

# **An IRS-TPC Research Conference: Advancing Tax Administration**

*Papers Given at the  
2014 IRS-Tax Policy Center Research Conference*

**Held at the Urban Institute  
Washington, DC  
June 19, 2014**

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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, “Advancing Tax Administration,” held at the Urban Institute in Washington, DC, on June 19, 2014. Conference presenters and attendees included researchers from all 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 Rosemary Marcuss, the IRS Director of Research, Analysis, and Statistics, who introduced a video welcome from IRS Commissioner John Koskinen. The remainder of the conference included sessions on taxpayer compliance costs, innovative enforcement strategies, tax uncertainty and corporation compliance, and understanding taxpayer behavior. The keynote speaker was George Yin—the Edwin S. Cohen Distinguished Professor of Law and Taxation and Thomas F. Bergin Teaching Professor at the University of Virginia. He offered some thoughts on “Reforming (and Saving) the IRS by Respecting the Public’s Right To Know.”

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

The IRS-TPC 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 and TPC. Members of the program committee included: Alan Plumley, Mary Braunger, Elizabeth Bushrod, Rahul Tikekar, and Melissa Vigil (National Headquarters Office of Research); Sarah Allen (Office of Program Evaluation and Risk Analysis); Mike Weber (Statistics of Income); Ken Bulcroft (Small Business and Self-Employed); Lisa Elliott (Wage and Investment); Fran Cappelletti (Taxpayer Advocate); Christina Hui (Criminal Investigation); Charles Boynton (Large Business and International); Michael Mahn (Tax Exempt and Government Entities), and Elaine Maag (Tax Policy Center). In addition, Blake Greene and Joanna Teitelbaum from the Tax Policy Center oversaw numerous details to ensure that the conference ran smoothly.

This volume was prepared by Paul Bastuscheck, Lisa Smith, and Camille Swick (layout and graphics) and Beth Kilss and Georgette Walsh (editors), all of the 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.

Janice M. Hedemann  
Director, National Headquarters Office of Research  
Chair, 2014 IRS-TPC Research Conference

## An IRS-TPC Research Conference: Advancing Tax Administration

### Contents

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Foreword.....		iii
1. Taxpayer Compliance Costs and Tax Administration		
❖ Improving Form 1098-T: How a Revised Form Could Increase Take-Up, Improve Compliance, and Lower Taxpayer Burden <i>Deena Ackerman, Julie-Anne Cronin, and Nicholas Turner</i> .....		3
❖ Convenience May Be Necessary for Widespread Pension Participation by the Poor <i>Valrie Chambers</i> .....		21
❖ The Compliance Costs of IRS Post-Filing Processes <i>John Guyton and Ronald Hodge</i> .....		39
2. Innovative Enforcement Strategies		
❖ Offshore Voluntary Disclosure Schemes: A Preliminary Analysis <i>Matthew Gould and Matthew D. Rablen</i> .....		61
❖ Uncollectible Versus Unproductive: Compliance Impact of Working Collection Cases That Are Ultimately Not Fully Collectible <i>Erik Miller, Stacy Orlett, and Alex Turk</i> .....		79
❖ Concentrated Enforcement in a Best-Case Tax Enforcement Regime <i>Leigh Osofsky</i> .....		99
3. Tax Uncertainty and Corporation Compliance		
❖ 2010-2011 Schedule M-3 Profiles and Schedule UTP Filing Status <i>Charles Boynton, Portia DeFilippes, Ellen Legel, and Lisa Rupert</i> .....		115

❖ Unintended Consequences of Linking Tax Return Disclosures of Tax Uncertainty to Financial Reporting for Tax Uncertainty <i>Erin M. Towery</i> .....	145
❖ The Effect of CAP on Tax Aggressiveness <i>Amy Dunbar and Andrew Duxbury</i> .....	149
<b>4. Understanding Taxpayer Behavior</b>	
❖ Tax Evasion and Self-Employment in the US: A Look at the Alternative Minimum Tax <i>Donald Bruce and Xiaowen Liu</i> .....	165
❖ Do Doubled-Up Families Minimize Household-Level Tax Burden? <i>Maggie R. Jones and Amy B. O'Hara</i> .....	181
❖ RAS Affordable Care Act Microsimulation Model <i>Brian Erard, Emily Heys, Layne Morrison, Robert Mueller, and Brock Ramos</i> .....	205
<b>5. Appendix</b>	
❖ Conference Program.....	223

