and statutory tools to the activities that yield a higher return on investment than other activities allowed under current law—subject, however, to two constraints. The first constraint—consistent with the budget scorekeeping guidelines—is that the IRS is limited by the scope of its statutory authority. A second constraint is the availability of resources to the IRS—including the access to up-to-date technology and the number and skills of staff. CBO's and JCT's revenue estimates will reflect each organization's judgment regarding the state of the IRS's infrastructure and its impact on the timing and scope of implementation. A related consideration is the ability of both the IRS and taxpayers to adjust to a new initiative. That ability will depend, in part, on the extent to which the IRS can shift its resources and the complexity of new spending initiatives or changes to the tax code.

Technology. The IRS's ability to adjust to legislative changes is closely linked to the state of its computers and the long-term challenges of the IRS's computer modernization program. A 2016 report from the Government Accountability Office found that the IRS's individual master file and business master file still rely on computer programming language developed more than 50 years ago. That outdated language is increasingly difficult to write and maintain.²¹ Integration of new legislation into old computer systems will, to some extent, slow implementation.

But beyond computer modernization, legislation that imposes new—and sometimes unfamiliar—responsibilities often requires establishment of new systems. Both FATCA and the ACA were enacted in 2010, but implementation of most of the major provisions in those acts did not become effective for several years to allow time for the IRS and businesses to build the information infrastructure necessary to operate new systems. Such statutory deadlines would be reflected in the estimates of legislation. Although those two laws were largely implemented as scheduled (see an exception below), estimators generally consider the extent to which similar deadlines in other tax laws will be met successfully.

Another consideration is the timing of the enactment of tax legislation. Often, tax legislation is not enacted until December or the start of the following year. The American Taxpayer Relief Act (ATRA), for example, was enacted on January 2, 2013, but extended many provisions that had expired on December 31st and contained other new provisions that were effective on January 1st.²² For the IRS, updating and developing tax forms and rewriting and testing computer programs to reflect legislation enacted in late November or December for the following tax year coincides with the ongoing testing of their systems for the upcoming filing season; enactment at the beginning of the tax year means that changes to the forms and computer programs must occur during the busiest period of the year. As a consequence, the IRS may delay the beginning of the filing season for some, if not all, taxpayers or put a temporary hold on the processing of certain returns. Estimators consider the likelihood of such delays and their impact on reporting and on taxpayers making use of the provisions affected by the legislation. Those effects are compounded by delays in the issuance of guidance by the IRS.

Staff. With new responsibilities, the IRS may require additional staff or the reallocation of personnel. Either action probably requires on-the-job training. The extent of new training will slow full implementation of a new law or targeted appropriations, which affect the timing of CBO's and JCT's estimates of savings.

²¹ Government Accountability Office (2016a).

²² Public Law 112-240.

Recent trends in the IRS's staffing also affect revenue estimates of compliance initiatives. Along with the decline in the IRS's appropriations, the number of the agency's employees has fallen over the past two decades—from 113,931 in 1995 to 79,890 in 2015.²³ The IRS's staff has also aged—with more than half of its employees over the age of 50 in 2015 and a quarter eligible to retire in 2016.²⁴ In the short term, the aging of the IRS's workforce is probably associated with an increase in productivity and an ability to adapt to new responsibilities because of the experience of the older workers. Replacing the retired workers with younger staff, however, will initially result in a loss of institutional knowledge, additional training costs, and a reduction in productivity—all factors that reduce savings relative to a scenario where the majority of the workforce is experienced. As the new hires gain experience and skills over time, productivity is generally anticipated to rise.

Flexibility. Legislation can enable the IRS to shift resources from one activity to another with a higher return from the same amount of funding. For example, when the IRS finds an error on a tax return, it generally must either accept the return or file a notice of deficiency, which starts the audit process and consumes resources. However, if the error falls within the IRS's mathematical or clerical error authority, the IRS can correct the error without starting an audit. Expanding that authority potentially yields a higher return than more labor-intensive audits, even if fewer dollars are gained per return—largely because the IRS can detect many more erroneous refunds and prevent them from being paid out at far less cost per return than would be the case with audits. However, the people who are highly skilled auditors are generally not the same people who can write new programming language or build the large-scale data sets necessary to detect erroneous claims during the processing of returns. That lack of flexibility may reduce the estimates of savings, at least in the short term.

Complexity. The complexity of a provision affects its implementation. The ACA, for example, requires employers with 50 or more full-time employees to make an employer shared responsibility payment to the IRS if (1) they did not offer minimum essential health insurance to 95 percent of their full-time employees or (2) at least one of their employees received a premium tax credit for purchasing health insurance through the health insurance exchanges. To enable the IRS to administer those requirements, employers must report to the IRS information each year on the health insurance coverage offered to their full-time workers. Confusion and concern by employers about the administration of those provisions—especially the new reporting requirements—caused the IRS to delay implementation of the employer responsibility payments for a year to allow additional time to discuss with taxpayers ways to simplify those rules.²⁵ That transition relief was extended for another year for employers with fewer than 100 employees.²⁶

Implementation of provisions can be delayed by lags in the release of regulations, rules, notices, and other types of guidance from the IRS.²⁷ To the extent that estimators can anticipate such delays, projected savings from initiatives can be slowed.

Specific Issues in Estimating the Revenue Effects of IRS Appropriations

Nearly everything that the IRS does can be characterized as a way to improve compliance:

- Customer service—such as answering taxpayers' questions over the telephone, through the IRS website, or in person at Taxpayer Assistance Centers—can help taxpayers avoid errors on their tax returns that can result in either underpayments or overpayments.
- Increasing enforcement—through expansions of information reporting, audits, criminal investigations, and collection—would lead to improvements in detection and deterrence.
- Computer modernization would support expansions of customer service and enforcement.

²³ Internal Revenue Service *Data Book* (various years), Table 30.

²⁴ Koskinen (2015).

²⁵ Internal Revenue Service (2013).

²⁶ Internal Revenue Service (2014).

²⁷ The IRS provides other types of guidance to taxpayers through various documents and publications. For more information of those forms of IRS guidance, see Internal Revenue Service (2016c).

Despite the potential contributions of each of those activities to compliance, CBO estimates the revenue savings only from expansions of enforcement. Improvements in compliance as a result of customer service or computer modernization are not easily observed and thus difficult to measure.

Methodology

As a starting point in its analysis of requests for more funding of IRS enforcement activities, CBO generally relies on the IRS's estimates of the return on investments (ROIs) for specific types of initiatives. Those ROIs are estimated by economists in the IRS Office of Research who have access to detailed confidential data found in the Enforcement Revenue Information System (ERIS), which is part of the IRS's Compliance Data Warehouse. ERIS tracks the amount and timing of revenue from all the IRS's enforcement functions, along with the number of hours spent on cases, where available. The estimates are limited to the direct effects of enforcement activities that result in collections of unpaid taxes; they do not include the effects of other actions (such as math error procedures) that prevent erroneous refunds from being paid or the improvements in compliance associated with deterrence. For any given set of initiatives in a particular year, the IRS forecasts that revenues will be collected over a 10-year period. The collection ratios are derived from past initiatives, with collection data from the most recent initiatives given a greater weight than data from initiatives implemented further in the past.

The IRS's measures of ROI for new initiatives are derived from the average savings per dollar of funding for similar existing activities. When estimating the revenue savings from a new initiative, however, the appropriate measure is not the average ROI but the marginal ROI—that is, the additional amount of revenues received from an additional dollar of funding. The IRS makes one adjustment to the average rates to move the ROIs closer to being marginal measures: That adjustment is made to the first three years of an initiative and reflects the amount of time it takes to hire and train new staff.

In CBO's judgment, the IRS's estimates of ROIs do not account for other factors that affect the marginal estimates of ROIs from compliance initiatives. In the past, CBO has adjusted the ROIs to account for changes in the composition of the caseload over time, taxpayers' adjustments to their evasion methods, and the IRS's modifications to its detection algorithms in response to taxpayers' adoption of new forms of noncompliance.

Example: IRS Program Integrity Proposal in the President's Budget for 2016

The caps on discretionary spending are automatically adjusted to accommodate additional appropriations for certain program integrity (compliance) initiatives for the IRS and various government transfer programs. In recent years, the Administration has included program integrity proposals in its budgets. CBO previously released a description of its analysis of the Administration's proposal for an IRS program integrity initiative in its FY 2012 budget.²⁸

The President's FY 2016 budget included a program integrity proposal that would have increased funding of IRS enforcement initiatives by \$421 million in FY 2016 (Table 2). Those funds would have been used to finance 10 new initiatives, five of which—with a total cost of \$333 million in FY 2016—were expected to raise immediate and measurable revenues:

- Increase audit coverage (\$151 million) by hiring more field employees; boosting coverage of employment tax returns and estate and gift tax returns; expanding examinations; improving document matching programs; and extending support activities.
- Enhance collection coverage (\$123 million) by addressing growing inventories resulting from past reductions in staff; increasing coverage of employment tax cases among business taxpayers; improving service to taxpayers in delinquencies; and extending support activities.
- Address international and offshore compliance issues (\$41 million) by expanding coverage of entities with undisclosed offshore accounts to ensure their compliance with required U.S. tax reporting.

²⁸ Congressional Budget Office (2011).

- Improve audit coverage of large partnerships (\$16 million) by increasing the number of agents with specialized knowledge of partnership law and strengthening enforcement activities related to flow-through entities.
- Prevent identity theft and refund fraud (\$3 million) by providing staffing and advanced technologies to handle the increased workload associated with identity theft and refund fraud.

TABLE 2. Components of Proposed Funding Increase for Enforcement Initiatives and Returns on Investments, FY 2016

2016 IRS Enforcement Initiative	Cost in 2016 (Millions of Dollars)	Revenue in 2016 (Millions of Dollars)	Return on \$1 of Investment (Dollars)
Increase Audit Coverage	150.7	397.5	2.6
Enhance Collection Coverage	122.8	345.9	2.8
Address International and Offshore Compliance Issues	40.7	49.3	1.2
Improve Audit Coverage of Large Partnerships	16.2	44.5	2.7
Prevent Identity Theft and Refund Fraud	2.7	24.2	9.0
Other Initiatives	87.5	0.0	0.0
All	420.6	861.4	2.0

Source: Internal Revenue Service (2015)

In addition to the \$421 million for IRS enforcement initiatives, the proposal to lift the cap in FY 2016 also included \$5 million for enforcement activities at the Alcohol and Tobacco Tax and Trade Bureau and \$241 million to fund investments in IRS infrastructure. The President proposed to continue the 2016 initiatives over the 10-year budget window.

For the IRS's enforcement activities proposed to begin in 2016, CBO projected the same initial return on investment as estimated by the Administration for the first 3 years of an initiative. In the first year, the estimated returns on investments were under \$3 for each \$1 of additional funding for most of the IRS's enforcement initiatives; however, the ROI was as low as \$1 to \$1 for the international tax initiative and as high as \$9 to \$1 for the initiative to prevent identity theft and refund fraud (Table 2). The overall ROI for the 2016 initiative (including the provisions that were not expected to raise revenue) was estimated to be \$2 to \$1 in 2016 and was projected to rise to \$6 to \$1 by 2018, when full implementation was expected (Table 3). For later years, CBO estimated a lower return on investment than the Administration expected. CBO projected that the return on added spending would decline over time as taxpayers shifted to other less-detectible forms of tax evasion, causing revenue collections to fall. Thus, the ROI for the 2016 initiative was estimated to fall by 19 percent from the 2018 rate by the end of the decade.

2016 IRS Enforcement Initiative	Cost in 2018 (Millions of Dollars)	Revenue in 2018 (Millions of Dollars)	Return on \$1 of Investment (Dollars)
Increase Audit Coverage	158.5	1,266.7	8.0
Enhance Collection Coverage	131.2	1,179.7	9.0
Address International and Offshore Compliance Issues	43.1	159.6	3.7
Improve Audit Coverage of Large Partnerships	16.9	129.1	7.6
Prevent Identity Theft and Refund Fraud	3.1	63.8	20.6
Other Initiatives	81.8	0.0	0.0
All	434.6	2,798.9	6.4

TABLE 3. Components of Proposed Funding Increase for Enforcement Initiatives and Returns on Investments, FY 2018

Source: Internal Revenue Service (2015)

The FY 2016 budget also increased discretionary spending by additional amounts through FY 2020 to fund other new IRS enforcement initiatives. The Administration, however, did not provide any details on those future initiatives. In CBO's judgment, the IRS was anticipated to tackle the areas of noncompliance with the highest ROI first (that is, begin with the "low-hanging fruit"). Thus, CBO estimated that the ROIs on the FY 2017 initiative would be lower than the rates for the 2016 initiative. In each of the following 3 years, the ROIs would continue to fall as the IRS dealt with increasingly more difficult areas of noncompliance. Because the IRS would not be able to maintain the same return as spending was ramped up, the return on investment for the 2020 initiative was 25 percent lower in the first year, compared with the 2016 initiative, according to CBO's estimates (Figure 3). When fully implemented in the third year, the ROI for the 2020 initiative was estimated to be 28 percent lower than the comparable rate for the 2016 initiative.

The combined effect of the initiatives implemented over the FY 2016–2020 period would be a ramping up of spending on tax administration by nearly \$19 billion over the FY 2016–2025 period. CBO estimated that the Administration's request would yield \$55 billion in additional revenues over that latter period. That estimate does not include collections resulting from those initiatives but not received by the IRS until after 2025. The estimate of \$55 billion in additional revenues also does not include any potential effects on voluntary tax compliance from the proposed sustained increases in enforcement spending. Without additional specification of the policies, especially beyond 2016, CBO had no basis for estimating such effects. (The Administration also did not include such effects in its estimate presented in the budget.) On net, after accounting for the increased spending, the initiative would have reduced the deficit by nearly \$37 billion over the 10-year budget window.

The estimated increases in revenues represented the cumulative impact over time of appropriations for IRS enforcement activities in the amounts proposed in the President's budget. But those appropriations would be enacted one year at a time. Therefore, even if the added funding was provided for 2016, CBO's revenue baseline for the 2016–2025 period would not immediately change by the \$55 billion estimated but rather would increase in steps as the additional investment provided by each year's appropriation was accounted for—assuming no new information was later identified that would change the estimated effects.

FIGURE 3. Return on \$1 of Investment from Proposed Funding Increases for the Internal Revenue Service's Enforcement Initiatives, FYs 2016 to 2025



Source: Congressional Budget Office

Estimating the Effects of Legislative Changes

The types of compliance proposals analyzed by JCT can be classified into four broad types. As data can be scarce and the IRS's response uncertain, JCT follows a set of principles to consistently estimate these proposals.

Types of Legislative Proposals

Proposals to reduce noncompliance include simplification of the tax code, new enforcement tools, new statutory authority, and mandates requiring the IRS to use its existing authority.

Simplification. Some simplification proposals, such as providing safe harbors for businesses or extending eligibility for a deduction or credit, might simultaneously reduce taxpayer errors but increase the deficit. Allowing small corporations to make estimated payments based on the prior year's tax reduces errors in having to estimate the current year's tax and would be expected to result in lower estimated payments. Legislation in 1991 eliminated the support test and household maintenance test from the eligibility criteria for the EITC, and subsequent legislation in 2004 extended those changes to other child-related tax preferences.²⁹ Those simplification provisions reduce noncompliance by expanding eligibility for those preferences to many people whose claims were erroneous under prior law.

New enforcement tools. Information reporting is a tool that JCT has scored as raising significant revenue over the last decade, with prominent present-law examples including reporting on payment card and third-party payment transactions and basis reporting on publicly traded securities.³⁰ Other new tools include allowing the IRS to exchange information with other Federal agencies, State and local governments, prisons, and even agencies in foreign countries.

²⁹ Public Law 101-508 and Public Law 108-311.

³⁰ Public Law 110-289, section 3091, and Public Law 110-343, section 403, respectively.

New authority. Statutory authority is important in determining how efficiently the IRS can act on information gained from enforcement tools. As described above, mathematical or clerical error authority allows the IRS to correct certain errors without an audit. Examples of mathematical or clerical errors include computational errors shown on returns, certain entries exceeding statutory limits, and omissions of required taxpayer identification numbers for claiming certain credits. The Administration's proposed expansion of math error authority to include "correctable errors," such as information reported by taxpayers on a tax return not matching information received by the Social Security Administration and shared with the IRS, but not within the IRS's current math error authority to correct, is an example of new authority.³¹ Changes to deficiency procedures and increases in penalties are other examples.

Mandate use of existing authority. Some proposals mandate the IRS to undertake a specific activity that it is already within its authority. As discussed in detail below, a recent legislative change requiring the IRS to delay payment of certain refunds is an example.

Methodology

As described above, JCT assumes that the IRS generally allocates its resources in order to maximize revenues. In addition, when estimating compliance proposals, JCT assumes that the IRS's resources are fixed. Thus, for example, if a new tool or new authority is less efficient than existing tools or authority, JCT does not score it as raising revenues. If a provision requires the IRS to do something new that diverts funds from more efficient uses, JCT scores it as losing revenues.

Data related to compliance proposals can be scarce, but several sources are frequently useful. When estimating the revenue effect of an information reporting proposal, JCT is often guided by the IRS's reports on the tax gap. JCT combines that information with its projections for how much income is covered by the proposal and its estimates of the effective tax rates on that income. For proposals related to penalties, JCT is informed by the data found in ERIS. Studies done by the Government Accountability Office (GAO), the Treasury Inspector General for Tax Administration, and outside experts (such as academic economists) are often helpful for a variety of compliance estimates.

Example: Legislation To Reduce Identify Fraud by Accelerating Reporting Requirements

The Consolidated Appropriations Act of 2016 accelerated the filing dates of W-2s and Forms 1099-MISC related to nonemployee compensation to January 31 (from March 31 for electronic submission and from February 28 or 29 for paper submission). The law also requires the IRS to hold refunds to claimants of the EITC or the additional child tax credit (ACTC) until February 15.³² The first part is a new tool. The second part requires the IRS to do something that it already has authority to do. Both parts take effect beginning in the 2017 filing season.

In estimating the effects of that provision, JCT focused primarily on the potential of the provision to raise revenues by reducing refund fraud related to identity theft. Under prior law, the IRS did not match information from W-2s and Forms 1099-MISC until July or later.³³ At that point, the IRS used information reporting to detect tax fraud related to identity theft. By July, however, most refunds of withholding and payments of refundable tax credits had been paid. JCT does not have access to information on the detection methods used by the IRS, but given the IRS's demonstrated ability to detect fraudulent returns in the post-filing season, receiving information returns earlier, in JCT's judgment, should allow increased detection of fraud before paying refunds.

JCT's quantitative starting point for the revenue estimate was the IRS's estimate that it had paid \$5.8 billion in refunds associated with identity theft during the 2013 filing season, as reported by GAO.³⁴ Using the Auto-

³¹ For a more complete description of the Administration's proposed expansion of math error authority, see "Provide the IRS with Greater Flexibility to Address Correctable Errors" in Department of the Treasury (2016), pp. 225–226.

³² Public Law 114-113, division Q, section 201.

³³ See Figure 1 in Government Accountability Office (2014a).

³⁴ Government Accountability Office (2015).

mated Underreporter (AUR) program, which matches information returns to tax returns and thus is likely to involve W-2 or Form 1099-MISC, the IRS identified \$3 billion in erroneous refunds. Another \$2.8 billion in identity theft was detected before the start of the AUR program by another IRS filter that flags when more than one person files a return with the same Social Security number. Some of that fraud probably would have been identified later by the AUR program if it had not been flagged at the duplicate return stage, so JCT factored that into its estimate.

In GAO's view, the IRS's estimate of erroneous refunds due to identity fraud was highly uncertain. For example, GAO cites a sensitivity analysis done by the IRS that suggests that the AUR component could be as high as \$78 billion or as low as \$120 million. JCT was unable to find more granular information before estimating the provision.³⁵ Despite the uncertainty described above, JCT used the IRS's \$5.8 billion estimate to produce a baseline for fraudulent refunds that were identified as being paid out. From there, JCT estimated the amount of revenue savings from detection and deterrence.

JCT estimated that some of the effect would come from the IRS using information from W-2s and Forms 1099-MISC to detect fraudulent returns filed by identity thieves. JCT assumed that the IRS would incorporate earlier receipt of the information into its fraud filters but that implementation would take several years until the IRS determined from filing season experience how to use that earlier receipt of the information optimally. The estimate of revenue savings was also constrained by the fact that the IRS had not received additional funds to implement the new system. The estimated revenue effect is therefore phased in over several years.

One key factor that JCT believed could have a large revenue effect was whether the IRS would change how quickly it pays refunds (apart from the mandated delay in EITC and ACTC refunds). Although the tax code allows the IRS to delay refunds until 45 days after April 15 without paying interest, the IRS's goal is to issue refunds quickly.³⁶ The earlier receipt of information returns appears to increase the benefit to the IRS of delaying refunds, but JCT was conservative in estimating to what extent the IRS might pay some refunds less quickly.

Nonetheless, there should be some effect, as the IRS procedure when it suspects identity theft is less resource-intensive than its procedures for auditing noncompliant returns from legitimate taxpayers. If the IRS suspects that a return was not filed by the true taxpayer, it is not subject to the usual rules involving notice of deficiency. Instead, it can simply deny a refund if the filer cannot verify his or her identity.

In addition to considering how the IRS might change its behavior in response to the provision, JCT also thought about how people engaging in identity fraud might change their behavior. If those filers believe that the IRS is unlikely to hold refunds until it can match the accelerated information returns to tax returns, they have an incentive to file returns earlier in the filing season, before information from W-2s and Forms 1099-MISC is integrated into fraud filters. Moreover, as the provision requires that the IRS delay paying refunds to EITC and ACTC claimants, JCT assumed that identity thieves would have some incentive to avoid claiming those credits in the event that claiming them would result in the IRS making use of the required delay to catch the fraud by matching information returns. Finally, identity thieves would have more incentive to avoid using identities that have W-2s or Forms 1099-MISC associated with them.

JCT considered that the provision might also have effects unrelated to identity fraud, such as reducing EITC or ACTC overpayments. Recent research provides evidence that under current law, some taxpayers overclaimed income to maximize refundable credits, especially starting in the mid-2000s.³⁷ To the extent that taxpayers are claiming wage income beyond what is shown on their W-2s, the provision might allow the IRS to detect overclaimed credits before paying refunds. However, unlike with identity theft, in the absence of the proposed expanded math error authority mentioned above, the IRS would have to file a notice of deficiency

³⁵ After the provision became law, the GAO testified that the IRS used a new methodology to estimate the amount of refunds associated with identity theft that was paid in 2014. With that new approach, the IRS's estimate for 2014—\$3.1 billion—was just over half of its 2013 estimate. See Government Accountability Office (2016b).

³⁶ See Government Accountability Office (2014a), p. 5.

³⁷ Mortenson and Whitten (2016).

in order to deny a claim. As it is unlikely that the efficiency of such an audit would exceed the efficiency of the audit that it would replace, JCT did not include revenues from that effect in its estimate.

Combining all of the factors described above, JCT estimated that the provision would increase revenues by \$779 million over the FY 2016–2025 period.³⁸ The estimated revenue effects were relatively small, though increasing, from FY 2017, when the provision will take effect, through FY 2019, reached a steady state in FY 2020 (when JCT assumed it would be fully implemented), and grew thereafter with CBO's projection of nominal GDP.

What Information Would Be Useful to CBO's and JCT's Estimators?

Revenue estimating is challenging, and analysts will always benefit from more data, more administrative details, and more research. To estimate the effects of compliance proposals, CBO and JCT would both benefit especially from more information regarding the IRS's estimates of the tax gap and returns on investment, the IRS's enforcement actions, and taxpayers' compliance behavior.

Tax Gap

More information about the measurement and sources of the tax gap would provide insight into the baseline for noncompliance. Additional details on the methodology used in the most recent NRP study would allow CBO and JCT to better evaluate the findings from that research. The current studies categorize errors by the degree of third-party verification applied to certain types of income or tax provisions—but more information on the amount of the tax gap related to specific types of income or tax provisions could inform the choice of parameters when estimating the effects of tax compliance provisions.

Returns on Investment

Through ERIS, the IRS has access to detailed information on their workforce's productivity for particular types of enforcement actions, and their economists rely on that data to generate ROIs. To some extent, the IRS has been able to share information on the factors that go into those estimates, but allowing CBO and JCT more access to its models would enable the Congressional estimators to test the sensitivity of ROIs to changes in the IRS's resources and the composition of its proposals.

A more difficult challenge for the IRS would be to expand its analysis of ROIs to include other types of IRS activities. Although the focus of its estimates is on actions that result in additional assessments of taxes owed to the IRS, the results of another type of enforcement action—the prevention of erroneous refunds—are not measured in the ROIs. An even more difficult expansion would be to examine the relationship between changes in taxpayer services and revenues—but that would probably be a long-term project requiring extensive analysis.

A third set of challenges involves the estimation of marginal ROIs. The return from an additional dollar of funding is likely to differ from the average ROI based on past funding. CBO adjusts the average ROIs estimated by the IRS to account for changes in the effectiveness of initiatives as funding increases, but more insight into the marginal effects would be useful.³⁹

Details of the IRS Enforcement Activities—Current and Future

As with the ERIS data, the IRS is forthcoming with CBO and JCT regarding its current enforcement activities—but its willingness to share information is (understandably) tempered with caution about providing sensitive information that if more widely known could undermine its compliance strategies. Still, more information about the anticipated implementation of newly proposed initiatives would aid CBO and JCT in their estimation of those proposals. The most striking examples are the proposed program integrity initiatives beyond the first fiscal year. In their recent proposals, the Administration has provided an amount of funding

³⁸ See Line II.1. in Joint Committee on Taxation (2015).

³⁹ Hodge, et al. (2016) estimated marginal revenue/cost curves for several categories of correspondence audits.

for those future year initiatives and an expected ROI but left it to the Congressional analysts to make assumptions regarding the components of the proposal.

Another key question is the length of time that the IRS anticipates it would take to implement a new initiative or to use new statutory authority. Related questions concern the response time for taxpayers and the IRS and probably require more research: First, how long does it take taxpayers to learn that the IRS has new tools and to find new ways to evade taxes? And second, how long does it take the IRS to identify those new methods of evasion and shut those channels down with existing authority and resources?

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Behavioral Research: Why Do People Do What They Do?

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Examining Motivations To Volunteer with the Volunteer Income Tax Assistance (VITA) Program: How Motivations Influence Future Volunteer Behavior

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Introduction

Every year, millions of people devote substantial amounts of their time and energy to helping others. One important manifestation of human helpfulness is volunteerism, whereby people help others on a regular, ongoing, volunteer basis, with this volunteer help often extending over long periods of time.

The idea that an individual would make significant personal sacrifices for another person, particularly when that person is a complete stranger, has long fascinated social psychologists (e.g., Batson (1991); Eisenberg (1986); Latané and Darley (1970)). Although studies of helping are common among general psychology texts, the existing literature speaks heavily about types of helping that are somewhat different from volunteerism, focusing on helping in contexts where the person is faced with an unexpected need for help. This calls for an immediate decision to act and an opportunity for the helper to provide a single—generally brief—act of help (e.g., Benson, *et al.* (1980)).

Factors uncovered by research on the helping that occurs in these kinds of contexts, sometimes referred to as spontaneous helping, may be important influences in volunteerism as well. Yet volunteerism appears to be illustrative of a different kind of helping—a kind that is more prototypic of planned helping, which often "calls for considerably more planning, sorting out of priorities, and matching of personal capabilities and interests with type of intervention" (Benson, *et al.* (1980), p. 89). Thus volunteers: (a) often actively seek out opportunities to help others; (b) may deliberate for considerable amounts of time about whether to volunteer, the extent of their involvement, and the degree to which particular activities fit with their own personal needs; and (c) may make a commitment to an ongoing helping relationship that may extend over a considerable amount of time and that may entail considerable personal costs of time, energy, and opportunity (Benson, *et al.* (1980)).

Volunteering with the Volunteer Income Tax Assistance (VITA) Program

The VITA program is an Internal Revenue Service (IRS) program designed to help low- and moderate-income taxpayers complete their annual tax returns at no cost. To carry out its mission of free tax preparation for taxpayers who qualify, the VITA program uses trained volunteers to provide the service of preparing tax returns. Founded in 1971 by Gary Iskowitz at California State University Northridge, the original program concept was to provide local taxpayers with free tax return preparation in an effort to provide a valuable community service and a hands-on learning experience for the students. The program has grown from a small group of accounting students to a nationwide program with more than 92,000 volunteers preparing 3.2 million returns annually.

VITA volunteers serve in roles such as site greeter, tax preparer, or quality reviewer, and VITA sites are generally located at community and neighborhood centers, libraries, schools, shopping malls, and other convenient locations. Volunteers are the backbone of the VITA program; they allow the IRS to serve taxpayers who might otherwise pay for tax preparation or make errors during self-preparation.

In addition to the overarching VITA program, the Tax Counseling for the Elderly (TCE) program offers free tax help to individuals who are age 60 or older. Cooperative grant agreements are entered into between IRS and eligible organizations to provide tax assistance to elderly taxpayers. The funds provided by the IRS are used by organizations to reimburse volunteers for their out-of-pocket expenses—including transportation, meals, and other expenses incurred by them in providing tax counseling assistance at locations convenient to the taxpayers. Tax return preparation assistance is provided to elderly taxpayers during the normal period for filing Federal income tax returns, which is from January 1 to April 15 each year. However, the program activities required to make sure elderly taxpayers receive efficient and quality tax assistance can be conducted year-round. Because the VITA program relies on volunteers, the ability of the IRS to learn more about these individuals and leverage their potential volunteer pool is vital to the strength and sustainability of the program. The defining features of volunteerism as voluntary, sustained helpfulness suggests that it may be productive to examine the motivations that lead individuals to seek out VITA volunteer opportunities and to sustain their VITA volunteerism from year to year. After all, the fundamental concerns of motivational inquiry are precisely the concerns engaged by the questions "Why do people volunteer with VITA?" and "What sustains VITA volunteerism?"

Taking a Functional Approach—Motivation To Volunteer

One useful approach to answering this question begins with the premise that volunteering serves different functions for different people. The functional approach to human behavior has a history that spans over a century (e.g., James (1890)). More recently, the functional strategy has been used to understand the motives behind volunteering.

Clary and Snyder (1991) defined functional analysis as being "concerned with the reasons and purposes that underlie and generate psychological phenomena—the personal and social needs, plans, goals, and functions being served by people's beliefs and their actions" (p. 123). As a result, a main premise of functionalist theorizing is that while different people can perform the same actions, these actions may serve different psychological functions for different individuals. This approach initially identified with functional theories of attitudes and persuasion (e.g., Snyder and DeBono (1987)) and has broadened to include analyses of diverse cognitive, affective, behavioral, and interpersonal phenomena (e.g., Cantor (1994)).

According to this perspective, people may have similar attitudes or engage in similar behaviors, but these attitudes or behaviors may satisfy different motivational functions. As the functional approach has been used with respect to the functions attitudes may serve, this approach has also helped to reveal underlying motivations of volunteering. Snyder (1993) found five functionally oriented motivations for engaging in volunteer work: community concern, values, understanding, personal development, and esteem enhancement. In a later investigation, Omoto and Snyder (1995) show that AIDS volunteering motivated by this function and by the personal development and understanding functions leads to a longer commitment, suggesting the importance of the relational motives for volunteers as well as for nonprofit management.

Similarly, Clary, *et al.* (1998) identified six distinct functions potentially served by volunteering: (i) the value function indicates concern for others; (ii) the understanding function is connected with the need to learn and improve one's knowledge of the world; (iii) the social function refers to the desire to conform to the norms and expectations of one's circle of peers; (iv) the career-related benefits are pooled in the career function; (v) the protective function refers to the need to protect oneself; and (vi) the enhancement function relates to volunteering as a means to enhance positive effects and to increase one's self-esteem (Clary, Snyder, and Stukas (1996)).

Another Function of Volunteering: Psychological Need Satisfaction

Self-Determination Theory (SDT) has identified three essential needs for optimal psychological growth and well-being: competence, relatedness, and autonomy (Deci and Ryan, 2000). According to SDT, a need for *competence* reflects the need to feel effective in one's efforts and capable of achieving desired outcomes (Deci and Ryan (2000)). The need for *relatedness* involves a need to feel connected to and understood by others (Deci, *ibid.*). Finally, *autonomy* reflects the need to feel volitional in one's actions, to fully and authentically endorse

one's behaviors, and to act as the originator of one's own behavior. While this definition of psychological needs and the specification of these particular psychological needs have been the source of considerable debate, a growing body of research has provided evidence for the role of each of these in psychological health and wellbeing (Carver and Scheier (2000); Deci and Ryan (2000); Kernis (2000)).

A broad literature has demonstrated the importance of ongoing feelings of competence for optimal functioning and well-being. For example, White (1959) theorized that feeling competent is an integral contributor to self-confidence. Bandura's (1977) work on self-efficacy has found that believing that one can bring about desired outcomes is an important determinant of psychological health. Similarly, Carver and Scheier (1990) have shown that believing that one is effectively making progress toward one's goals is psychologically beneficial.

The need to connect with and feel understood by others is a distinct human need that is echoed in most theories of human motivation and development (for review, see Reis and Patrick (1996)). Baumeister and Leary (1995) referred to this as the need to belong, and they reviewed extensive evidence demonstrating its vital role in human motivation. Further evidence for the need for relatedness is evident in studies involving daily experiences. For example, Watson, Clark, and Tellegen (1988) found that the more opportunities participants had to interact with important others within a given day, the more positive effect they experienced.

The need for autonomy has been the most controversial aspect on the SDT conceptualization, stemming largely from misconceptions regarding the definition of autonomy. From the SDT perspective, autonomy refers to self-government or to the extent to which people feel self-determined in their actions. Autonomy is not to be confused with independence. From the SDT perspective, autonomy does not involve independence or detachment from others. Rather, it involves a sense of volition, agency, and initiative. Thus, fulfillment of one's need for autonomy does not preclude feeling related to and connected with others. Studies show that autonomy is positively associated with relatedness and well-being (Ryan and Lynch (1989)) and that those who functioned more autonomously had more positive social experiences (Hodgins, Koestner, and Duncan (1996)).

SDT prescribes that overall psychological health requires the satisfaction of all three needs. It is through the satisfaction of these needs that individuals are able to move through the experience of achieving effective-ness, connectedness, and intrinsic motivation.

Why Study Motivation in VITA Volunteers

Anecdotally, individuals report that volunteering has made them "grow as a person," suggesting that psychological growth is a motivational concern for individuals engaging in volunteer work. Previous research (Davis-Smith (2010); Clary, *et. al.* (1998)) found that for some individuals, engaging in volunteer work is a mechanism for satisfying their psychological motivations, leading to greater satisfaction with their volunteer work. We proposed that the same findings hold for VITA volunteers: that individuals who engage in volunteer work with the VITA program are motivated to do so because it serves as a source of psychological benefits and growth.

Overview of the Present Research

To test this hypothesis, we conducted two studies in which we expected there to be a relationship between psychological motivations and volunteering with the VITA program. Study 1 hypothesized that VITA volunteers are motivated by functional and psychological need satisfaction—that volunteer tax preparation serves specific functions and triggers motivationally relevant feelings within volunteers.

Because persuasive messages are effective to the extent that they are able to speak to the motivations specific to the recipient, Study 2 used a conjoint methodology to determine if motivationally relevant messaging could be used to influence future volunteerism with the VITA program. It was hypothesized that motivationally relevant messaging would be more appealing and ultimately allow the IRS to be more successful in its recruitment efforts by determining the optimal message, delivery mode, messenger, and incentive to encourage VITA volunteerism.

The proposed studies were the first of their kind; previous research has never comprehensively surveyed the VITA volunteer population or attempted to optimize messaging elements used for their recruitment. The studies are also unique in that they specifically targeted IRS employees as a response group. Anecdotally, it has long been believed that because IRS employees are an underused source of potential VITA volunteers, the right type of recruitment messaging could allow the VITA program to greatly benefit from the on-the-job tax knowledge and experience that this population possesses.

Study 1

The purpose of Study 1 was to survey current and prospective VITA volunteers to better understand motivations to volunteer with the VITA Program. Theoretically, motivationally fulfilling activities are more satisfying. As such, the study used two motivational frameworks—Determination Theory and the Functional Approach to Volunteerism—to examine the relationship between motivational fulfillment, aspects of the volunteer experience, and overall satisfaction. We hypothesized that one or both of these theoretical frameworks influence individuals to volunteer with the VITA program and help sustain that volunteering from year-to-year.

Method

Participants. One thousand four hundred seven individuals participated in this survey. All participants were engaged in volunteer work, or had been within the past 12 months. Three subgroups of volunteers were targeted for the study: Current VITA volunteers (548 responses; respondents who answered "Yes" to "Are you presently, or have you been within the past 12 months, a VITA/TCE volunteer?"), IRS employees (436 responses; respondents from a sample of IRS employees who answered "No" to "Are you presently, or have you been within the past 12 months, a VITA/TCE volunteer?"), and non-VITA volunteers (423 responses; respondents who answered "No" to "Are you presently, or have you been within the past 12 months, a VITA/TCE volunteer?"), and non-VITA volunteers (423 responses; respondents who answered "No" to "Are you presently, or have you been within the past 12 months, a VITA/TCE volunteer?").

Procedure. Participants were invited to participate in an online Study of Volunteerism sponsored by the IRS. They were asked to complete a battery of self-report measures (described below).

Volunteer Functions Inventory (VFI). This 30-item questionnaire is used to measure functional motivations to volunteer (Clary, *et al.* (1998)). The scale is divided into 6 separate functional motives: protective, values, career, social, understanding, and enhancement. Participants were instructed to respond using a 1 (not at all accurate) to 5 (extremely accurate) Likert-type scale. Responses to these items were summed; scores on each subscale could range from 5 to 25, with higher scores indicating greater functional motive satisfaction during volunteer work.

Volunteer needs satisfaction (VNS). We modified the Basic Need Satisfaction at Work Scale (Deci, *et al.* (2000)), using 7 items to assess the extent to which individuals experience satisfaction in each of their three basic needs—autonomy, competence, and relatedness—while volunteering (3 sub-scales). Participants were instructed to respond using a 1 (not at all true) to 5 (very true) Likert-type scale and to consider their feelings and experiences from the past year of volunteer work. Responses to these items were summed; therefore, scores on each subscale could range from 7 to 35, with higher scores indicating greater need satisfaction during volunteer work.

Benefits of Volunteering. This 18-item scale measures functionally relevant and need-related benefits received through volunteering. Participants were instructed to respond using a 1 (strongly disagree) to 5 (strongly agree) Likert-type scale. Both functionally relevant (protective, values, career, social, understanding, enhancement) and need-relevant (autonomy, competence, relatedness) benefits are included. Responses to these items were summed; scores on each subscale could range from 5 to 15, with higher scores indicating a greater presence of the need-relevant or functionally relevant benefit.

Aspects of the VITA Volunteer Experience. These items, administered only to participants who indicated they were VITA volunteers, measured feelings toward volunteering for the IRS, factors influencing their decision to volunteer with VITA, satisfaction with their VITA experience, and whether they would recommend the VITA program to others. Items are analyzed individually, and kept continuous, with higher scores indicating a level of agreement or prevalence of satisfaction. **Demographics.** Participants were asked to respond to several types of demographic questions, including primary volunteer site type, age, education, and social media experience.