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# **Taxpayer Compliance Costs and Tax Administration**

**Ackerman ♦ Cronin ♦ Turner**

**Chambers**

**Guyton ♦ Hodge**

# Improving Form 1098-T: How a Revised Form Could Increase Take-Up, Improve Compliance, and Lower Taxpayer Burden

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## I. Introduction

Form 1098-T originated with the Taxpayer Relief Act of 1997 (TRA97). TRA97 created the Hope Scholarship Tax Credit (HTC) and the lifetime learning credit (LLC). These new benefits allowed qualifying students attending eligible institutions to claim a tax credit against qualifying education expenses. TRA97 also required that eligible educational institutions file a return reporting qualified tuition and related expenses and other information for each enrolled student as prescribed by regulations. Among other items, Form 1098-T reports student status (if the student is attending at least half time, and if a graduate student), student expenses, and scholarships. The current design of Form 1098-T helps taxpayers claim certain education tax credits and it also helps the IRS monitor compliance with the education tax credits.<sup>2</sup> Yet, as currently designed and administered, Form 1098-T falls short of providing *all* the information necessary for students to claim the tax credits or for the IRS to effectively monitor compliance with education-related provisions. This paper presents some evidence that some eligible students may not be taking any education-related tax benefit or may not be choosing the optimal benefit. We also present evidence that some students may be taking a tax benefit for which they are not eligible. But underlying this “evidence” is the fact that not all the information required to determine eligibility is observable on the tax return or the Form 1098-T. As a result, it is not possible to know with certainty whether a student is optimizing or compliant. Students who do not appear to be optimizing or who appear to be noncompliant may be responding to information that is not observable. More information is necessary to be able to guide taxpayers to the optimal and compliant benefit.

In recognition of these limitations, both the President and Congress have proposed modifying the reporting of tuition expenses and scholarships on Form 1098-T.<sup>3</sup> These proposals would move the information reported on Form 1098-T closer to the information needed by taxpayers with education expenses when preparing their tax returns. This paper describes these proposed changes, along with additional ways that improved reporting on Form 1098-T could increase take-up of the education benefits, improve compliance, and decrease the compliance burden that families with students must bear in order to claim this credit.

The paper is organized as follows: Section II briefly describes currently available tax benefits related to postsecondary education expenses. Section III describes Form 1098-T. Section IV describes the limitations of Form 1098-T. Section V presents data gathered from Forms 1098-T and 8863, including the number of students claiming education credits by type of credit and type of student and the number of students claiming a credit without a Form 1098-T. Section VI presents a proposed redesign of Form 1098-T and shows how a new worksheet based on the redesigned Form 1098-T could guide students in selecting the optimal tax benefit. Section VII concludes.

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<sup>1</sup> The authors wish to thank Andrew Bershadker for his assistance. Views and opinions expressed are those of the authors and do not necessarily represent official Treasury positions or policy.

<sup>2</sup> Through 2014, taxpayers with education expenses may claim an above-the-line deduction. This paper focuses on the tuition credits, which will remain available. Claims data are presented for all three benefits, since in the absence of the deduction, many of the taxpayers claiming a deduction would have claimed a credit instead.

<sup>3</sup> See the *General Explanation of the Administration's Fiscal Year 2016 Revenue Proposals (Greenbook)*. Fiscal Year 2016 Revenue Proposals (Greenbook), page 128. This proposal was also included in the FY 2014 and FY 2015 Greenbooks. See also *Summary of Staff Discussion Draft: Tax Administration* by Chairman Baucus, U.S. Senate Committee on Finance, November 2013.