Study 1 Findings

Study 1 hypothesized that functional and psychological need satisfaction motivations exist within individuals who elect to volunteer with the VITA program.



FIGURE 1. Feelings About Volunteering for the IRS





As anticipated, VITA volunteers hold the most (75 percent) favorable feelings towards volunteering to help prepare tax returns, when compared to IRS employees (59) and non-VITA volunteers (General volunteers; 29 percent) respondents. Similarly, the overwhelming majority of VITA volunteers (95 percent) hold favorable feelings about volunteering for the IRS; the other two segments, IRS employees and non-VITA volunteers, hold considerably more unfavorable feelings (22 percent and 33 percent, respectively) towards volunteering to help prepare tax returns.



FIGURE 3. All Respondents—Function Approach to Volunteerism

General volunteers (3.94) and IRS employees (4.05) are most motivated by the values function; volunteering in their communities is driven by a concern for others and their community (Figure 3). VITA volunteer respondents are most motivated by the understanding function; volunteering with the VITA program allows them to learn, understand, and practice skills and abilities.



FIGURE 4. All Respondents—Volunteer Need Satisfaction

Items rated on a 5-point scale from 1 (not at all true) to 5 (very true).

Of the three basic needs, all respondents, regardless of their volunteer subgroup, indicated that volunteering primarily satisfies their competence and relatedness needs (General volunteers: competence (3.91) and relatedness (3.90); IRS employees: competence (4.07) and relatedness (4.01); VITA volunteers: competence (4.15) and relatedness (4.00)) (Figure 4). Their volunteer work allows them to feel capable of achieving desired goals and outcomes while also feeling related and connected to others.



FIGURE 5. All Respondents—Functional Benefits of Volunteering

Items rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree).

Of all the function-based benefits, VITA volunteers are primarily receiving values (4.39) and social (4.07) benefits from their VITA volunteer work (Figure 5). Said another way, volunteering with VITA is allowing volunteers to satisfy their concern for the welfare of others (values), while also developing and strengthening social ties to their community (social). IRS employees and general volunteers report receiving values benefits from their volunteer work (4.49 and 4.33, respectively), but also report receiving understanding benefits (3.85 and 3.92, respectively). These individuals are expressing their altruistic and humanitarian (values function) values while also gaining knowledge, skills, and abilities (understanding function).



FIGURE 6. All Respondents—Need-Relevant Benefits of Volunteering

Items rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree).

All respondents, regardless of their volunteer subgroup, indicated that they primarily receive relatedness benefits from their volunteering; their volunteer work allows them to provide an important service while also satisfying their need to belong (Figure 6).



FIGURE 7. All Respondents—Average Volunteer Satisfaction Ratings

Survey respondents were asked to rate elements of satisfaction with their volunteering experience. Respondents, regardless of their volunteer subgroup, rated "I believe that my volunteering is worthwhile" the highest (VITA volunteers 4.61; IRS employees 4.58; General volunteers 4.49) (Figure 7).





Items rated on a 5-point scale from 1 (not important) to 5 (extremely important).

Items rated on a 5-point scale from 1 (extremely dissatisfied) to 5 (extremely satisfied).

VITA volunteers were asked to rate the importance of various reasons to volunteer with the VITA program. Respondents indicated that providing an important service to people in need was the most important factor influencing their decision to volunteer with the VITA program. Volunteering in a role that does not require tax law knowledge (2.88) and not needing previous experience (2.93) were rated the least important factors influencing their choice to volunteer with VITA (Figure 8).

The overwhelming majority of VITA volunteer respondents indicated they would volunteer with the VITA program in the future (93 percent), would recommend volunteering with VITA/TCE to a friend (98 percent), and would recommend VITA/TCE tax services to a friend (99 percent) (Figure 9).



FIGURE 9. Future VITA Volunteer Plans and Willingness to Recommend VITA (n=543)

Discussion

The results from Study 1 reveal that volunteering—either with the VITA program or another type of volunteer organization—facilitates respondents' need-based and functionally relevant motivations, and contributes to their overall satisfaction with their volunteer work.

Study 2

Persuasive messages are effective to the extent that they are able to speak to the motivations specific to the recipient. In this applied context, if organizations were able to create recruitment materials that were tailored to individuals' psychological needs, these need-relevant messages would be more appealing and could ultimately allow organizations to be more successful in their recruitment efforts.

The purpose of Study 2 was to systematically test methods to optimize VITA recruitment efforts by administering a survey to current and prospective VITA volunteers, and analyzing it using a trade-off methodology. It was hypothesized that participants would find messages containing motivationally relevant elements more persuasive than those that did not.

Method

Participants. One thousand eight hundred sixty individuals participated in this survey. Unlike the first survey, approximately one-quarter of respondents were not engaged in any type of volunteer work at the time of the survey; all others were engaged in volunteer work, or had been within the past 12 months. Table 1 describes the four subgroups of people who were included in the study.

	General Population	IRS Employees	
	Are you presently, or have you been within the past 12 months, a VITA/TCE volunteer?	Are you presently, or have you been within the past 12 months, engaged in volunteer work?	Total
Yes	Current VITA volunteers 501	IRS employee volunteers 407	908
No	Non-VITA volunteers 426	IRS employee non-volunteers 526	952
Total	927	933	1,860

TABLE 1. Groups of People Included in the Study

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Procedure. Following the administration of Study 1, Pacific Consulting Group (PCG) convened a brainstorming session comprised of a group of VITA volunteers and IRS employees (from Research, the VITA Program, and Communications & Liaison) to craft motivationally relevant messaging ideas that provided the framework for Study 2. The brainstorming session participants were encouraged to expand upon Study 1 findings; said another way, the participants were encouraged to craft messages that directly spoke to respondents' motivations to volunteer and make a connection between the benefits of VITA volunteerism and the types of benefits that Study 1 respondents indicated they received from their volunteer work.

The final list of messaging elements included (see below): the media vehicle (i.e., how the message was received), the source (i.e., who provided the message), incentives, calls to action (i.e., the next step after receiving the message), and the message content.

FIGURE 10. Study 2 Messaging Elements

11 Media Vehicles

- Volunteer partner Website 1.
- 2. Volunteer matching site
- Local newspaper 3.
- 4. www.irs.gov video
- 5. Local radio
- 6. www.irs.gov Web page
- 7. IRS Facebook page
- 8 IRS Twitter
- 9 IRWeb
- 10. Posters in IRS cafeteria
- Internal IRS email 11.

7 Sources

- 1. VITA site coordinator
- Current VITA volunteer 2.
- Taxpayer helped by VITA 3
- No specific spokesperson 4.
- 5 J. Garcia. CARE director
- 6. A. Franqui, AARP board
- director 7 S. Orman, finance advisor

2016 Tax Organizer

1. Free hour of consultation with 2.

6 Incentives

- CPA 3. Letter of Commendation
- 4. No incentives
- IRS employee recognition 5.
- from division heads 6. Earn lunch with anyone at IRS

7 Calls to Action

- 1. Interactive suitability form
- 2. 2-minute video
- 3. Call with coordinator
- 4. Sign up for training
- Visit and observe VITA site 5
- 6. Leave contact at www.irs.gov 7. Watch 1-hour online training overview

23 Messages

- 1. Help someone get deserved refund
- 2. Thousands received refund
- Impact 4 million families 3
- 4. No prior tax experience needed
- Taxes are overwhelming. Help. 5.
- 6. E-learning helps with your taxes
- Learn tax law, customer service, and 7. software
- 8. There is a volunteer gap
- Flexible volunteer hours 9
- Taxes are confusing. You can help. 10.
- 40.000 have volunteered 11.
- 12. Returns are simple
- 13. Help military families
- 14. Give tax skills for lifetime
- 15. 60% of returns are simple
- 16 You have the power
- 17. Gain experience for your résumé
- 18. Reduce stress in the U.S.
- 19 Share, achieve immortality
- Springboard to business career 20.
- Good reason—Gwen Anderson 21
- signed up for 10th year 22 Help prevent tax evasion
- Give IRS a good name 23
Participants were invited to take an online Study of Volunteerism sponsored by the IRS. They were presented with a randomized assortment of options for each messaging element and asked to determine the value of individual components and overall persuasive appeal.

Pacific Consulting Group conducted PCG Net Optimizer[™] analysis to identify the most persuasive messaging elements to use in a communications campaign to persuade General volunteers and IRS employees to take the next step towards becoming a VITA volunteer. The Net Optimizer[™] analysis produces the relative value of each option within the messaging element, indexed on a 1 to 10 scale, with higher values indicating greater persuasive appeal. VITA volunteers were included due to their experiences with the VITA program, and the plausible role they would play in interacting with new VITA volunteers. The results from both the VITA volunteers and General volunteer groups inform VITA volunteer communications messages targeted to the general population. IRS employees had several unique messaging element options and therefore should be targeted separately.

Study 2 Findings

General Volunteers. When asked to indicate which messaging element was the most important, General volunteers rated how you get the message (28 percent) and what the message says (26 percent) as the most important (Figure 11). For younger respondents, incentive and what you should do next are more important, and how you get the message and what the message says are not as important compared to older respondents.



FIGURE 11. General Volunteers—Messaging Elements Percent Importance (n=426)



FIGURE 12. General Volunteers—How You Get the Message

For General volunteers, the highest value (10.00) was placed on volunteer matching Web site for how you get the message, followed closely by volunteer partner Web site (9.51). The IRS social media vehicles, specifically the Twitter feed and Facebook page, were the least persuasive (1.00 and 4.19, respectively) (Figure 12). Differences in preferences for how you get the message emerge when looking at age and education. Younger respondents place the highest value on a volunteer partner Web site, whereas older respondents place greater value on their local newspaper. Younger respondents and respondents with some higher education place greater er value on a page on IRS.gov.



Overall, higher value is placed on having a spokesperson, but not necessarily a known personality. The highest value was placed on receiving the message from a current VITA volunteer (10.00), VITA site coordinator (8.65), or a taxpayer who was helped by the VITA program (7.77) (Figure 13). Preferences differ slightly when age, employment, and education are considered; older or retired respondents and respondents with advanced degrees place greater value on a taxpayer helped by VITA over current VITA volunteers and VITA site coordinators.



FIGURE 14. General Volunteers—What the Message Says

General volunteers placed the highest value (10.00) on the message "The volunteer hours are flexible and include weekdays, evenings, and weekends" (Figure 14). Age differences emerge, with younger respondents placing greater value on "The only volunteer job where you learn tax law, customer service, and software skills at the same time."





Offering any incentive has a higher value than no incentive, and respondents placed the highest value on receiving a 2016 Tax Organizer file for signing up. Preferences differ when age and education are considered. Middle-aged respondents and those with a Bachelor's degree placed the highest value on an hour's consultation with a CPA, whereas younger respondents and respondents with some higher education place the highest value on a Letter of Commendation.





General volunteers placed the highest value on completing an interactive online form (10.00) to determine suitability as the next step in volunteering (Figure 16). Preferences differ when education is considered; respondents with advanced degrees place greater value on watching a 2-minute video, but those with only some higher education place greater value on talking with a site coordinator by phone about volunteer roles.

	Most Persuasive Message Scenario	Least Persuasive Message Scenario	Sample Message Scenario
How you get the message	Volunteer matching site	Twitter (IRS)	Video on IRS.gov Web site
Who gives the message	Current VITA volunteer	Suze Orman, personal finance advisor	Taxpayer helped by VITA
What the message says	The volunteer hours are flex- ible and include weekdays, evenings, and weekends.	Learn tax law as a springboard to a career in business.	Volunteer to prepare taxes and gain experience you can put on your resume.
Incentive	Sign up and receive a Tax Organizer file for 2016.	No incentive	No incentive
What you should do next	Complete an interactive online form with your volunteer pref- erences that will immediately determine your suitability for the role.	Watch a 1-hour training over- view online.	Watch a 2-minute video of a volunteer describing their experience and impact.
Percent likelihood of taking the next step	46%	20%	33%

TABLE 2. General Volunteers—Most and Least Persuasive Message Scenarios

When presented with the best possible combination of messaging element options (scenario), 46 percent of General volunteers indicated they would take the next step towards becoming a VITA volunteer (Table 2). When presented with the worst possible scenario, 20 percent indicated they would take the next step.



FIGURE 17. IRS Employees—Messaging Elements Percent Importance (n=933)

IRS Employees. When asked to indicate which messaging element was the most important, IRS employees rated how you get the message (26 percent) and what the message says (25 percent) as the most important (Figure 17).



FIGURE 18. IRS Employees—How You Get the Message

IRS employees placed the highest value (10.0) on internal IRS email for how you get the message. Other IRS sources—Web pages (8.76) or videos on IRS.gov (7.71), the internal Website IRWeb (7.93), and even communications posted in IRS buildings (6.58)—also were rated to be highly persuasive (Figure 18).

FIGURE 19. IRS Employees—Who Gives the Message



People with simple taxes often find filing overwhelming. They need your help.					,	10.00)				
Help those who serve our country by providing free tax preparation for military families.						9.89					
In your community we have volunteer gap: only 10 volunteers for 25 low-income or elderly citizens who need help with taxes.					9	9.61					
The volunteer hours are flexible and include weekdays, evenings, and weekends.					9	.36					
The only volunteer job where you learn tax law, customer service, and software skills at the same time.					9.	18					
VITA volunteers impact nearly 4 million families each year.					9.	13					
Most VITA returns are simple to prepare, and support is provided for more complicated returns.					8.9	93					
No prior tax experience is needed—you'll receive tax preparation training.					8.5	6					
Thousands of low-income taxpayers got refunds last year thanks to VITA volunteers.					8.5	1					
By volunteering with VITA you can help prevent tax return mistakes, so less work for the taxpayer and less work for the IRS.					8.4						
Volunteer to prepare taxes, and gain experience you can put on your resume.					8.20						
Half of Americans say that preparing a tax return is confusing. You can help.		7.88									
60% of VITA returns prepared involve a simple form such as 1040EZ.		7.78									
Help someone file and receive the full tax refund they deserve.		7.49									
There must be a good reason that IRS employee Gwen Anderson signed up as a VITA volunteerfor the 10th straight year.				7	.37						
Help someone file this season, and give them tax skills for a lifetime.				7	.20						
Help others prepare taxes, and help give IRS a good name.				7.	.19						
You have the power to use what you know to help others get their dough.			5	5.45							
40,000 people have volunteered with VITA more than 10 years.			5.	15							
You can reduce the stress level in the United States on April 15.			4.	90							
The 60 Link & Learn e-learning modules that train you will also help with your own taxes.			4.3	8							
Learn tax law as a springboard to a career in business.		2.4	0								
Share your knowledge. It is a way to achieve immortality. Dalai Lama.		1	.00								
	0	1	2	3	4	5	6	7	8	9	10

FIGURE 20. IRS Employees—What the Message Says

For IRS employees, the highest value (10.00) was placed on the message "People with simple taxes often find filing overwhelming. They need your help." Other highly valued messages follow a similar service theme (e.g., "Help those who serve our country" (9.89)), but also tap into benefits for the volunteer themselves (e.g., "Learn tax law, customer service, and software skills" (9.18) and "Volunteer hours are flexible" (9.36)) (Figure 20).



FIGURE 21. IRS Employees—Incentives

As with General volunteers, offering any incentive has a higher value than no incentive for IRS employees. They placed the highest value (10.00) on a Letter of Commendation as an incentive for volunteering (Figure 21).

FIGURE 22. IRS Employees—What To Do Next



For IRS employees, the highest value (10.00) was placed on completing an interactive form that determines suitability as the next step (Figure 22).

	Most Persuasive Message Scenario	Least Persuasive Message Scenario	Sample Message Scenario
How you get the message	Internal IRS email	Twitter (IRS)	Posters in IRS cafeteria
Who gives the message	VITA site coordinator	Suze Orman, personal finance advisor	Julie Garcia, CARE director
What the message says	People with simple taxes often find filing overwhelming. They need your help.	Share your knowledge. It is a way to achieve immortality. Dalai Lama.	60% of VITA returns prepared involve a simple form such as 1040EZ.
Incentive	Complete one year of successful volunteering and receive a Letter of Commendation to use in your job search.	No incentive	Help for one tax season and get a free hour's con- sultation with a CPA.
What you should do next	Complete an interactive online form with your volunteer prefer- ences that will immediately determine your suitability for the role.	Watch a 1-hour training over- view online.	Visit and observe at a VITA site.
Percent likelihood of taking the next step	46%	15%	30%

TABLE 3. IRS Employees: Most and Least Persuasive Message Scenarios

When presented with the best possible combination of messaging element options (a scenario), 46 percent of IRS employees indicated they would take the next step towards becoming a VITA volunteer. When presented with the worst possible scenario, 15 percent indicated they would take the next step (Table 3).

Current VITA Volunteers. Current VITA volunteers were asked to list the top reasons why they would encourage and discourage a friend to volunteer with VITA.

TABLE 4. Top Reasons To Encourage a FriendTo Volunteer with VITA

Reason To Volunteer	Percent
Helping society/community	34%
Learn about taxes	16%
Personal satisfaction	14%
To meet people (social reasons)	13%
Experience for career/education	7%
Negative comment	1%
Other	15%

TABLE 5. Top Reasons To Discourage aFriend To Volunteer with VITA

Reason Not To Volunteer	Percent
Takes time/very time-consuming	21%
People are frustrating/difficult to deal with/ not a people person	17%
Hard work/big training commitment	12%
Not good at math/taxes	9%
Not good with computers/computers are hard to use	5%
You are not appreciated	2%
Positive comment	4%
Other	31%

The most common reasons to volunteer with VITA were to help society or their community (34 percent), to learn about taxes (16 percent), for personal satisfaction (14 percent), and to meet people (13 percent) (Table 4). When asked about the top reasons not to volunteer with VITA, the most common are that it takes time or is very time-consuming (21 percent), people are frustrating or difficult to deal with (17 percent), and it's hard work or a big commitment (12 percent) (Table 5).



FIGURE 23. VITA Volunteers—Messaging Elements Percent Importance (n=501)

For VITA volunteers, the most important messaging elements are what the message says (27 percent) and how you get the message (24 percent) (Figure 23). Differences emerge when age is considered; for younger respondents, incentive, who gives the message, and what you should do next are more important, and how you get the message is not as important as it is to older respondents.





VITA volunteers placed the highest value (10.00) on receiving the message from the partner Web site (Figure 24). Differences in preferences emerged when age, employment, education, and years at VITA were considered. Younger VITA volunteers place the highest value on a volunteer matching site. Older volunteers, retired volunteers, those with Bachelor's or advanced degrees, and experienced VITA volunteers (i.e., those who have volunteered with VITA for more than five seasons) place greater value on a local newspaper.





In general, higher value is placed on having a spokesperson, but not necessarily a known personality. VITA volunteers placed the highest value (10.00) on a taxpayer who has been helped by VITA providing the message (Figure 25). Older respondents and experienced VITA volunteers placed the highest value on hearing the message from a VITA site coordinator.