## II. Education-Related Tax Benefits

Form 1098-T was first introduced to help administer the Hope Scholarship Tax Credit (HTC) and the lifetime learning credit (LLC). Both credits were created as part of the Tax Reform Act of 1997 to help families pay for postsecondary education expenses. In 2008, over 7.7 million students received \$7.6 billion in HTC and LLC. In 2009, the American Recovery and Reinvestment Act of 2009 (ARRA) created the American Opportunity Tax Credit (AOTC) as a temporary replacement for the HTC. The maximum AOTC is larger than the maximum HTC and unlike the HTC, the AOTC is partially refundable. The AOTC is currently available through 2017. A brief description of the AOTC and LLC are given below, followed by a description of the above-the-line deduction of up to \$4,000 in tuition and fees, which expires after 2014. We also describe how the administration of certain other education-related tax benefits could benefit from a redesigned Form 1098-T. These include the exclusion of certain scholarships and fellowships from income, the extension of the dependent exemption to full-time students age 19 through 23, and the extension of qualifying children for purposes of claiming an earned income credit to full-time students age 19 through 23.

### *The American Opportunity Tax Credit*

For any given student, a taxpayer may take either an AOTC or a LLC but a taxpayer may not claim both credits for one student; a taxpayer may take an AOTC for one student and an LLC for a second student. If a taxpayer is eligible to take an AOTC for a particular student, the AOTC will provide the greater benefit. The AOTC provides a tax credit of up to \$2,500 per student per year for the first four years of postsecondary school if the student is enrolled at least half time. The AOTC is calculated as 100 percent of the first \$2,000 and 25 percent of the next \$2,000 in qualified tuition and related expenses. Forty percent of the otherwise available AOTC is refundable (for a maximum refundable credit of \$1,000). Qualified tuition and related expenses for the AOTC includes tuition, fees, and course materials including books and supplies required for enrollment or attendance. Since only one benefit may be claimed for any given dollar of qualified expenses, scholarship amounts that are excluded from a student's taxable income must be subtracted from expenses that otherwise qualify for the AOTC. Likewise, expenses that are paid by other tax-preferred sources, such as employer-paid expenses under Internal Revenue Code Section 127 or expenses paid by earnings from a Section 529 qualified tuition plan, are not qualifying expenses for the purpose of claiming the AOTC. To qualify for the AOTC, the student must be enrolled in a course of study leading to a degree, certificate or other recognized credential. The AOTC phases out between modified adjusted gross income (MAGI) of \$80,000 and \$90,000 (\$160,000 and \$180,000 if married filing jointly).

Table 1 shows the number of returns, the amounts claimed, and the share of the credit in excess of tax liability, by AGI of the claimants. In total, 12.8 million taxpayers and their families received \$21.8 billion of AOTC in 2011 with an average credit of \$1,699 per return (some taxpayers may receive more than one credit if there was more than one qualifying student on his or her return). Sixty percent of AOTC returns receive an outlay (a credit that exceeds tax liability) and 30 percent of the total AOTC received on returns is an outlay.

**TABLE 1. Number of Returns, Amount of Credits, and Share of Credit That Is an Outlay by AGI for Returns Claiming an American Opportunity Tax Credit, Tax Year 2011**

Adjusted Gross Income (Thousands)	Total AOTC			Portion of AOTC that Is an Outlay				
	Return Count (Thousands)	Total (\$ Millions)	Average (\$)	Number of Returns (Thousands)	Total Amount (\$ Millions)	Average per Return (\$)	Returns With Outlay (%)	Outlay as Percent of Total AOTC (%)
\$0 to \$10	2,029	1,810	892	2,010	1,763	877	99	97
\$10 to \$20	2,580	2,942	1,140	2,475	2,205	891	96	75
\$20 to \$30	1,775	2,903	1,635	1,494	1,200	804	84	41
\$30 to \$40	1,215	2,243	1,846	730	597	817	60	27
\$40 to \$50	893	1,817	2,036	434	370	852	49	20
\$50 to \$75	1,530	3,404	2,225	352	310	881	23	9
\$75 to \$100	1,083	2,544	2,350	64	59	919	6	2
\$100 to \$150	1,262	3,251	2,577	10	7	656	1	0
\$150 to \$200	384	798	2,078	2	1	520	0	0
> \$200	0	0	0	0	0	0	0	0
<b>Total</b>	<b>12,824</b>	<b>21,786</b>	<b>1,699</b>	<b>7,637</b>	<b>6,573</b>	<b>861</b>	<b>60</b>	<b>30</b>