Help someone file and receive the full tax refund they deserve.	10.00	
Thousands of low-income taxpayers got refunds last year thanks to VITA Volunteers.	9.61	
VITA volunteers impact nearly 4 million families each year.	9.29	
No prior tax experience is needed—you'll receive tax preparation training.	9.06	
People with simple taxes often find filing overwhelming. They need your help.	8.43	
The 60 Link & Learn e-learning modules that train you will also help with your own taxes.	8.36	
The only volunteer job where you learn tax law, customer service, and software skills at the same time.	8.28	
In your community we have volunteer gap: only 10 volunteers for 25 low-income or elderly citizens who need help with taxes.	7.74	
The volunteer hours are flexible and include weekdays, evenings, and weekends.	7.61	
Half of Americans say that preparing a tax return is confusing. You can help.	7.56	
40,000 people have volunteered with VITA more than 10 years.	6.82	
Most VITA returns are simple to prepare, and support is provided for more complicated returns.	6.65	
Help those who serve our country by providing free tax preparation for military families.	6.46	
Help someone file this season, and give them tax skills for a lifetime.	6.06	
60% of VITA returns prepared involve a simple form such as 1040EZ.	5.21	
You have the power to use what you know to help others get their dough.	4.66	
Volunteer to prepare taxes, and gain experience you can put on your resume.	4.60	
You can reduce the stress level in the United States on April 15.	3.90	
Share your knowledge. It is a way to achieve immortality. Dalai Lama.	2.23	
Learn tax law as a springboard to a career in business.	1.00	
(0 1 2 3 4 5 6 7 8 9	10

FIGURE 26. VITA Volunteers—What the Message Says

VITA volunteers placed the highest value (10.00) on the message "Help someone file and receive the full tax refund they deserve" (Figure 26). Differences emerge when considering education. Respondents with some higher education place the highest value on "Thousands of low-income taxpayers got refunds last year thanks to VITA volunteers."

FIGURE 27. VITA Volunteers—Incentive



Offering any incentive has a higher value than no incentive. VITA volunteers placed the highest value on a Tax Organizer file (10.00) as an incentive to volunteer (Figure 27). Differences in preferences emerge when considering age, employment, education, and years at VITA. Younger respondents, those who are employed, those who have volunteered one season or less, place greater value on a Letter of Commendation. Older respondents, retired respondents, those with Bachelor's or advanced degrees, those who have volunteered with VITA for two or more years place greater value on no incentive.

FIGURE 28. VITA Volunteers—What To Do Next



For VITA volunteers, the highest value was placed on talking to a VITA site coordinator (10.00) about volunteer roles for the next step (Figure 28). However, younger respondents, employed respondents, respondents with some higher education or a Bachelor's degree, and those who have volunteered with VITA for one season or less place a higher value on completing an interactive online form to determine suitability.

	Most Persuasive Message Scenario	Least Persuasive Message Scenario	Sample Message Scenario
How you get the message	Volunteer partner Web site	Twitter (IRS)	Facebook (IRS)
Who gives the message	Taxpayer helped by VITA	Annette Franqui, member of Board of Directors of AARP	VITA site coordinator
What the message says	Help someone file and re- ceive the full tax refund they deserve.	Learn tax law as a spring- board to a career in business.	You can reduce the stress level in the United States on April 15.
Incentive	Sign up and receive a Tax Organizer file for 2016.	No incentive	No incentive
What you should do next	Talk with a volunteer site coordinator by phone about the Tax Coach and Tax Pre- parer roles.	Watch a 1-hour training over- view online.	Fill out a form on IRS.gov with your contact information for someone to contact you.
Percent likelihood of taking the next step	56%	19%	38%

 TABLE 6. VITA Volunteers—Most and Least Persuasive Message Scenarios

When presented with the best possible combination of messaging element options (a scenario), 56 percent of VITA volunteers indicated they would take the next step towards becoming a VITA volunteer (Table 6). When presented with the worst possible scenario, 19 percent of VITA volunteers indicated they would take the next step.

Comparing Overall Top Preferences and Persuasive Appeal. The most persuasive combinations of messaging elements have a 46 percent–56 percent likelihood of leading to the next step, with some of the most persuasive messaging elements overlapping between groups.

	VITA Volunteers	General Volunteers	IRS Employees
How you get the message	Volunteer partner Web site	Volunteer matching site	Internal IRS email
Who gives the message	Taxpayer helped by VITA	Current VITA volunteer	VITA site coordinator
What the message says	Help someone file and re- ceive the full tax refund they deserve.	The volunteer hours are flex- ible and include weekdays, evenings, and weekends.	People with simple taxes of- ten find filing overwhelming. They need your help.
Incentive	Sign up and receive a Tax Organizer file for 2016.	Sign up and receive a Tax Organizer file for 2016.	Complete one year of suc- cessful volunteering and receive a Letter of Com- mendation to use in your job search.
What you should do next	Talk with a volunteer site co- ordinator by phone about the Tax Coach and Tax Preparer roles.	Complete an interactive online form with your vol- unteer preferences that will immediately determine your suitability for the role.	Complete an interactive online form with your vol- unteer preferences that will immediately determine your suitability for the role.
Percent likelihood of tak- ing the next step	56%	46%	46%

TABLE 7. Overall Most Persuasive Messaging Elements

TABLE 8. Least Persuasive Messaging Elements

	VITA Volunteers	General Volunteers	IRS Employees
How you get the message	Twitter (IRS)	Twitter (IRS)	Twitter (IRS)
Who gives the message	Annette Franqui, member of Board of Directors of AARP	Suze Orman, personal finance advisor	Suze Orman, personal finance advisor
What the message says	Learn tax law as a spring- board to a career in business.	Learn tax law as a spring- board to a career in business.	Share your knowledge. It is a way to achieve immortality. Dalai Lama.
Incentive	No incentive	No incentive	No incentive
What you should do next	Watch a 1-hour training over- view online.	Watch a 1-hour training overview online.	Watch a 1-hour training over- view online.
Percent likelihood of tak- ing the next step	19%	20%	15%

The least persuasive options dramatically lower the likelihood to take the next step (from 46 percent–56 percent to 15 percent–20 percent), and many of the least persuasive messaging options overlap between groups (Table 8).

Discussion

Both General volunteers and IRS employees are viable targets with considerable upside recruitment potential. Messages that appeal to the nature of volunteering (i.e., providing a needed service) and that acknowledge the busy lives that potential volunteers lead (i.e., volunteer hours are flexible) were rated highly. Spokespersons who can speak intimately about the VITA process are desired above famous individuals. Incentives are also highly persuasive tools. Combining messaging elements into campaigns with the highest possible impact would persuade nearly half of General volunteers and IRS employees to take the next step towards becoming a VITA volunteer.

General Discussion

Motivational Foundations of VITA Volunteerism

Study 1 findings indicated that functional and psychological need fulfillment did motivate individuals to volunteer, and led to greater satisfaction with their volunteer experiences. VITA volunteers had motivations that separated them from other types of volunteers. In addition to holding the most favorable attitudes towards volunteering for the IRS and helping others prepare tax returns, volunteering with VITA is a an extension of their concern for others and their community, and provides them with values and social functional benefits. General volunteers and IRS employees also report their drive for volunteerism being fueled by a concern for their community, and report receiving values and understanding functional benefits. All respondents indicated that their volunteer work reflects needs for competence and relatedness, allowing them to achieve desired goals and outcomes and facilitating interpersonal relationships with others.

Further, Study 2 findings revealed that certain combinations of message delivery mode, messenger, and message content were rated more persuasive by participants, and more likely to motivate them to take the next step towards becoming a VITA volunteer. While not always fiscally viable, incentives prove to be powerful tools of persuasion. Individuals actively engaged with the program (i.e., VITA volunteers, VITA site coordinators) should be used to recruit on behalf of the program, and when crafting recruitment messaging, messages that highlight the desirable functional- and need-based benefits should be highlighted.

Caveats

Several limitations apply to this effort. The first, which applies equally to both studies, is an issue of sample composition. Both studies relied on an opportunity sample of interested parties. While very common in research, it is plausible that the findings could have differed, and be more readily generalized if a more diverse population were used. Study 2 was unique in that it asked respondents to consider five disparate messaging elements and make one choice regarding persuasive appeal of the overall message. These series of hypothetical choices—the cornerstone of the trade-off analysis—are another limitation of the research because of the inherent benefit in examining prosocial behavior and decision-making in its most natural setting. Finally, it was implausible to brainstorm and test every potential incentive, spokesperson, media vehicle, message, and next step within the confines of this study. This is a limitation, because the strength of the decisions that respondents made were only as strong as the inputs used to build the model.

Implications for the Practice of Volunteering with the IRS

There are two practical implications of this research. First, the functional approach proposes that continued participation depends on a person-situation fit, such that volunteers who serve in roles that match their own motivations will derive more satisfaction and more enjoyment from their service and be more likely to intend to continue to serve than those whose motivations are not being addressed by their activities. Support for these propositions comes from Study 1, implying that VITA site coordinators and coordinators of volunteer service organizations may find it useful to work to maximize the extent to which they provide volunteer opportunities that afford benefits matched to their volunteers' motivations. In so doing, perhaps they will lessen the rate of turnover in their volunteer labor force.

The functional approach also suggests that underlying the decision to volunteer is a process by which individuals come to see volunteerism in terms of their personal motivations; one way that they can come to view volunteering this way is through exposure to optimized messages. Studies such as Study 2 have direct implications for the IRS and organizations dependent on the services of volunteers; such organizations should consider using applied research on motivations and their associated benefits to strategically promote their organizations in ways that speak to the volunteers they seek to recruit.

Implications for the Nature of Volunteering, and Conclusions

In this set of studies, we tested hypotheses about two critical events in the volunteer process: satisfaction of volunteer helpers and recruitment of new volunteers. Our findings lend support to the efficacy of using communications that emphasize need and functionally relevant factors—how they can stir an individual to action and lead to more satisfying volunteer experiences. Whereas research on prosocial behavior has most often focused on questions about whether a potential helper in a spontaneous helping situation will engage in a brief intervention (the prototypic example being research on bystander intervention in emergencies; e.g., Latané and Darley (1970)), attention to planned, sustained helping encourages us to consider other often neglected questions about the voluntary initiation of helping, and continued investment in and commitment to service as a voluntary helper.

Considerations of ongoing, planned helping behavior also illustrate the influence of person-based processes on helping, an influence that has often been found lacking relative to the situational determinants of prosocial action typically studied in spontaneous helping situations (e.g., Clary and Snyder (1991)). Planned helpfulness represents a phenomenon in which the salient cues for action are less demanding, at least in comparison to emergency situations. It engages processes that encourage individuals to look inward to their own dispositions, motivations, and other personal attributes for guidance in deciding whether to get involved in helping, in the selection of a helping opportunity, and in the maintenance of helping over an extended course of involvement.

As volunteerism as a form of sustained, ongoing helping directs us to consider person-based processes, the Functional Approach and SDT remind us that behavior (in this case planned, sustained helpfulness) is not simply a matter of being influenced by dispositions or by situational forces, but rather is jointly determined. Although the precise nature of this joint determination remains to be fully realized, individuals come with needs and motives important to them, and volunteer service tasks do or do not afford opportunities to fulfill those needs and motives. Together, these features of persons and of situations are integrated in the agendas that individuals create and implement as they seek out, become involved in, and continue to be involved in volunteerism.

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OMB# 1545-1432

IRS SURVEY OF VOLUNTEERISM

The Internal Revenue Service (IRS) is committed to better understanding the types of individuals that choose to commit their time to volunteer tax preparation or to volunteering in general. You can help in this important mission by providing your feedback below. This voluntary survey should take less than 15 minutes to complete. Our survey partner, Pacific Consuting Group, will keep your identity private to the extent permitted by law. If you have any questions about this survey, please email <u>survey@study.poglim.com</u> or contact the Survey Help Line at 1-886-890-7897 and refer to study R004.

1 Purpose of Volunteering

1.1 Are you presently, or have you been within the past 12 months, engaged in any volunteer work?

O Yes

O flo - Thank you, but this survey is only for those who have volunteered in the past 12 months.

The following questions ask about the reasons you volunteer in general. Please rate the accuracy of the following statements on a 5-point scale from "Not At All Accurate" to "Completely Accurate".

Purp	ose of Volunteering	Accurate	2	3		Accurate 5
1.2	Volunteering can help me to get my foot in the door at a potential new job.	0	0	0	0	0
1.3	My friends volunteer.	0	0	0	0	0
1.4	I am concerned about those less fortunate than myself.	0	0	0	0	0
1.5	People I'm close to want me to volunteer.	0	0	0	0	0
1.6	Volunteering makes me feel important.	0	0	0	0	0
1.7	People I know share an interest in community service.	0	0	0	0	0
1.8	No matter how bad I've been feeling, volunteering helps me to forget about it	0	0	0	0	0
1.9	I am genuinely concerned about the particular group I am serving.	0	0	0	0	0
1,10	By valuetzering I feel less locely.	0	0	0	0	0
1.11	I can make new contacts that might help my business or career.	0	0	0	0	0
1.12	Doing volunteer work releves me of some of the guit over being more fortunate than others.	0	0	0	0	0
1,13	I can learn more about the cause for which I am working.	0	0	0	0	0
1.14	Volunteering increases my self-esteem.	0	0	0	0	0
1,15	Volunteering allows me to gain a new perspective on things.	0	0	0	0	0
1.16	Volunteering allows me to explore different career options.	0	0	0	0	0
1,17	I feel compassion toward people in need.	0	0	0	0	0
1.18	Others with whom I am close place a high value on community service.	0	0	0	0	0
1.19	Volunteering lets me learn things through direct, hands on experience.	0	0	0	0	0
1.20	I feel it is important to help others.	0	0	0	0	0
1.21	Volunteering helps me work through my own personal problems.	0	0	0	0	0
1.22	Volunteering will help me to succeed in my chosen profession.	0	0	0	o	0
1.23	I can do something for a cause that is important to me.	0	0	0	0	0
1.24	Volunteering is an important activity to the people 1 know best.	0	0	0	0	0
1.25	Volunteering is a good escape from my own troubles	0	0	0	0	0
1.26	I can lears how to deal with a veriety of people.	0	0	0	0	0
1.27	Volunteering makes me feel needed.	0	0	0	0	0
1.28	Volunteering makes me feel better about myself.	0	0	0	0	0
1.29	Volunteering experience will look good on my resume.	0	0	0	0	0
1.30	Volunteering is a way to make new thiends.	0	0	0	0	0
1.31	I can explore my own strengths.	0	0	0	0	0

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Catalog Number 67363G

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Attitudes Toward Volunteering

The following questions ask about your attitudes towards your volunteer work and the place(s) where you volunteer. Please indicate on a 5-point scale from "Not At All True" to "Very True" how true the following statements are for you given your general experiences with volunteering.

Attitu	des Toward Volunteering	All True	2	3	4	True 5
21	I feel I can influence how my volunteer work gets done.	0	0	0	C	0
2.2	I really like the people I volunteer with,	0	0	0	0	0
2.3	I do hot feel very competent while volunteering.	0	0	0	0	0
2.4	When I volunteer, people tell me I am good at what I do.	0	0	0	0	0
25	I feel pressured while volunteering.	0	0	0	0	0
2.6	I get along with people where I volunteer.	0	0	0	0	0
27	I pretty much keep to myself while volunteering.	0	0	0	0	0
2.8	I am free to express my ideas and opinions while volunteering	0	0	0	o	o
2.9	I consider the people I volunteer with to be my friends.	0	0	0	0	0
2.10	I have been able to learn interesting new skills while volunteering.	0	0	0	0	0
2.11	While volunteering, I have to do what I am lold.	0	0	0	0	0
2.12	Most days I feel a sense of accomplishment from volunteering.	0	0	0	0	0
2.13	My feelings are taken into consideration while volunteering.	0	0	0	0	0
2.14	While volunteering, I do not get much of a chance to show how capable I am.	0	0	0	o	0
2.15	Where I volunteer, people care about me.	0	0	0	0	0
2.16	Where I volunieer, there are not many people that I am close to.	0	0	0	0	0
2.17	I feel like I can pretty much be myself while volunteering.	0	0	0	0	0
2.18	The people I volunteer with do not seem to like me much.	0	0	0	o	0
2.19	While volunteering I often do not leel very capable.	0	0	0	0	0
2.20	There is not much apportunity for me to decide for myself how to go about my volunteer work.	0	0	o	o	o
2.21	Where I volunieer, people are pretty friendly towards me.	0	0	0	0	0

Your Volunteer Experience

The following questions ask about your experiences volunteering. Please indicate to what extent you agree or disagree with the following statements regarding your volunteer work on a 5-point scale from "Strongly Disagree" to "Strongly Agree."

rour veluneer Expenience		-	3	-4	5
3.1 People close to me learned that I did volunieer work.	0	0	0	0	0
3.2 I feel important when I volunteer,	0	0	0	0	0
3.3 I am able to express my ideas and opinions when I volunteer.	0	0	0	0	0
3.4 I am able to explore my own personal strengths when I volunteer.	0	0	0	0	0
3.5 My friends have found out that I did volunteer work.	0	0	0	0	0
3.6 Volunteering is developing strengths and capabilities I didn't know I had.	0	0	0	0	0
3.7 I feel less londy when I volunteer.	0	0	0	0	0
3.8 I am able to add important experience to my resume.	0	0	0	0	0
3.8 Volunteering gives me new ways to interact with others.	C	0	0	0	0

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Your	Volunteer Experience	Strongly Disagree 1	2	3	4	Sarongy Agree 5
3.10	I make new contacts that might help my business or senser when I volunteer.	0	0	0	0	0
3.11	Volunteering says a lot about who I ark as a person.	0	0	0	0	0
3.12	I am genuinely concerned about the people whe are helped when I volunteer	0	0	0	0	0
3.13	I do something for a cause I believe in when I volunteer.	0	0	0	0	0
3.14	Volunteering gives me a sense of competence.	0	0	0	0	0
3.15	I feel better about myself when I volunteer.	0	0	0	0	0
3.16	I amable to work through some of my own personal problems when I volunteer	0	0	0	o	0
3.17	I learn how to deal with a greater variety of people when I volunteer	0	0	0	0	0
3.18	I now know and care about what happens in my community.	0	0	0	0	0

The following questions ask about your overall experiences volunteering. Please indicate to what extent you agree or disagree with the following statements given your overall volunteer experiences on a 5-point scale from "Strongly Disagree" to "Strongly Agree."

Satis	faction with Volunteering	Btrongly Disagree 1	2	3	4	Strongly Agree 5
3,19	I find my volunteer experience to be personally fulfilling.	0	0	0	0	0
3.20	I feel I accomplished some 'good' through my volunteer work.	0	0	0	o	0
3.21	I believe that my volunteering is worthwhile	0	0	0	с	0
3.22	I make an important contribution to the organization I volunteer for.	0	0	0	0	0
3,23	I am satisfied with my experience as a volunteer.	O	0	0	C	0

Volunteering with the VITA/TCE Program

4.1 How would you feel about volunteering to help people prepare their tax returns?

- O Very favorable O Favorable O Neutral O Unfavorable

- O Very unfavorable

4.2 How would you feel about volunteering for the IRS as an organization?

- O Very fevorable O Favorable
- O Neutral
- O Unfavorable
- O . Very unfavorable

The Volunteer Income Tax Assistance/Tax Counseling for the Elderly (VITA/TCE) Program is a community based effort. managed by the internal Revenue Service (IRS) that provides free tax return preparation assistance to low-to-moderate income taxpayers, seniors, people with disabilities and limited English speakers. Some of the organizations involved in this program Include United Way, Goodwill, AARP Tax Alce, and local community organizations.

4.3 Are you presently, or have you been within the past 12 months, a VITA/TCE volunteer?

O Yes

O No -> Please skip to Guestion 5.1

4.4 Please indicate the number of filing seasons you have volunteered with the VITA/TCE program: _ seasons

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- 4.5 At what type of VITA/TCE site have you volunteered in the most recent tax season?
 - O Traditional/Stand-alone VITA site
 - face-to-face tax preparation located throughout the community e.g. libraries, schools and non-profits) O Facilitated Self-Assistance (FSA) Stand-alone Site
 - (only allows taxpayers to self-prepare their return with the help of a VITA/TCE volunteer) O FSA Fusion
 - (sites that offer a combination of traditional VITA/TCE assistance and FSA)
 - O FSA Remike (allows taxpayers to have self-facilitated tax preparation experience from the location of their choice)
 - O Virtuel Tax Preparation Site
 - despayers bring their documentation to a designated drop-off location to be prepared by a VTA/TCE volunteer) O Mittary VITA
 - pax assistance for military members and their families, located on military installational O Tax Counseling for the Edenty (TCE) - non-AARP
 - (fee lax help for taxpayers 60 years of age and other specializing in questions about pensions and reinement-related issues unique to seniors) O AARP-Tax Aide

 - (TCE sites operated by the AARP Foundation's Tax Aide Program)

Factors in Decision to Volunteer with VITA

When you were deciding whether to volunteer with VITA/TCE, how important were the following factors to you'? How important was it that ?

		important 1	2	3	4	important 5
4.6 No previous experien	ice is required to volunteer with VITA.	0	0	0	0	0
4.7 IRS provides free tax to prepare basic tax r	law training, e-file training and all the materials needed returns.	٥	0	0	0	o
4.8 The volunteer hours a	are flexible.	Ó	0	0	0	0
4.9 VITA/TCE volunteer to community and neight	sites are generally located at convenient locations (a.g., iborhood centers, schools, libraries).	0	0	0	0	0
4.10 I can volunteer in a re	ole that does not require tax law knowledge.	0	0	0	Ó	0
4.11 I would be providing a their returns.	on important service for people who seed help preparing	o	0	0	٥	0
4.12 I would be representi	ng the IRS and the tax preparation community.	0	0	0	0	0
4.13 I will not be held liable	e for mistakes made in my role as a VITA/TCE volunteer	0	0	0	0	0

Satisfaction with VITA/TCE Experience

Please rate your satisfaction with your experience as a VITA/TCE volunteer. How satisfied are you with the ...?

		Extremely Dissatisfied 1	2	3	4	Extremely Satisfied 5
4.14	Mode of delivery of the training (e.g., online, face-to-face, etc.)	0	0	0	0	0
4.15	Level of detail provided in the training material.	0	0	0	0	0
4.16	Topics covered in training.	0	0	0	c	0
4,17	Overall quality of the training for your role as a volunteer for VITA/TCE.	0	0	0	c	0
4.18	Quality of the resources and support available to you while you were volunteering.	0	0	0	0	0
4.19	Appreciation you received from the IRS or the sponsoring organization.	0	0	0	o	0
4.20	Overall, how satisfied are you with your VITA/TCE volunteering experience?	0	0	0	0	0

4.21 Please describe any other resources you felt you needed but did not receive that would have made you feel more supported in your role as a VITA/TCE volunteer.

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		IRS Sa	rvey of Volunteerism	
4.22	Do you plan to volu	nteer with VITA/TCE in the future	a?	
	O Yes O No			
4.23	Would you recomm	end volunteering for VITA/TCE to	o a friend?	
	O Yes O No			
4.24	Would you recomm	end VITA/TCE tax filing services	to a friend who needs	ed help filing taxes?
	O Yes O No			
6	General Volunte	er Information		
hein	lowing questions ask	shout your volunteering in gene	ral.	
ne to	iowing docations ask	about your volunteering in gene	T 40.	
5,1	How long have you	been participating in any type of	volunteer activities?	
	O 1-2 years			
	O 3-5 years O 6-10 years			
	O More than 10 year	C		
5.2	When do you typica	lly volunteer? Please select all t	hat apply.	
	During regular bus	iness hours		
	Evenings Weekends			
5.3	How many organiza	tons have you volunteered with	during the past 12 m	onths?
	0 1			
	0 2-3			
	O More than 5			
5.4	Where do you typics	ally look for information about vo	lunteer opportunities?	Please select all that apply.
	Facebook	Current volu	nteer organization(s) (e.g	p. website, newsletters, email)
	Twitter	Church or or National call	ganizational publication	(e.g., newsletters)
	News websites	Local public	ations (e.g., newspapers	magazines)
	Linkedin	 Word of mo. Other 	an.	
5.5	How would you des	cribe your current volunteer activ	vities? Please select a	all that apply
	U Volunteer tax prep	arer (e.g., Volunteer income Tax Ass	istance/Tax Counseling	for the Elderly (VITA/TCE) volunteer)
	Cosch, referee, or Tutor or teach	supervise sports teams or other out	door activities	
	Mentor or voluntee Re as subas, creation	r with youth feens		
	Collect, prepare, d	istribule, or serve food		
	Fundraise or sell 8 Provide counseling	ems to make money a medical care. FIRE/EMS, prorote	ctive services	
	Provide general of	file services		
	 Engage in music p 	al or management assistance, inclu enformance, or other artistic activitie	guê servinê di a poaro i	or committee
	Engage in general Debitical activities	labor, supply general transportation	to people	
	Environmental ser	vices or protection		
	 Animal rescue or s Some other activity 	ervices f		
orn 1	4683(12-2014)	Cetalog Number 67363G	XXXX /3.00V	Department of the Treasury-Internal Revenue Servic

The following questions are about your primary volunteer activity.

- 5.6 Which of these best describes your primary volunteer activity? Please select one response.
 - O Volunteer lax preparer (e.g. Volunteer income Tax Assistance/Tax Counseling for the Ederly (VITA/TCE) volunteer)
 - O Coach, referee, or supervise sports teams or other outdoor activities
 - O Tutor or teach
 - O Mentor or volunteer with youth feens O Be an usher, greeter, or minister
 - O Collect, prepare, distribute, or serve food
 - O Fundraise or sell items to make money
 - O Provide counseling, medical care, FIRE/EMS, or protective services
 - O Provide general office services
 - O Provide professional or management assistance, including serving on a board or committee
 - O Engage in music performance, or other artistic activities
 - O Engage in general labor, supply general transportation to people
 - O Political activism
 - O Environmental services or protection
 - O Animal rescue or services O Some other activity

5.7 What is the name of the primary organization or agency you volunteer wth?

5.6 Did you receive any training prior to the start of your primary volunteer experience?

- O Yes
- O No

5.9 How do you typically volunteer when you are at your primary volunteer location? Please select all that apply.

- I Alone
- With family
- With one or two friends
- With a small group.
- With a large group (e.g., social organization or church group)

General Demographic Information

What devices do you typically use to access the internet? Please select all that apply. 6.1

- Desktop computer
- Laptop computer
 Tablet (e.g., iPad)
- Smartphose (e.g., iPhone, Android, Blackberry) Other (please specify)
- 6.2 What is your manital status?
 - O Single, never married
 - O Married
 - O Civil union/Domestic partnership O Separated

 - O Divorced O Widowed
- 6.3 What is your sex?
 - O Male
 - O Female
 - O Transpendered
 - O Other

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- 6.4 Which category describes your current age?
 - O 18 to 24 years O 25 to 34 years
 - O 35 to 44 years
 - O 45 to 54 years
 - O 551084 years
 - O 65 to 74 years O 75 to 84 years
 - O Over 85 years
- 6.5 What is your employment status?
 - O Student, working part time
 - O Student, working ful time

 - O Employed full time O Employed part lime
 - Not employed, but looking for work

 - O Retired, not employed Please skip to Question 6.7
- 6.6 If you are currently employed or looking for work, which of the following best describes your field or industry?
 - O Agriculture/Forestry/Fishing
 - O MiningConstruction
 - O Business/Professional Services
 - O Computers/Information Technology O Transportation/Communications and Public Utilities
 - O Education

 - O Financial Services/Tax services O Public Administration
 - O Healthcare
 - O Manufacturing
 - O Active Duty Miltary
 - O Non-Profit or Religious Organization
 - O Government Agence
 - O Insurance/Real Estate
 - O Retai/Wholesale
 - O Other
- 6.7 What is the highest level of education you have completed?
 - O Grade school
 - O Some high school O High school diploms/GED
 - O Trade/Vocational school
 - O Some college
 - O Associate's degree
 - O Bachelor's degree
 - O Advanced degree (Master's, Doctaral, or professional degree)

Thank you for completing the survey. Please return this questionnaire by mail using the enclosed business return envelope or by mailing the survey to the following address:

> Pacific Consulting Group, IRS Survey of Volunteerism P.C. Box 60058

> > Palo Alto, CA 94308

Paperwork Reduction Act Notice

The Paperwork Reduction Act requires that the IRS display an OMB control number on all public information requests. The OMB Control Number for this study is 1545-1432. Also, if you have any comments regarding the time estimates associated with this study or suggestions on making this process simpler, please write to the: Internal Revenue Service, Tax Products Coordinating Committee, SEW CAR MP TTSP,1111 Constitution Ave. NW, IR 6406, Washington, DC 20224

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APPENDIX B Study 2 Questionnaire

IRS Survey of Volunteerism

The IRS is committed to better understanding the types of individuals that choose to commit their time to volunteer tax preparation or to volunteering in general. You can help in this important mission by providing your feedback in this voluntary survey. It should take less than 15 minutes to complete. Our survey partner, Pacific Consulting Group, will keep your identity private to the extent permitted by law. If you have any questions about this survey, please email <u>surveyStatudy porfirm com</u> or contact the Survey Help Line at 1-866-960-7887and refer to study R004.

1. Introduction

1.1 Are you presently, or have you been within the past 12 months, engaged in volunteer work?

O Yes

O No (TERMINATE ONLY if Not IRS Employee: Thank you, but this servey is only for those who have volunteered in the past 12 months.)

The following questions ask about the reasons you volunteer in general. Please rate the accuracy of the following statements on a 5point scale from "Not At All Accurate" to "Completely Accurate".

Furp	ose of Volunteering	ering Not At All		9	ompletely Accurate	
		1	2	3	- 4	5
1.2	Volunteering can help me to get my loot in the door at a potential new job.	0	0	0	0	0
1.3	I can make new contacts that might help my business or career.	0	0	0	0	0
1.4	Doing volunteer work relieves me of some of the guilt over being more fortunate than others.	o	D	0	0	0
1.5	Volunteering allows me to gain a new perspedive on things.	0	0	0	0	D
1.6	I feel compassion toward people in need.	0	0	0	0	0
1.7	Others with whom I am close place a high value or community service.	0	0	0	0	0

Please indicate to what extent you agree or disagree with the following statement given your overall experiences on a 5-point scale from "Strongly Disagree" to "Strongly Agree".

Satisfaction with Volunteering		Strongly Disagree			84	Strongly Agree
	-	1	2	3	4	5
1.8	I am satisfied with my experience as a volunteer.	0	0	0	0	0

2. Preferences

The Volunteer Income Tax Assistance/Tax Counseling for the Elderly (VITA/TCE) Program is a community based effort managed by the Internal Revenue Service (IRS) that provides free tax return preparation assistance to low to-moderate income taxpayers, seniors, people with disabilities, and limited English speakers. Some of the organizations involved in this program include United Way, Goodwill, AARP Tax Aide, and local community organizations. Volunteers do not need prior tax experience.

[Programmer: Add clickable definition of VITA throughout survey: "Volunteer Income Tax Assistance Program that provides free tax return preparation assistance to low-to-moderate income taxpayers, serios, people with disabilities, and limited English speakers. Volunteers do not need prior tax experience."]

[IRS Employees only.] For this survey, please assume VITA Volunteering means helping people in your community outside of work hours.

2.0 Are you presently, or have you been within the past 12 months, a VITA/TCE volunteer?

O Yes O No

For each of the following questions, please assume you see or hear a message about volunteering with the VITA program.

[For VITA Volunteers Only (G2.0=yes), repeat before each of the Q2 series below. "If you are a current VITA volunteer, please think back to when you first decided to become a volunteer."] 2.1 Which message content would be most persuasive and which would be least persuasive in convincing you to take the next step towards becoming a VITA Volunteer?

Select one option per column. (Programmer: first column selection can NOT be the same as the second column)

	Most Persuasive (choose one)	Least Persuasive (choose ene)
Help someone file and receive the full tax refund they deserve.	0	0
Learn tax law as a spring board to a career in business.	0	0
The volunteer hours are flexible and include weekdays, evenings, and weekends.	0	0
People with simple takes often find fling overwhelming. They need your help.	0	0
Share your knowledge. It is a way to achieve immortality. Datai Lama.	0	0
Help those who serve our country by providing free tax preparation for military families.	0	0
No prior tax experience is needed—you'll receive tax preparation training	0	0
60% of VITA returns prepared involve a simple form such as 1040EZ.	o	o

2.2 How would you most like and least like to learn about volunteering for VITA? Select one option per column. [Programmer: first column selection can NOT be the same as the second column]

	Most Like (choose one)	Least Like (choose one)
Page on IRS.gov website	0	Q
Local radio	0	0
Volunteer matching site (e.g. volunteermatch.org)	0	0
Facebook (IRS)	0	0
Local newspaper	0	0
Video on IRS gov website	0	0
Twitter (IRS)	0	0
Volunteer partner website (e.g. AARP, United Way)	0	0

2.3 From which individual would you most like and least like to learn about volunteering for VITA? Select one option per column. [Programmer: first column selection can NOT be the same as the second column]

	Most Like (choose one)	Least Like (choose one)
Current VITA volunteer	0	0
Annette Franqui, member of Board of Directors of AARP	0	0
Taxpayer helped by VITA	0	0
VITA Site Coordinator	0	0
Suze Orman, personal finance advisor	0	0

2.4 Which incentive would be most persuasive and which would be least persuasive in motivating you to take the next step towards becoming a VITA volunteer? Select one option per column.

[Programmer: first column selection can HOT be the same as the second column] [Programmer: throughout survey, add clickable definition for Tax Organizer File: File folder set up to organize your tax receopts and papenwork for filing]

	Most Persuasive (choose one)	Least Persuasive (choose one)
Help for one tax season and get a free hour's consultation with a CPA	0	0
Sign up and receive a Tax Organizer file for 2016	0	0
Complete one year of successful volunteering and receive a Letter of Commendation to use in your job search	o	٥

2.5 Which next step would you most like and least like to take in order to get more information about volunteering for VITA? Select one option per column.

[Programmer: first column selection can NOT be the same as the second column] [Add popup definition of interactive Online Form: "A set of questions online that ask about your qualifications and preferences and based on your responses determine if you'd be a good match to be a VITA Volunteer."]

	Most Like (choose one)	Least Like (choose one)
Watch a 2 minute video of a volunteer describing their experience and impact	0	0
Visit and observe at a VITA site	0	0
Fill out a form on IRS gov with your contact information for someone to contact you	0	o
Watch a one hour training overview online	0	0
Talk with a volunteer site coordinator by phone about the Tax Coach and Tax Preparer roles	o	o
Sign up for the training and certification process	0	0
Complete an interactive online form with your volunteer preferences that will O immediately determine your suitability for the role		o

3. Persuasive Messages

For the following set of questions, we will ask you to compare a series of two separate messages about volunteering for VITA and to choose the one that would be most likely to persuade you to take the next step in becoming a VITA Volunteer. You will be presented with ten different sets of messages to compare, each containing different messaging elements.

There are no right or wrong answers. We are only interested in how you would react to the different messaging elements based on the information provided.

What will persuade you to take the next step towards becoming a VITA Volunteer?

[For VITA Volunteers Only (G2.0=yes): "If you are a current VITA volunteer, please think back to when you first decided to become a volunteer."]

Each message will contain five different messaging elements.

How you get the message: where the message is presented

- · Who is giving the message: the individual presenting the message
- · What the message says: the content of the message
- · Incentive: additional benefits to motivate VITA volunteering
- What you should do next: the next step you can to take towards becoming a VITA volunteer

Please click here to review examples and to become familiar with the different options and what they mean. [ONLY show if clicked]

- · How you get the message: where the message is presented
 - Page on IRS.gov webste
 - Local radio
 - Twitter (IRS)
- · Who is giving the message the individual presenting the message
 - Current VITA volunteer
 - Taxpayer helped by VITA
 - VITA Site Coordinator
- What the message says the content of the message
 - Help someone file and receive the full tax refund they deserve.
 - Learn tax law as a spring board to a career in business.
 - VITA volunteers impact nearly 4 million families each year.
- · Incentive: additional benefits to motivate VITA volunteering
 - Help for one tax season and get a free hour's consultation with a CPA
 - Sign up and receive a Tax Organizer file for 2016
 - Complete one year of successful volunteering and receive a Letter of Commendation to use in your job search
- · What you should do next the next step you can to take towards becoming a VITA volunteer
 - Fill out a form on IRS.gov with your contact information for someone to contact you
 - Complete an interactive online form with your volunteer preferences that will immediately determine your suitability for the role
 - Watch a one hour training overview online

[NOTE: List below of all Conjoint Messaging Elements (Attributes and Levels) is for programming only. Do not show in survey.]

How you get	 Page on IRS.gov website
the message	 Video on IRS gov website
	Twitter (IRS)
	 Facebook (IRS)
	 Volunteer partner website (e.g. AARP, United Way)
	 Volunteer matching site (e.g. volunteermatch.org)
	Local radio
	Local newspaper
	[SHOW TO IRS EMPLOYEES ONLY]
	IRWeb

4

	Posters in IRS caleteria Internal IRS email
Who gives the message	Current VITA volunteer Taxpayer helped by VITA VITA Site Coordinator Suze Orman, personal finance advisorAnnette Franqui, member of Board of Directors of AARP No specific spokesperson [SHOW TO IR\$ EMPLOYEES ONLY]
100.000	CARE Director
message says	 The only volunteer job where you learn tax law, customer service and software skills at the same time. Share your knowledge. It is a way to achieve immortality. Datai Lama. You have the power to use what you know to help others get their dough. The 60 Link & Learn e-learning modules that train you will also help with your own taxes. In your community we have volunteer gap: only 10 volunteers for 25 low income or elderly citizens who need help with taxes. Half of Americans say that preparing a tax return is confusing. You can help. You can reduce the stress level in the United States on April 15. 40,000 people have volunteered with VITA more than 10 years. People with simple taxes often find filing overwheiming. They need your help. Learn tax law as a spring board to a career in business. VITA volunteers impact nearly 4 million families each year. The volunteer hours are flexible and include weekdays, evenings, and weekends. No prior tax experience is needed—you'll receive tax preparation training. Thousands of low income taxpayers got refunds last year thanks to VITA Volunteers. Most VITA returns are simple to prepare and support is provided for more complicated returns. Help someone file this season and give them tax skills for a lifetime. Volunteer to prepare taxes and gain experience you can put on your resume. 60% of VITA returns prepared involve a simple form such as 1040EZ. Help tose who serve our country by providing free tax preparation for military families. SHOW TO IRS EMPLOYEES ONLY: There must be a good reason that IRS employee Gwen Anderson signed up as a VITA volunteer. for the 10[®] straight year. By volunteering with VITA you can help prevent tax return mstakes, so less work for the taxayour tax preventeers and pain experience.
Incentive	Help for one tax season and get a free hour's consultation with a CPA Sign up and receive a Tax Organizer file for 2010 Complete one year of successful volunteering and receive a Letter of Commendation to use in your job search No incentive [SHOW TO IRS EMPLOYEES ONLY] Help 50 taxpayers and receive recognition from division heads at the town hall meeting. Sign up with VITA and earn lanch with anyone at the IRS of your choosing
Next Step	 Fill out a form on IRS gov with your contact information for someone to contact you Complete an interactive online form with your volunteer preferences that will immediately determine your suitability for the role Talk with a volunteer site coordinator by phone about the Tax Coach and Tax Preparer roles Watch a 2 minute video of a volunteer describing their experience and impact Watch a one hour training overview online Visit and observe at a VITA site Sion up for the training and certification process

wits time to make some choices!

The following questions look similar, but each presents slightly different details for the two different messages so please pay attention! In each question, please compare the two boxes and choose the more persuasive message by selecting the radio button under that message.