### *The Lifetime Learning Credit*

The LLC provides a nonrefundable tax credit of up to \$2,000 per tax return. The LLC is not limited to a set number of years, to a particular enrollment intensity, or to students pursuing a degree, certificate or other recognized credential. So, a student who is taking a refresher course to acquire, maintain, or improve job skills would qualify for the LLC but not the AOTC. Likewise, students in their 5th year or more of school, including graduate school, or who are enrolled less than half-time (who are otherwise eligible) will qualify for an LLC but not an AOTC. Importantly, neither credit is available to pay for hobby courses even though some schools may file Form 1098-T for students taking classes for fun.<sup>4</sup> The LLC is calculated as 20 percent of up to \$10,000 in qualified tuition and related expenses per tax return. Qualified expenses for the LLC include only tuition and fees required for enrollment or attendance. The definition of required fees is very narrow for the LLC. As stated in the regulations to this section of the Code, qualifying course materials for the LLC are restricted to those purchased directly through the school as a condition of enrollment or attendance.<sup>5</sup> Thus, most course books are not qualifying expenses for the LLC. In 2014, the LLC phases out between modified adjusted gross income (AGI) of \$54,000 and \$64,000 (\$108,000 and \$128,000 if married filing jointly).

Table 2 shows the number of returns and amounts claimed by AGI of the claimants that claimed the LLC in 2011. In total, 2.9 million returns received \$2.1 billion of LLC in 2011 with an average LLC of \$731.

**TABLE 2. Number of Returns and Amount of Credit by AGI for Returns Claiming a Lifetime Learning Credit, Tax Year 2011**

Adjusted Gross Income (Thousands)	Lifetime Learning Credit		
	Number of Returns (Thousands)	Total Amount (\$ Millions)	Average Per Return (\$)
\$0 to \$10	8	0	27
\$10 to \$20	413	150	364
\$20 to \$30	498	334	671
\$30 to \$40	443	344	778
\$40 to \$50	377	329	872
\$50 to \$75	539	442	820
\$75 to \$100	462	397	861
\$100 to \$150	114	89	782
\$150 to \$200	0	0	0
> \$200	0	0	0
<b>Total</b>	<b>2,853</b>	<b>2,087</b>	<b>731</b>

### *The Above-the-Line Deduction for Tuition and Related Expenses*

The above-the-line deduction for tuition and related expenses allowed taxpayers to reduce their taxable income by up to \$4,000 of tuition and fees per tax return. Taxpayers with incomes up to \$65,000 (\$130,000 for joint filers) may claim the full \$4,000 and taxpayers with incomes greater than that but up to \$80,000 (\$160,000 for joint filers) may claim up to \$2,000. A student for whom a deduction is claimed may not be claimed for an education credit. Expenses are defined in the same way as for the LLC. This benefit expired for tax years after 2014.

### *The Exclusion of Certain Scholarships and Fellowships from Income*

Many scholarships, including the Pell grant, can be spent on a wide range of expenses, including tuition and fees, course related expenses, living expenses, and child care. Some scholarships restrict the terms of their use to a limited set of these expenses. For example, certain Post-9/11 GI Bill benefits may pay only the veteran's tuition and required fees although other GI Bill amounts may be used for additional expenses. Scholarship income that is used to pay tuition,

<sup>4</sup> Only the student will know whether certain classes are hobby classes or classes that are being taken to maintain skills. For example, a Shakespeare course could be taken by someone who tutors or teaches to maintain or expand skills or could be taken just for fun.

<sup>5</sup> See Income Tax Regulations, Section 1.25A-2(d)(ii). The education credits are defined in Section 25A of the Internal Revenue Code.

required fees and course-related expenses (including for books) may be excluded from income for purposes of calculating income tax liability. In order to qualify for the exclusion, the scholarship cannot be designated for some other purpose (e.g., room and board) and generally cannot represent a payment for services (e.g., teaching). Excluded amounts should be subtracted from expenses that would otherwise qualify a student for an education credit. The exclusion does not have an AGI limitation. To qualify for the exclusion, the student must be a degree candidate. Scholarships used to pay other expenses such as living expenses do not qualify for the exclusion from income.