3.1	Which message is more	persuasive in convincing y	ou to take the next st	ep described	in the table below?
-----	-----------------------	----------------------------	------------------------	--------------	---------------------

	Message 1	Message 2
How you get the message	Page on IRS.gov website	Local newspaper
Who gives the message	Suze Orman, personal finance advisor	Current VITA Volunteer
What the message says	The only volunteer job where you learn tax law, customer service and software skills at the same time	40,000 people have volunteered with VITA more than 10 years.
Incentive	Sign up and receive a Tax Organizer file for 2018	No incentive
What you should do next	Watch 2 minute video of a volunteer describing their experience and impact	Talk with a volunteer coordinator by phone about the Tax Coach and Tax Preparer roles
Which message is more persuasive in convincing you to take the next step described above?	o	o

[REPEAT THE QUESTION 9 MCRE TIMES FOR A TOTAL OF 10 COMPARISONS. PROGRAM WILL ROTATE THE MESSAGE ELEMENTS.]

3.2 Which of the following two messages presented on IRS gov is more persuasive?

[Show two images with the same content, incertive, and next step: "Help someone file this season and give them tax skills for a lifetime.Learn more by watching a one hour training overview online." One image has a picture of a taxpayer being helped at a VITA site and one image has no picture (only text). Respondents selects one image.]

4. Thank you for making those choices.

In the tables below, you will see two messages. How likely would you be to take the next step towards becoming a VITA volunteer if you were to receive each of these two messages? Please indicate the likelihood for each with the sliding scale ranging from 0 to 100. O means "Definitely would NOT take the next step towards becoming a VITA volunteer" and 100 means "Definitely WOULD take the next step towards becoming a VITA volunteer."

[PROGRAMMER: Force answer to this question. Please do not show the error message for the pretest due to the scale resetting to 0 issue. We want to see how many respondents in the pretest actually give reverse answers.]

in the second	Message 1	Message 2
How you get the message	[Programmer: Show most liked from 2.2]	[Programmer: Show least liked from 2.2]
Who gives the message	(Programmer: Show most liked from 2.3)	(Programmer: Show least liked from 2.3)
What the message says	[Programmer: Show most persuasive from 2.1]	[Programmer: Show least persuasive from 2.1]
Incentive	[Programmer: Show most persuasive from 2.4]	[Programmer: Show least persuasive from 2.4]
What you should do next	(Programmer: Show most liked from 2.5)	(Programmer: Show least liked from 2.5)
Likelihood of you taking the	(Programmer: Show sliding scale from 1- 100 with 0 being "Definitely would NOT"	(Programmer: Show sliding scale from 1- 100 with 0 being "Definitely would NOT"

next step towards becoming a	and 100 being 'Definitely would')	and 100 being "Definitely would"
VITA volunteer		

5. Volunteering with the VITA/TCE Program

[Programmer: Only ask section 5 if Q2.0=yes]

5.2 Please indicate the number of filing seasons you have volunteered with the VITA/TCE program. seasons

5.3 At what type of VITA/TCE site have you volunteered in the most recent tax season? O Traditional/Stand-alone VITA site

(face-to-face fax preparation located throughout the community, e.g. libraries, schools and non-profits)

O Facilitated Self-Assistance (FSA) Stand-alone Site (only allows taxpayers to self-prepare their return with the help of a VITA/TCE volunteer)

O FSA Fusion

(sites that offer a combination of traditional VITA/TCE assistance and FSA)

O FSA Remote (allows taxpayers to have self facilitated tax preparation experience from the location of their choice)

O Vetual Tax Preparation Site (taxpayers bring their documentation to a designated drop-off location to be prepared by a VITA/TCE volunteer).

OMIRBY VITA

(ixx assistance for military members and ther families, located on military installations) OTax Counseling for the Elderly (TCE) – non-AARP (free tax help for taxpayers 60 years of age and idder specializing in questions about pensions and retirement-related issues unique to seniors) OAARP - Tax Aide (TCE sites operated by the AARP Foundation's Tax Aide Program)

5.4 Do you plan to volunteer with VITA/TCE next year? O Yes O No

5.4a Thinking about your overall experience volunteering with VITA, what would you tell a friend who is interested in VITA are the top three reasons to volunteer with VITA/TCE next year? (open end with three answer slots numbered 1, 2, 3)

5.4b Thinking about your overall experience volunteering with VITA, what would you tell a friend who is interested in VITA are the top three reasons NOT to volunteer with VITA/TCE next year? (open end with three answer slots numbered 1, 2, 3)

5.5 Would you recommend volunteering for VITA/TCE to a friend?

O Yes O No

5.5a [If no to prior question] Why would you not recommend volunteering for VITA/TCE to a friend? (open end)

6. Demographics

8.0 Where do you typically look for information about volunteer opportunities? Please select all that apply.

- Facebook
 Twitter
- Google+ Linked in
- News websites
- Blogs
 Current volunteer organization(s) (e.g. website, newsletters, email)
- Church or organizational publication (e.g., newsletters)
 National publications (e.g., newspapers, magizines)
- Local publications (e.g., newspapers, magazines)
 Word of mouth
- C Other

6.1 What devices do you typically use to access the internet? Please select all that apply.

Desktop computer

Laptop computer

- 6.2 What is your manital status?
 - O Single, sever married O Married
 - O Civil union/Domestic partnership
 - O Separated
 - O Divorced O Widowed
- 6.3 What is your sax?
 - O Male O Pemale

 - O Transgendered O Other
- 6.4 Which category describes your current age?
 - O 18 to 24 years
 - O 25 to 34 years
 - 35 to 44 years
 - C 45 to 54 years C 55 to 64 years
 - 65 to 74 years
 - O 75 to 84 years O Over 85 years
- 6.5 What is your employment status?
 - O Student, working part time
 - O Student, working full time
 - C Student full time (please skip to Question 6.7) O Employed full time
 - Employed part time

 - Not employed, but looking for work Not employed and not looking for work (please skip to Question 6.7)

 - Retired, working part time
 Retired, not employed (please skip to Question 6.7)

6.6. [SKIP FOR IRS EMPLOYEES] If you are currently employed or looking for work, which of the following best describes your field or industry?

- O Agriculture/Forestry/Fishing
- O Mining/Construction
- O Business/Professional Services
- Computers/Information Technology
- O Transportation/Communications and Public Utilities
- O Education
- O Financial Services/Tax services
- O Public Administration
- O Heathcare
- O Manufacturing
- O Active Duty Miltary
- O Non-Profit or Religious Organization
- O Government Agency
- O Insurance/Real Estate
- O RetailWhalesale
- O Other
- 6.7 What is the highest level of education you have completed?
 - C) Grade school
 - Some high school
 High school diploms/GED

 - O Trade/Vocational school O flome college
 - O Associate's degree
 - O Bachelor's degree
 - C Advanced degree (Master's, Doctoral, or professional degree)

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REST OF QUESTIONS FOR IRS EMPLOYEES ONLY] 6.8 How many years have you been employed by IRS7 (enter number)

- 6.9 Which IRS Division do you work for?
 - 0 W8I 0 \$8/5E
 - O LBM
 - O Appeals O TAS
 - O SPEC
 - O C&L O Other
- 6.10 What is your role?
 - 0 Analyst 0 CSR
 - O Other, specify _
- 6.11 Do you currently or have you in the past needed to know how to prepare tax returns as part of your job? [multiple response] Yes, Individual Returns
 Yes, ONLY returns other than Individual Returns (SB/SE, L8&I)
 No

8.12 In your current job at the IRS, are you more busy during tax preparation season (January-April) than the rest of the year?

- O Never
- O Sometimes O Always

Thank you for completing the survey.

Paperwork Reduction Act Notice

The Paperwork Reduction Act requires that the IRS display an OMB control number on all public information requests. The OMB Control Number for this study is [OME number]. Also, if you have any comments regarding the time estimates associated with this study or suggestions on making this process simpler, please write to the Internal Revenue Service, Tax Products Coordinating Committee, SE W CAR MP T.T.SP, 1111 Constitution Ave. MV, IR-6409, Washington, DC 20234

Do Appeals to Social Norms Increase Taxpayer Compliance?

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Improving tax compliance is a main goal of revenue agencies around the world. The standard policy tool has traditionally been increased enforcement efforts (e.g., larger penalties, higher audit rates). However, in recent years other policy tools have been suggested and tested. Several field experiments have found that appeals to certain social norms in the form of letters sent to taxpayers requesting payment of unpaid taxes yields a significant positive response (Hallsworth, List, Metcalfe, and Vlaev (2014); Bott, Cappelen, Sørensen, and Tungodden (2014); Iyer, Reckers, and Sanders, (2010)). However, evidence for social appeals is not clear-cut. Other field experiments have found either no or ambiguous effects (Blumenthal, Christian, and Slemrod (2001); Wenzel (2005, 2006); Wenzel and Taylor (2004); Torgler (2004, 2012)).

This paper uses laboratory experiments to test appeals to social norms as a means to improve tax payment compliance. We formulate a model of the ways in which social norms affect an individual's compliance decision. We then test the predictions of this model using data from laboratory experiments in which different appeals to social norms are presented. In our experimental design, student subjects earn income by performing a task, they disclose income, and they face an audit process similar to that in the natural setting. A key feature is that different social norms: "descriptive norms," or the type of behavior that is typical or most frequently enacted, and "injunctive norms," or the type of behavior that "constitutes morally approved and disapproved conduct." In addition, for injunctive norms we introduce approval-framed and disapproval-framed injunctive norm messages.

Our results suggest that appeals have a modest but statistically significant impact on tax compliance. The magnitude of both approval- and disapproval-framed injunctive norm messages is an increase of around 2 percent in taxes paid.

Experimental Design

We use a laboratory experiment to examine the impact of social norms on tax withholding and reporting decisions. In this experiment, social norms are induced in four treatments in order to observe resulting differences in tax decisions. The experimental design captures the essential features of the voluntary income reporting and tax assessment system used in many countries. Human participants in a controlled laboratory environment perform a task that pays them income, and they also receive a random income component. The participants must choose between several values of income to be withheld prior to observing the realized value of their random income, upon which taxes are automatically withheld, and then they must decide how much of their total income to report to the tax agency. Taxes are paid on reported income only. Any unreported income may be discovered via a random audit, and then the individual must pay the owed taxes plus a fine based on the unpaid taxes. The probability of detection is fixed and known to the individual and is independent of the individual's decisions. Subjects are fully and accurately informed about the various features of the experimental

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setting (e.g., tax rates, penalty rates, audit rates, public good payoffs, and the like). This withholding, reporting, audit, and penalty process is repeated over a number of rounds, each representing a tax period. At the completion of the experiment, all participants are paid in cash an amount based upon their laboratory market earnings, converted to U.S. dollars.

Participants are recruited from a pool of undergraduate students at two major universities, one public (Appalachian State University) and one private (Cornell University). Upon arrival at the laboratory, participants are assigned to a computer station, which assures privacy. Basic instructions are provided via a hard copy and also via a series of screen images. The instructions use tax language, rather than more "neutral" terms. After reading the instructions, participants are allowed to ask questions. Decisions are made privately, and participants are not allowed to communicate with one another during the session. Participants are informed (via the consent sheet) that all responses are anonymous and that no individual identification will be collected.

Participants are not told the exact duration of the experimental session, which is predetermined to last for 20 real rounds. Including instructions, practice rounds, and the real rounds, sessions take on average 75 minutes to complete. Participant earnings range from \$26 to \$32, depending upon subject performance.

Once subjects complete the informed consent and are taken through the detailed instructions, they follow five steps, which are briefly described as follows.

Step 1. Participants perform a task for which they are paid taxable earnings on each round. The task involves estimating the number of gumballs (or marbles) in a jar at the front of the lab. An exact estimate results in the maximum earnings (10,000 lab dollars). Subjects' earnings are reduced from this maximum by a linear function (common knowledge) of 50 lab dollars for each gumball or marble their estimate varies from the actual number in the jar, but participants are guaranteed a minimum fixed income of 5,000 lab dollars in each round. This amount represents the earned component of their income, which is in effect for the duration of the experiment. The subject also receives a random income component in each round, which is added to the fixed income from the earnings task. The random portion of the income follows a uniform distribution that has a lower bound of 5,000 lab dollars and an upper bound of 10,000 lab dollars.

Step 2. After completing the earnings task, the tax withholding and reporting rounds proceed. Each round represents a tax year. The subjects make their withholding decision while knowing only their fixed income for the year; the variable portion of income is revealed in the next round. There is a penalty for underwithholding as applied by the tax agency, and an opportunity cost (forgone consumption or interest) for overwithholding. Participants choose their tax withholding amount from a menu for that round. In the first ten rounds of the experiment, no social norm messages are presented. In the second ten rounds, social norm messages are presented prior to choosing the withholding rate for individuals in one of the three treatment groups. The control group does not receive social norm messages are normally introduced in the field after a period where no such message has been provided.

Step 3. The tax reporting phase of the tax period requires the subjects to claim a deduction which determines their tax liability. Taxable income is reported income minus the deduction. The tax form is filed. Collected taxes fund a public good (implemented as a transfer payment to all participants).

Step 4. After the results have been examined for the round, the computer randomly selects individuals for audit. This random process is independent across subjects, and the probability of being selected is common knowledge. Audits work perfectly (i.e., all unpaid taxes are detected), and a penalty plus any unpaid taxes are collected from the subject. Underwithholding is also penalized at this point. The subjects then get a final summary screen that shows their earnings (including penalty costs and transfer payments) for the round.

<u>Step 5.</u> At the conclusion of the study (20 paid rounds), participants receive their final balance in cash and complete a 5-minute survey that asks questions regarding their experience in the experiment, demographic information, and variables relating to altruistic attitudes and behaviors.
Our objective is to examine the effects of social norms on individual tax reporting decisions. To establish a baseline, we conduct laboratory experiments using student subjects in which no normative messages are given to subjects. We then introduce three different social norm messages that vary in the type of normative information communicated. One hundred twenty experimental participants were recruited for each of the four treatments, including the control treatment. A total of 479 participants completed the experiment. (Treatment 2 had one fewer participant because only 19 of the recruited participants came to the experiment session.)

Two types of norms appear to drive behavior: "descriptive norms," which describe the type of behavior that is typical or most frequently enacted, and "injunctive norms," which describe the type of behavior that "constitutes morally approved and disapproved conduct" (Cialdini *et al.* (1990), p. 1015). Although the two types of norms are distinct constructs (Park and Smith (2007)), their isolated use may yield different results depending on contextual information. In particular, devoid of an injunctive norm, descriptive norms that describe the average behavior of others can have a "boomerang effect." However, when a message couples a descriptive norm with an injunctive norm, this type of undesired effect can be avoided. Indeed, there is evidence that the potential boomerang effect of descriptive norms can be eliminated by the addition of information about the level of social approval or disapproval of a behavior (Cialdini *et al.* (1990); Schultz *et al.* (2007)).

This research suggests that those who violate the norm of tax compliance are less likely to violate the norm if an appeal is made, but those who are in compliance may actually be more likely to violate the norm unless their behavior is rewarded with some indication of social approval (Schultz *et al.* (2007); Irwin and Simpson (2013)).

The social norm messages resulting from these focus groups and used in the experiments are described in Table 1.

Treatment	Group name	Test phrase
1	Control	Note: No information is presented.
2	Descriptive norm	"In a previous session of this experiment, a large majority of Appalachian State University/Cornell University students withheld enough earnings to pay their entire tax liability, and 12% did not. This is very similar to the country as a whole where 3 in 4 Americans withhold enough taxes throughout the year to pay their entire tax liability, and 1 in 4 does not."
3	Injunctive norm, approval-framed	"In a previous session of this experiment, a large majority of Appalachian State University/Cornell University students withheld enough earnings to pay their entire tax liability. This is very similar to the country as a whole where 3 in 4 Americans withhold enough taxes throughout the year to pay their entire tax liability. Some 90% of Americans say that personal integrity is a big reason why they comply with tax regulations, and those who withhold enough taxes have a 97% tax compliance rate."
4	Injunctive norm, disapproval-framed	"In a previous session of this experiment, a minority of Appalachian State Universi- ty/Cornell University students did not withhold sufficient funds to pay their entire tax liability. This is very similar to the country as a whole where only 1 in 4 Americans still owes taxes at the time of filing. Some 88% of Americans agree that any type of tax cheating is unacceptable, and people who do not withhold enough earnings to pay all of their taxes are 4 times more likely to cheat on their taxes."

TABLE 1. Treatment Descriptions

Results

Simple descriptive statistics from the various sessions are presented in Table 2. For both *Tax Paid* (or the amount of reported taxes by the subject) and *Withholding Amount* (or the amount of individual tax withheld), we report the average level of the variable, averaged across all subjects and all (relevant) rounds, along with its standard deviation. Tax compliance decreased as the experiment progressed, which is consistent with many other tax compliance experiments. Therefore, we separately examine participant behavior in the first

and second halves of the experiment. Recall that no social norm messages were shown during the first half of the experiment, and participants in each treatment group were shown the relevant social norm message for each round during the second half of the experiment. The relevant comparison is then between the change in behavior of the control group and the change in behavior of each treatment group from the first to the second half of the experiment.

The main conclusions are that both the disapproval- and approval-framed injunctive social norm messages are associated with significantly smaller decreases in the amount of taxes paid relative to the control group in the second half of the experiment, and thus can be said to decrease tax noncompliance. Note also that the effects of the approval- and disapproval-framed messages on amount of taxes paid are largely the same, while the effect on amount withheld is positive for the approval-framed message and negative for the disapprovalframed message. Unreported regression analysis of individual choices confirms the conclusions drawn from the simple descriptive statistics.

		Average Withholding Amount			Average Tax Paid			
Ireatment	N	1st Half*	2nd Half**	Difference	1st Half*	2nd Half**	Difference	
Control (Treatment 1)	120	3430.42 (1583.23)	3528.33 (1604.06)	93.91 2.9%	3241.53 (715.15)	3162.33 (736.89)	-79.20 -2.4%	
Descriptive norm (Treatment 2)	119	3302.52 (1603.48)	3270.59 (1621.81)	-31.93 -1.0%	3284.38 (773.75)	3149.00 (777.31)	-135.38 -4.1%	
Injunctive norm, approval-framed (Treatment 3)	120	3534.58 (1507.09)	3649.58 (1524.17)	115.00 3.3%	3214.26 (756.12)	3145.73 (757.89)	-68.53 -2.1%	
Injunctive norm, disapproval-framed (Treatment 4)	120	3383.75 (1591.66)	3240.83 (1592.02)	-142.92 -4.2%	3279.44 (747.57)	3216.05 (709.01)	-63.39 -1.9%	

TABLE 2.	Simple Descri	ptive Statistics	(Amounts in La	ab Dollars)
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NOTE: Standard deviations are in parentheses.

*No social norm messaging.

** With social norm messaging (except for control group).

Conclusion

Our experiments show a small but significant impact of injunctive social norm messages on tax compliance. The effect of both approval- and disapproval-framed injunctive norm messages in these experiments is a higher rate of taxes paid (measured by difference between first and second halves of the experiment) of around 2 percent as compared to the control group. If a similar response were to occur for the U.S. tax system with roughly a trillion dollars in taxes collected, the result would be an increase in tax revenue of around \$20 billion.

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Understanding the Nonfiler/Late Filer: Preliminary Findings

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I. Background

This paper presents preliminary analysis of the Internal Revenue Service (IRS) Calendar Year (CY) 2014 nonfiler/late filer survey results. (See Appendix for Survey Instrument.) Our goal was to better understand why certain individuals who have an unfiled return wait to file that return until the IRS contacts them with notices and/or enforcement actions such as a "Substitute for Return" tax assessment. Had the taxpayer filed the return soon after the first notice, many months of concern, numerous IRS notices, and mounting penalties and interest could have been avoided. The survey population consists of taxpayers who were notified about an unfiled 2011 or 2012 return and resolved the issue in CY 2014 either by agreeing to the assessment or filing the requested return. The paper discusses preliminary recommendations for potential outreach, education, and enforcement processes.

There are any number of reasons why an individual may fail to file a return. Prior to the study, the IRS had anecdotal evidence that many taxpayers don't file because they don't have the money to pay the balance due on the return. It's likely that some taxpayers believe they are not required to file. They may be unaware of, or confused by, the filing requirement rules. Some may have been misled by well-meaning friends or relatives who aren't fully aware of the individual's tax circumstances. Of particular interest are older individuals who may believe they are no longer required to file because they assume (or are led to believe) that their retirement income is not taxable. Some taxpayers may have experienced personal events that make timely filing difficult, if not impossible, or at least a relatively low priority.

Complexity and compliance burden (the time and money taxpayers expend to comply with tax law) may also affect taxpayers' decision to file. Tax complexity may influence some taxpayers' ability to perceive taxes correctly, particularly if they don't understand the rules or when they don't make the connection between taxes and the benefits they fund (Congdon, *et al.* (2009)). Complexity may also increase the psychological costs, frustration, and anxiety associated with filing a tax return (Guyton, *et al.* (2005)). Erard and Ho (2003) showed that compliance burden was positively related to noncompliance either through frustration of the taxpayer or ignorance of tax provisions resulting from complexity. More complicated tax returns, such as those filed by the self-employed, are also associated with higher complexity and compliance burden (Slemrod (1985)).

The Return Delinquency Process

Each year, the IRS return delinquency process identifies individual taxpayers who may have a filing requirement but have not filed a tax return by the required due date. A portion of these identified individual taxpayers are contacted about an unfiled return. For various reasons, the number of contacts has decreased over time. Over the last five tax years (2010 through 2014), the IRS went from contacting over three million individual taxpayers for unfiled 2010 tax returns to just over one million for the 2014 tax return.¹

An individual may receive up to two delinquent return notices for an unfiled return. The first delinquent return notice (CP 59) does not provide the taxpayer with any information about the potential balance due and, as shown in Table 1, provides a somewhat "softer" warning about what may lie ahead for them if they

¹ Source: Individual Master File Transaction History table in IRS Compliance Data Warehouse (TC140). Data accessed May 2016.

don't respond.² If a taxpayer does not respond to the nonfiler notices, the case may be escalated and moved to Taxpayer Delinquency Investigation (TDI) status.

TABLE 1. Nonfiler Notices

Notice	Timing	Main Message	Consequence of Not Responding
CP 59 (first notice)	Within12 months of Return Due Date	You didn't file a Form 1040 tax return	 If you don't file a tax return, or dispute this notice if you feel you've received it in error, you may owe penalty and interest charges on the amount of tax due. We may determine your tax for you.
CP 516 or CP 518* (final notice)	516 or 518* 8 weeks from CP 59 You must file your 20X3 notice)		 We may determine your tax for you, and penalty and interest may continue to accrue. If you are owed a refund for the current tax year, or any prior year, it may be delayed because of this unfiled return.

*A portion of the individuals receiving a CP 59 may be designated as Primary Code B, where the taxpayer will receive up to two delinquent return notices (CP 59 and CP 516), and they will remain in notice status and not move into a Taxpayer Delinquent Investigation status unless the taxpayer responds.

Some TDI cases go directly to the Automated Substitute for Return (ASFR) inventory, while other cases are transferred to Examination under the manual Substitute for Return (SFR) process from the Automated Collection System (ACS) or a Field Collection office (FC) after unsuccessful attempts to secure or otherwise resolve the delinquent return.

According to a study conducted by the IRS (Datta, *et. el.* (2015)) on the impact of ASFR on revenue collection and subsequent voluntary compliance, the ASFR process has significant direct and indirect impact on filing compliance for both payment of tax and subsequent filing. A direct impact reflects a change in the treated taxpayer's behavior. An indirect impact is a change in other taxpayers' behavior based on knowledge or awareness of the treatment. The indirect effects are somewhat smaller than the direct effects for payment of taxes, but the indirect effects on subsequent filing compliance are large relative to the direct effects. It's certain that the taxpayer's experience influences the degree of direct and indirect effects as well as whether compliance is positively or negatively impacted. A better understanding of late filers' behavior, psychology, and moral and social influences will be critical to unraveling and improving the impact of the ASFR process on taxpayer compliance (Andreoni, *et al.* (1998)).

One concern about the SFR process is that the proposed deficiency could be higher in some cases (and sometimes substantially higher) than the balance due that is ultimately calculated on the filed return. There are credits and deductions that can be claimed by the taxpayer only on a filed return. The IRS uses income information reported by third parties (e.g., Forms W-2, 1099-INT, 1099-MISC, 1099-R, etc.) to calculate unreported gross income on a per-taxpayer basis.³ The filing status is assigned based on the individual's previously filed return. If the filing status was either married filing jointly (MFJ) or married filing separately (MFS), the MFS filing status is assigned. Otherwise, or if no prior return was received, the single filing status is used. Because family units are not considered for the proposed SFR deficiency, the more favorable head of household or qualifying widow(er) filing statuses are not used.

To determine taxable income, only one exemption and the standard deduction for the presumed filing status are used. The proposed deficiency is determined by calculating tax on the taxable income and offsetting it with withheld income reported to the IRS (such as wage withholding on Form W-2). Since other deductions and all credits—to which the taxpayer may be entitled cannot be considered (taxpayers must claim these tax benefits on a filed tax return), the tax liability estimated in this way may be overstated.

An overstatement of the true tax liability may cause the taxpayer not to act. If the individual has an idea of his actual tax liability, he may think that the IRS notice is a hoax because the proposed assessment is much too high. However, if the taxpayer is naïve about his actual tax liability, seeing the large balance due—and interest

² Internal Revenue Service. Internal Revenue Manual 5.19.2.1 (11-06-2015) "What is the IMF Return Delinquency Program?"

³ Internal Revenue Service. Internal Revenue Manual 5.19.2.4.1 (01-16-2015) "IRP Income."

and penalties—may paralyze him with fear. Either way, the deficiency process proceeds because the taxpayer is not responding to IRS notices.

On the other hand, because the IRS doesn't know about other income the taxpayer may have (e.g., selfemployment income not reported on Form 1099-MISC or Form 1099-K), the SFR process also has the potential to *understate* actual tax liability. If this is the case, the taxpayer may simply choose to pay the proposed tax amount in the hopes that IRS will not pursue the case further.

Administrative data show that some individuals won't respond to a notice until collection or garnishment procedures begin (or are scheduled to begin). A report by Small Business/Self-Employed Research (2014) showed that a large percentage of individuals with high-dollar ASFR default assessments waited until after a Notice of Federal Tax Lien was filed to file their return and have the assessment adjusted.

IRS Burden Research

The IRS conducts taxpayer burden research in order to support burden estimation and burden reduction efforts throughout the IRS, as well as to meet the Office of Management and Budget (OMB) and public taxpayer burden reporting requirements. IRS burden estimates are also being used for policy analysis and administrative process redesign support. (See Marcuss, *et al.* (2013) and Guyton and Hodge (2015)).

To provide a more holistic view, IRS conducts taxpayer surveys to gather data on the time and money taxpayers spend complying with tax-filing requirements and resolving postfiling issues, as well as the filing or postfiling experience in general. These data are linked to administrative data to create and update econometric taxpayer burden models. Linking taxpayer surveys to tax administration data provides greater context for root cause analysis. Modeling the factors associated with these root causes allows operational use of the general insights for treatment design and alignment while respecting the sensitivity of individual taxpayer survey responses.

The IRS has created models for prefiling and filing burden estimates related to individual taxpayers, business entities, and tax-exempt organizations. It also has an individual taxpayer postfiling burden model and is currently gathering data for a business entity postfiling burden model. IRS is also expanding its model portfolio beyond income tax compliance, with plans to create models of the burden associated with information return documents and employment tax compliance.

II. Study Design

Data collection for the nonfiler/late filer study was conducted in coordination with the IRS CY 2014 Individual Taxpayer Compliance Burden Survey. The study included taxpayers who resolved an enforcement or collection issue or who amended a filed return in CY 2014. These taxpayers received at least one IRS notice indicating the need to file a return and ultimately either filed the return or agreed to the IRS assessment.

This study gathered qualitative and quantitative data regarding taxpayers' experience resolving an issue with an unfiled return. Specifically, this special study gathered information on the drivers of nonfiling and the burden associated with filing a late return after receiving an IRS notice.

IRS adapted an existing compliance burden survey to include items that would help IRS understand barriers to filing on time and gain insight into taxpayer behavior. Specifically, the survey addressed the following questions:

- Why do taxpayers file late?
- What prompts them to file?
- What actions do they perform to become compliant?
- What are taxpayers' perceptions of the process?
- How much time and money do taxpayers spend to become compliant?
- How can IRS facilitate filing?

The Survey Population

The Return Delinquency Process has unique intricacies with regard to how and when cases are selected. Because cases may take many years to resolve, and cases from a particular tax year may not yet have been identified for treatment, it is not reasonable to select a single tax year for audit.

Selecting based on when the case was resolved, however, yields a diverse and more representative set of taxpayers for our sampling frame, because cases from different tax years resolve during that year. That said, we focused on a set of taxpayers whose cases resolved in CY 2014, the most recently concluded calendar year. We also stipulated that the taxpayer had to have actively worked to resolve the nonfiling issue.

Ideally, we would want to sample all tax years that fall into the CY 2014 frame, but our research interests limit that possibility. Firstly, we are interested in the taxpayers' experience leading up to nonfiling. Thus, the tax year in question has to be recent enough that the taxpayer can reasonably recall the events that occurred from the time the return should have been filed to the time the taxpayer ultimately filed the return or otherwise resolved the case.

Secondly, tax administration processes in general play a role in determining which set of tax years are available for research purposes and align to our research interests. Tax Year 2014 tax returns were not due to be filed until sometime during CY 2015 and, thus, were excluded from our sampling frame. Tax Year 2013 cases that resolved during CY 2014 were considered atypical and were excluded from the analysis. Tax Year 2011 and 2012 cases were considered to be recent enough for taxpayers to be able to reasonably recall their experiences related to the case and were selected for the analysis.

Having determined the study population, we next needed a sample design capable of producing estimates for both the overall population as well as a wide variety of subpopulations. The goal was an efficient design that would yield survey data that allows the researcher to estimate outcomes of interest. In CY 2014, about 185,000 nonfiler cases met our criteria for inclusion in the study population. To design an adequate sample, we considered how a taxpayer's return delinquency could impact his or her survey responses.

Because taxpayers who went through the SFR treatment stream have a different experience than taxpayers who did not, we developed a stratified sample design along those lines. Taxpayers within the SFR treatment stream were further segmented into an ASFR group and an SFR-Exam group. Hence, the final sample design yields three strata: (1) Non-SFR; (2) ASFR; and (3) SFR-Exam.

As mentioned above, the statistically representative sample includes cases from Tax Years 2011 (~70 percent) and 2012 (~30 percent) (Table 2). Note that the ASFR and Non-SFR cases are a stratified random sample. The SFR-Exam population is a census after ineligible taxpayers were removed.⁴

Strata	Population N	Sample n
ASFR	16,543	1,013
SFR-Exam	966	960
Non-SFR	167,419	1,030
Total	184,928	3,003

TABLE 2. Study Population and Survey Sample Size

Characteristics of the Population

Figure 1 shows the age distribution of our study population. Our population is roughly balanced within the stratum for those aged 30–64; however, ASFR taxpayers tended to be older (65 years of age or older), while Non-SFR taxpayers tended to be younger, under age 30.

⁴ Study population was filtered to remove taxpayers with incomplete contact information.



FIGURE 1. Age Distribution by Strata

Approximated Income and Balance Due

As noted above, nonfilers are identified based on income information reported to IRS. When we look at the distribution of income (Figure 2) and balance due (Figure 3), calculated based on Information Returns Processing (IRP) documents submitted to IRS, we find that SFR-Exam taxpayers had higher income and balance due than taxpayers in the other strata. Likewise, Non-SFR individuals had relatively lower incomes and lower balances due.



FIGURE 2. Number of Taxpayers by IRP Adjusted Income

* Dollar ranges are defined to be over the lower amount and less than or equal to the upper amount.



FIGURE 3. Number of Taxpayers by IRP Adjusted Balance Due

* Dollar ranges are defined to be over the lower amount and less than or equal to the upper amount.

Number of Information Returns as a Proxy for Complexity

Most individuals in the sample had five or fewer information returns (Figure 4), as is the case with the general taxpayer population. Not surprisingly, wage & investment (WI) taxpayers tended to have fewer information returns, while self-employed (SB) taxpayers had, on average, a greater number of information returns, including Forms 1099-MISC and 1099-K.

FIGURE 4. Number of Information Documents Associated with Taxpayer Identification Number (TIN)



Time to Resolve

Taxpayers may have received the first IRS contact in 2012, 2013, or 2014, depending on the year of the unfiled return. We consider the date of first contact in order to determine the time to resolve.



FIGURE 5. Time to Resolve by Strata

Figure 5 shows that, of the cases that resolve relatively quickly, most are Non-SFR cases. This is because this group is predominantly cases that resolved in the notice phase that comes before the SFR process, for which a default assessment is not sent until about 200 days after the 30-day notice. SFR-Exam cases take longer to resolve than ASFR cases, partly because the SFR-Exam cases enter the SFR process later than the ASFR cases.

SFR-Exam cases have a higher-than-average tax balance due, have more information returns associated with them, and tend to be more complex, small-business cases, whereas Non-SFR taxpayers tend to be younger, have lower income and balance due, are less complex, and resolve relatively quickly. While time to resolve may be a proxy for complexity of the tax situation, it could also be measuring enthusiasm or procrastination on the part of the taxpayer to resolve their issue.

Filing Behavior

As stated above, the survey sample includes individuals who were contacted about an unfiled return for either Tax Year 2011 or 2012, to which we will refer as the "nonfiling year." To understand the filing behavior of the sample population and the potential impact of the enforcement process, we set the nonfiling year to time "t" and then look at the filed returns before and after the nonfiling year.

Figure 6 shows the filing rate among the full sample. While it isn't clear whether or not these taxpayers had a filing requirement each year other than the nonfiling year, filing rates among ASFR and Non-SFR taxpayers are relatively high. Everyone either filed or is treated as having filed a return in the nonfiling year. When we look at years other than the nonfiling year, over 75 percent of ASFR taxpayers filed every year, and nearly 90 percent of Non-SFR taxpayers had filed, especially in the years just prior to contact.

On the other hand, SFR-Exam taxpayers are much less likely to have filed a return, waning steadily from 60 percent 7 years prior to contact to below 40 percent the year just prior to contact. After contact, however, almost 90 percent of taxpayers filed the very next year, but the rate declines somewhat the second year among all strata.



FIGURE 6. Filing Rate for Full Sample in Years Around Nonfiling Year

(Includes timely and late-filed returns)

When we look at the timely filing rate in Figure 7, we find a more nuanced story. As with the filing rate, ASFR and Non-SFR taxpayers were more likely to file timely than SFR-Exam taxpayers. While none of these taxpayers timely filed a return in the nonfiling year, it appears that timely filing among taxpayers in *each* stratum began declining 4 years prior to contact.



FIGURE 7. Timely Filing Rate for Full Sample in Years Around Nonfiling Year

Although 75 percent of ASFR and Non-SFR taxpayers filed a tax return 7 years prior to contact (Figure 6), about 55 percent of these returns were filed on time (Figure 7). Likewise, 20 percent of SFR-Exam taxpayers also filed a late return 7 years prior to the nonfiling year (comparing Figures 6 and 7), even though their filing rate is much lower than the other two strata. By the year just prior to contact, only about 10 percent of ASFR and SFR-Exam taxpayers had filed timely.

Interestingly, timely filing increases the year after contact, but increases more dramatically the second year, with significant gains among all strata, but most notably among SFR-Exam taxpayers. It is also noteworthy that the timely filing rate hovers just around 50 percent 2 years later. It may be that taxpayers were occupied with resolving this issue, resulting in a late return the years following contact, but it's also possible that they had yet to receive the IRS notice prompting them to file their tax return for the year in question.

In Figure 8 we look at the filing history of the survey population who filed a late tax return any year from 2004 to 2014 to determine how long it took them to file their tax return. Just over 20 percent filed the same year that it was due. Forty percent filed the year after it was due, and 15 percent filed 2 years later. Again, the timing may coincide with receiving an IRS notice.



FIGURE 8. When Taxpayers Filed Their Late Returns

We also found that taxpayers who receive an IRS notice filed tax returns for additional years beyond the year for which they were being contacted. Figure 9 shows the number of late returns, by tax year, that were filed after IRS contact, excluding the tax year for which they were contacted. It was surprising that taxpayers filed returns as far back as 2004, but there were 12 taxpayers who did just that. It was expected, however, that the number of tax returns peaked around the study years. Because we are excluding the study year of contact, the small number for 2011 reflects the relatively smaller sample size for 2012 taxpayers.



FIGURE 9. Number of Additional Late Tax Returns Secured after Contact, by Tax Year

Many of these returns had losses associated with at least one of the schedules, while about 36 percent had a refund associated with them and over half had a balance due. It's interesting that an average refund of \$3,103 for many taxpayers didn't motivate them to file, but it's unclear if they were unaware of the refund and discovered the refund for past years when they filed the year in question, or chose to forego filing altogether.

	Taxpayers		Tax R	Average	
Those with a	Number	Percentage	Number	Percentage	Amounts
Schedule C Loss	197	10.8%	248	9.8%	-\$11,213
Schedule D Loss	164	9.0%	216	8.5%	-\$2,432
Schedule E Loss	156	8.6%	207	8.2%	-\$16,741
Schedule F Loss	19	1.0%	25	1.0%	-\$25,469
Refund	662	36.4%	902	35.6%	-\$3,103
Balance Due	990	54.4%	1422	56.1%	\$5,578
Exactly Paid	169	9.3%	213	8.4%	\$0

TABLE 3. Characteristics of Additional Late Ta	ax Returns Sec	cured after Contac
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Extension Filers

Figure 10 shows the percentage of the study population who filed Form 4868, *Application for Automatic Extension of Time To File U.S. Individual Income Tax Return,* around the nonfiling year. We assume that these taxpayers understood the filing requirements and were aware that they were required to file a return. We don't know, however, whether the taxpayers understood that the extension was only to October 15 or that filing Form 4868 does not count as filing a return.



FIGURE 10. Extension Filers Around Nonfiling Year

III. Survey Results

The overall response rate for the survey of 17.8 percent (see Table 4) was not unexpected. Excluding the SFR-Exam stratum, the response rate was in line with the CY 2014 Taxpayer Compliance Burden Survey that surveyed a statistically representative sample of all taxpayers who either amended a return or resolved an issue with a filed return in CY 2014.

TABLE 4. Survey Re	ADEL 4. Ourvey Response Rate					
Stratum	Sample Size	Number of				

TABLE / Survey Dechance Date

Stratum	Sample Size	Number of Responses	Response Rate (Percent)
ASFR	1,013	212	20.9
SFR-Exam	960	121	12.6
Non-SFR	1,030	202	19.7
Overall	3,003	535	17.8

*When undeliverable mail is taken into account, the response rates are 21.7%, 13.5%, and 21%, respectively, for an overall adjusted average of 18.8%

In order to understand the survey results in terms of the full study population, the survey data must be weighted to the population and then adjusted for unit nonresponse (because not all surveys were returned) and item nonresponse (because some respondents chose not to answer all questions).

The discussion below presents population estimates based on the weighted survey data.

Activities

Table 5 shows the top three behavioral responses to four key taxpayer activities.

	,
Reasons for not filing by the due date of the return (Survey Q1)	
1) Balance due on return	30%
2) Personal reasons (illness, death in the family, unemployment)	27%*
3) Did not have all of the necessary tax documents	14%
Reasons for ultimately filing the late return (Survey Q2)	
1) Able to get help completing the return (26%); Had enough time to prepare the return (14%)	40%
2) Had money to pay a balance due (8%); Set up a payment plan (11%)	19%
3) Received tax documents	16%
Response to first IRS notice (Survey Q3)	
1) Took the notice to a volunteer or paid professional	28%
2) Did not receive an IRS notice	18%
3) Did not open the first notice	14%
What nonfilers do to learn more about filing (Survey Q4)	
1) Consult with a paid or volunteer tax professional	44%
2) Contact IRS	34%
3) Search IRS.gov	16%

TABLE 5.	Тор	Three Behav	vioral Res	oonses to	Key T	axpayer	Activities	(Weig	hted)
						anpajo.	/	(

*Includes weighting for respondents who wrote in that a life event caused them not to file on time.

Based on our weighted estimates, having a balance due and personal reasons drive nonfiling for this population over half of the time. The responses to Q1 and Q2 are in line with results of focus groups with stop-filers in the construction industry conducted by IRS in 2003.⁵ As in that study, life events and inability to pay a balance due were top reasons respondents didn't file.

Individuals who requested an extension to file appear to have done so for the same reasons as other late filers (see Table 6), although, as we would expect, not having the necessary tax documents is a more common reason for these taxpayers.

Theu an Extension (Weighteu)	
Reason	Share
Did not have all of the necessary tax documents	27.0
Personal reasons (illness, death in the family, unemployment)	25.8
Balance due on return	24.2
Other	23.0

TABLE 6. Reasons for Not Filing, Reported by Respondents Who Filed an Extension (Weighted)

It is interesting to note that having a balance due is a reason for not filing on time an estimated 29 percent of the time, but having the ability to pay or setting up an installment plan is a reason for finally filing a return only an estimated 19 percent of the time. However, many of the respondents who said they didn't file on time because they couldn't pay also reported that they were unaware of payment options in Question 9.

We expected "Didn't know I had to file" and "Someone told me I didn't have to file" to be among the top reasons for not filing, but based on the survey results, those are drivers of nonfiling only an estimated 4 and 2 percent of the time, respectively.

⁵ IRS Office of Program Evaluation and Risk Analysis 2003 study of stop-filers in the construction industry, available upon request. "Stop-filers" are taxpayers who stop filing after multiple years of regular filing.

Responses to Questions 3 and 4 confirmed our expectations that tax professionals play a large role in assisting taxpayers in resolving their postfiling issue. Just over 28 percent of these late filers are estimated to contact a tax professional as soon as a notice is received, and we estimate that nearly half (44 percent) of these individuals will turn to a tax professional for information or assistance at some point.

Based on our analysis, approximately 14 percent of the population will not open the first notice. Whether it is out of fear, avoidance, or perhaps the belief that the message inside isn't important, even the best-written notice won't be effective unless the taxpayer reads it.

Time and Money

Not surprisingly, taxpayers who file a return after being contacted by the IRS are estimated to spend more time and money (Table 7) than the estimated average compliance burden related to filing a timely return (Table 8). However, we aren't able simply to assume that all the additional burden is due to postfiling activities (e.g., responding to IRS notices, seeking the services of a taxpayer representative). Higher burden could be related to higher-than-average tax complexity, especially for respondents with self-employment income. Taxpayers who file late may incur higher burden simply because more time has passed. For example, documents have been lost and must be replaced or the tax software they would otherwise use isn't readily available.

Average time (hours) spent on:	Mean	Median
Gathering tax materials	32	5
Interacting with the IRS/using IRS resources	17	2
Working with a tax professional	21	1
Total	70	16
Average money spent on:	Mean	Median
Tax professional fees	\$418	\$9
Software	\$32	\$0
Postage	\$13	\$3
Other fees	\$42	\$0
Total	\$505	\$150

TABLE 7. Estimated Average Time and Money Spent To ResolveNonfiling Issue (Weighted)

Primary Form Filed or	20	11	2012		
Type of Taxpayer	Total Time	Money (\$)	Total Time	Money (\$)	
All taxpayers	18	230	13	210	
Primary forms filed					
1040	22	290	16	270	
1040A	10	120	7	90	
1040EZ	7	50	4	40	
Type of taxpayer					
Nonbusiness	12	150	8	120	
Business	32	410	23	420	

TABLE 8. Individual Taxpayer Compliance Burden (Weighted)

Source: Tax Years 2013 and 2014 Form 1040 Instructions.

We note, too, that after winsorization (removing outliers) set at 90 percent for average time and 95 percent for average money, the estimates are 24 hours and \$511, respectively (Table 7). Median values further highlight the presence of outliers in reported time and money. Because many taxpayers filed tax returns for several years, it's possible that they included estimates beyond the year in question.

Stress

For Question 7, we presented a Likert scale matrix that asked survey recipients to rate the stress level of various activities associated with resolving the issue with their unfiled return. Recipients were also asked to provide an overall stress rating of the experience. Table 9 below summarizes the estimated percentages of stress levels for the population.

Stress Level	What to do next	What if I don't respond	Understand notice	Calling the IRS	Respond in writing	Find info/ complete return	Find out about payment options	Overall stress
Not at all stressful	8%	8%	12%	10%	10%	10%	14%	11%
A little stressful	14%	8%	20%	10%	14%	18%	10%	16%
Somewhat stressful	22%	17%	24%	20%	14%	24%	20%	24%
Very stressful	54%	60%	40%	42%	26%	44%	36%	49%
Did not do	2%	7%	4%	18%	36%	6%	20%	NA

TABLE 9. Stress Levels (Weighted)

*Not all respondents answered these questions. Some respondents elected to only answer some of the items.

Considering the reported stress levels for individuals who perform the activities (Table 9A), we estimate that figuring out what to do next and what will happen if the taxpayer doesn't respond are the two biggest sources of stress. Calling the IRS is close behind, however. Responding in writing is the least source of stress, but it's still estimated to be very stressful for nearly half of the taxpayers who do it.

Stress Level	What to do next	What if I don't respond	Understand notice	Calling the IRS	Respond in writing	Find info/ complete return	Find out about payment options	Overall stress
Not at all stressful	8%	8%	13%	13%	15%	12%	18%	7%
A little stressful	14%	9%	20%	12%	21%	19%	14%	17%
Somewhat stressful	23%	19%	24%	22%	22%	24%	25%	30%
Very stressful	56%	64%	43%	52%	42%	46%	44%	47%

TABLE 9A. Stress Levels for Taxpayers Who Perform an Activity (Weighted)

Upon comparing the stress responses to administrative data, we found that the longer the process took, the more stress was reported. Interestingly, respondents who reported the most stress did not necessarily have the highest proposed assessment or ultimately pay the highest tax. We also found that younger respondents generally reported more stress than the oldest respondents. Almost 20 percent of respondents age 50 or older reported no overall stress.

Preferred Communication Channels

Question 8 of the survey asked the survey recipients to tell us how they would have preferred to communicate with the IRS or find out about the status of their case if other options were available. This question allowed the respondent to choose more than one response.

Channel	Percentage
Email	54%
Secure online taxpayer account	40%
Text messaging	18%
Status quo/prefer mail	22%

TABLE 10. Preferred Channel (Weighted)

Based on our analysis (Table 10), we estimate that just over half of the population would choose to communicate via email if that option were available. Although not as popular as email, many of these taxpayers would be open to using a secure online account. We note that electronic communication options were generally preferred by younger respondents, but many older respondents also selected these options as well.

An estimated 7 percent of the study population are happy with the current process and prefer to communicate via mail. Not surprisingly, these taxpayers are generally older.

Suggestions To Improve Service

The final question gave respondents the opportunity to provide feedback on how the IRS could improve taxpayer services or make it easier for them to know when they should file a Federal income tax return and what payment options are available. Because only 57 percent of respondents completed this item, survey response rates rather than weighted responses are discussed here.

Of the respondents who answered the question, almost half suggested that the IRS improve existing processes, citing long waits, unreturned phone calls, and having to provide the same information each time they contacted the IRS. The other most common responses requested better information on payment plans and help with making payments. Taxpayers also wanted clearer notices and earlier notification of the issue to minimize penalty and interest. That being said, 10 percent of respondents who answered the question wrote in that they felt the IRS is doing a good job.

IV. Implications for Treatment Design

Results of this study will inform inventory case selection and treatment alignment for nonfilers to reduce compliance burden and improve the taxpayer experience. Insights from the survey data may also help the IRS identify taxpayer segments who will benefit from IRS actions that will encourage and facilitate timely tax filing and payment compliance, thus eliminating the time and money burden—and the stress—associated with undergoing IRS enforcement action.

The fishbone diagram in Figure 11 identifies possible reasons taxpayers might not file on time. After analyzing the survey responses, three of these root causes bubbled to the top: (1) taxpayers have incomplete or inaccurate information about filing requirements (including when there is a balance due); (2) the need to file a return becomes less salient the further one gets from April 15; and (3) once filing is deprioritized, it can easily remain deprioritized.



FIGURE 11. Beginning Fishbone Analysis: Reasons for Not Filing on Time

With these topics in mind, we make a few preliminary recommendations that could reduce the incidence of nonfiling:

- Improve educational resources and outreach to help taxpayers become correctly informed about filing requirements and the need to file even if they can't pay the balance due in full.
- Make payment options more transparent.
- Send reminders to file shortly after the tax season to previous-year filers who did not file by the due date of the return and did not request an extension.
- Send a filing reminder to taxpayers who may be at risk for nonfiling (e.g., extension filers, taxpayers near retirement age, unemployed individuals).
- Contacting extension filers could be facilitated by requesting a taxpayer's email address on Form 4868, *Application for Automatic Extension of Time To File U.S. Individual Income Tax Return.*
- Allow taxpayers to provide a reason for requesting an extension on Form 4868.
 - Conduct a randomized control trial to determine if tailored outreach can help taxpayers file (and pay) by October 15.

We also make the following recommendations to reduce burden and improve taxpayers' experience in the enforcement process:

- Provide clearer information up front about what will happen if taxpayer doesn't respond.
- Help taxpayers understand that their tax liability may be lower than the proposed tax, but they must complete and submit their return to claim and justify tax benefits that will reduce their tax assessment.
- Provide more timely communication (early notification of filing issue).
- Focus on expanding electronic communications to email, online accounts, and text messaging.
- Continue work to improve taxpayers' experience with mail and phone contacts, including improving notices to make them clearer.

TABLE 11. Current IRS Initiatives and Pilots Supported by Preliminary Findings

Technology Initiatives Supported by Preliminary Findings

- Expand electronic payment options
- Get the Get Transcript program back online
- Improve the online payment agreements page and provide new "streamlined" payment agreements with higher dollar limits and time horizons

Pilots Supported by Preliminary Findings

- Filing reminder notices for past nonfilers. Testing a postcard to examine the opening of the letter barrier
- Call site letter redesign
- ASFR letter pilot (to promote payment options)
- Testing a notice that highlights the IRS assessment vs. what was claimed on the last filed return (e.g., deductions and credits that were claimed by the taxpayer)

Respondents vs. Nonrespondents

Our analysis shows some similarities and differences between respondents and nonrespondents. For example, respondents had, on average, a higher rate of filing compliance prior to IRS contact (Figure 12), lower income levels based on information returns (Table 12), and lower adjusted proposed net tax due based on information returns (Table 12). However there was not much difference in age between respondents and nonrespondents (Table 14).





	Mean	Median
Respondents	\$74,935	\$56,793
Nonrespondents	\$84,207	\$62,128

TABLE 12. Nonrespondents vs. Respondents: Income

TABLE 13. Nonrespondents vs. Respondents: AdjustedProposed Net Tax Due

	Mean	Median
Respondents	\$8,169	\$3,567
Nonrespondents	\$9,887	\$4,103

TABLE 14. Nonrespondents vs. Respondents: Age

	Mean	Median
Respondents	53	53
Nonrespondents	47	47

Further Research

Further research will be carried out to analyze differences between survey respondents and nonrespondents. An associated representative data set that links survey responses to taxpayer characteristics and observed compliance outcomes will aid model development. These models will be used to refine the root cause analysis and develop treatment streams that are better tailored to the root cause of the noncompliance behavior.

Definitions

General Definitions

- Nonfiler—An individual who has a filing requirement but has not filed.
- Late filer—An individual who files a required return after the due date.
- SFR (Substitute for Return)—Process by which IRS calculates tax liability for certain nonfilers.
- *Study Population*—Individual taxpayers contacted by IRS about an unfiled return. Taxpayers either filed a return or agreed to the proposed assessment in CY 2014.

Survey Strata

- *ASFR* (Automated Substitute for Return)—An automated process to contact nonfilers and make a substitute for return assessment if they don't respond.
- SFR-Exam—Nonfiler cases worked by Examinations division.
- *Non-SFR*—Nonfiler cases where returns were secured by the notice process, automated collection system (ACS), or field collection.

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Appendix Nonfiler/Late Filer Survey Instrument

1.	Clon A. Ceneral Questions About rour rax	rear 20XX Filing Issue
	What reason <u>best</u> describes why you filed your Tax ' after the due date of the return? Check only one.	Year 20XX federal income tax return
	 Did not know I had to file Someone told me I didn't have to file There was a balance due on the return Didn't understand how to complete the return Other, <i>please specify:</i> 	 Software or paid preparer too expensive Didn't have all of the tax documents I needed Personal reasons (illness, death in the family, too busy)
2.	What prompted you to file your Tax Year 20• • •federa	al income tax return? Check all that apply.
	 To get my refund Found out I had to file To show IRS that I owed less than they said I did Received the tax documents I needed Other, <i>please specify:</i> 	 Able to get help to complete the return Had enough time to prepare the return Had enough money to pay the balance due
3.	What did you do when you received the first IRS not federal income tax filing issue? Check all that apply.	ice about your Tax Year 20XX
	 Did not receive an IRS notice Did not think it was important, so I did nothing Did not understand the notice, so I did nothing Other, <i>please specify:</i> 	 Took the notice to a paid or volunteer tax professional Did not open the first IRS notice, but did open subsequent notice
4.	What did you do to learn more about filing your Tax return?Check all that apply.	Year 20XX federal income tax



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Section C. Money Spent Resolving Your	Tax Year 20XX Return Filing Issue
The next questions ask about the money you sp income tax filing issue.	Sent to resolve your Tax Year 20XX federal
Please include:	Please do <u>not</u> include:
 Money spent by you while actively working to resolve your filing issue 	 Any tax, penalties, and interest related to your filing issue Costs related to filing any federal or state income tax returns not required to resolve your 20XX filing issue
6. Of the total money you spent resolving you	r Tax Year 20XX federal income tax filing issue
A. How much did you spend on tax profess	sional fees to resolve your filing issue?
 To a tax professional, at any point, to assis resolving your filing issue 	st you in \$ • • • Dollars Cents No money spent Not applicable
B. How much did you spend on a tax prepa	ration website or software to resolve your filing
issue? Include the purchase price as well as live a	dvice fees.
Do not include any general purchase accountin such as Quicken, MSN Money, or QuickBooks,	ig software, \$
	Dollars Cents
C. How much did you spend on postage o Include money paid other than tax, penalti Eor postage, envelopes, and other mail-re-	r other related costs to resolve your filing issue?
 For copying, faxing, or scanning of docum For copying, faxing, or scanning of docum 	lents Dollars Cents
 For any other products and services neces resolve your filing issue 	☐ No money spent
D. How much did you spend on fees to res processing fee or an offer-in-compromis Do not include tax, penalties, or interest.	solve your filing issue, such as a credit card se application fee?
	\$
	Dollars Cents
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Section D. Your Experience Resolving Your Tax Year 20XX Filing Issue

7. When resolving your Tax Year 20XX federal income tax filing issue, how stressful was each of the following?

	Not at all stressful	A little stressful	Somewhat stressful	Very stressful	Did not do
A. Figuring out what to do next					
 Figuring out what would happen if you didn't respond 					
C. Trying to understand IRS notices					
D. Calling the IRS					
E. Responding to the IRS in writing					
F. Finding the tax information you need to complete your return					
G. Finding out about payment options					

When resolving your Tax Year 20XX federal income tax filing issue, how stressful was the following?

	Not at all stressful	A little stressful	Somewhat stressful	Very stressful
H. Overall experience resolving this filing issue				

8. If there had been other ways to provide information to the IRS or find out about the status of your 20XX filing issue, which method(s) would you have used?



9. Please share any suggestions you have for how the IRS could improve taxpayer services or make it easier for you to know when you should file a federal income tax return and what payment options are available.

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6th Annual IRS-TPC Joint Research Conference on Tax Administration Urban Institute, 2100 M Street NW, Washington, DC 20037 Thursday, June 23, 2016

Program

8:30 - 9:00	Check in
9:00 – 9:15	Opening
Welcome	<i>Eric Toder</i> (Co-Director, Tax Policy Center) and <i>Ben Herndon</i> (Director, IRS Office of Research, Applied Analytics, and Statistics (RAAS))
9:15 - 10:45	Interventions: Influencing Taxpayer Compliance
	Moderator: Brenda Schafer (IRS, RAAS)
	• Taxpayer Responses to Third-Party Income Reporting: Evidence from a Natural Experiment in the Taxicab Industry, <i>Bibek Adhikari and James Alm (Tulane University)</i> , <i>Eleanor Wilking (University of Michigan), and Brett Collins and Michael Sebastiani (IRS, RAAS)</i>
	• Do Audits Deter Future Noncompliance? Evidence on Self-Employed Taxpayers, Sebastian Beer, Matthias Kasper, and Erich Kirchler (University of Vienna, Austria)
	• Impact of Fresh Start Initiative on Lien Filings and Taxpayer Compliance, Saurabh Datta (IRS, RAAS), Rizwan Javaid, and Alex Turk (IRS, Small Business/Self-Employed Division)
Discu	ussant: Alan Plumley (IRS, RAAS)
10:45 – 11:00	Break
11:00 - 12:30	Nonfiling: IRS-Census Data Comparisons

Moderator: Mike Weber (IRS, RAAS)

- What Drives Filing Compliance?, Brian Erard (B. Erard & Associates)
- Searching for Ghosts Redux: Improved Methodologies for Estimating the Nonfiling Tax Gap, *Pat Langetieg, Mark Payne, and Alan Plumley (IRS, RAAS)*
- Handling Respondent Rounding of Wages Using the IRS and CPS Matched Dataset, *Mike Brick and Minsun Riddles (Westat Inc.)*

<u>Discussant:</u> *Amy O'Hara (US Census Bureau, Center for Administrative Records Research and Applications)*

12:45 – 1:30 Keynote Speaker: Martin A. Sullivan, chief economist, Tax Analysts

1:30 – 2:30 Panel Discussion

Factors Affecting Revenue Estimates of Tax Compliance Proposals

<u>Moderator</u>: *Howard Gleckman (Tax Policy Center)*

Presenters: Janet Holtzblatt (Congressional Budget Office)

Jamie McGuire (Joint Committee on Taxation)

Discussants: Eric Toder (Tax Policy Center)

Mike Udell (District Economics Group) Emily Lin (US Department of the Treasury, Office of Tax Analysis) Mary-Helen Risler (IRS, RAAS)

2:30 - 2:45 Break

2:45 – 4:15 Behavioral Research: Why Do People Do What They Do?

Moderator: Sandy Lin (IRS, RAAS)

- Examining Motivations To Volunteer with the Volunteer Income Tax Assistance Program: How Motivations Influence Future Volunteer Behavior, *Patti J. Davis-Smith, Robert P. Thomas, and David C. Cico (IRS, Wage & Investment Research and Analysis)*
- The Effect of Social Norms on Taxpayer Payment Compliance, *Caroline von Bose* (Fors Marsh Group), Jubo Yan (Nanyang Technological University), James Alm (Tulane University), and William Schulze (Cornell University)
- Understanding the Nonfiler and Late Filer, Jose Colon de la Matta, John Guyton, Ron Hodge, Ahmad Qadri, Brenda Schafer, Melissa Vigil (IRS, RAAS)

<u>Discussant</u>: Joe Rosenberg (Tax Policy Center)

4:15 - 4:30 Wrap up

Ben Herndon, Director, IRS, RAAS