If scholarship income is excluded from gross income for tax purposes, the value of the tax benefit will depend on the taxpayer's marginal tax rate and will therefore depend on the variety of factors that determine a taxpayer's marginal tax rate, such as the taxpayer's income, marital status, and whether or not he or she is eligible for certain tax credits, such as the earned income tax credit. Under certain circumstances, excluding a scholarship from income is not the optimal choice for taxpayers. Under current tax law, if the terms of the scholarship allow it to be used for any education expenses, a student may choose whether to allocate scholarship amounts to tuition and fees or to living expenses. If allocated to tuition and fees, a scholarship reduces the amount of tuition eligible to be used to claim the AOTC or LLC. If a scholarship is used to pay all of the student's tuition and related expenses, the student (or parent in the case of a dependent taxpayer) will not be eligible for any AOTC or LLC. If allocated to living expenses, however, then the scholarship becomes taxable for the student. As a result, maximizing the scholarship and education credits requires calculating the value of the credit (as it affects the tax return of the student and the parent, if applicable) relative to the tax liability resulting from counting the scholarship as income.

The Administration's Fiscal Years 2015 and 2016 revenue proposals included a simplification proposal that would have allowed students with Pell grants to exclude their Pell grant from income without subtracting it from expenses that would otherwise be eligible for the AOTC. This would allow Pell grant recipients, most of whom have very low income, to avoid the complicated calculations that are required to allocate a grant optimally between taxable and nontaxable income.

Form 1098-T reports some, but not all, scholarship income (see further discussion below in Section IV, Limitations of Form 1098-T).

### ***Parental Personal Exemption, Head of Household Status and Earned Income Tax Credit for Students Ages 19 Through 23***

For parents supporting college students, there is also an extension of the benefit provided by the dependency exemption deduction and the earned income tax credit (EITC) for full-time students with ages 19 through 23. In the case of a single parent with only one child, the continued presence of a qualifying child allows the parent to use Head of Household filing status, with a bigger standard deduction and more favorable tax rate brackets than available to single filers. Dependent children over the age of 18 do not qualify as children for the dependency exemption or the EITC unless they remain full-time students (up through age 23).<sup>6</sup> In 2014, the personal exemption amount is \$3,950. In 2014, the maximum EITC is \$3,305 for taxpayers who have one qualifying child. For a single parent with one child earning \$30,000 the combined value of these three tax benefits is \$2,581.<sup>7</sup>

## **III. Description of Form 1098-T**

As described in detail below, all postsecondary institutions whose students are allowed to claim education credits are required to file a Form 1098-T with the IRS each year for most (but not all) enrolled students. Schools are also required to send a copy of Form 1098-T to each student for whom they file a Form 1098-T. The 1098-T is the only third-party information the IRS receives regarding a student's postsecondary education expenses, scholarships, and half-time and graduate student status. As such, it is very valuable to the IRS and to students who receive it. However, in its current form, Form 1098-T falls short of providing students and the IRS what is needed to calculate qualified education expenses. Most schools report the eligible expenses that they billed to the student but most schools do not report whether

<sup>6</sup> For purposes of these benefits, a full-time student must attend full-time for some part of "each of five calendar months during the calendar year" and the five months need not be consecutive. A full-time student is defined in the regulations to Section 151 as one who is enrolled "for the number of hours or courses which is considered to be full-time attendance" by the program in which the student is enrolled, in accordance with Department of Education guidelines. Dependent children who are permanently and totally disabled are not subject to the age limitations.

<sup>7</sup> The EITC for such a taxpayer would be \$1,360. Head of household status increases the taxpayer's standard deduction and widens the 10-percent rate bracket for a combined tax benefit of \$628. The extra personal exemption is worth \$593. In total, the combined value of the three benefits is \$2,581.

those expenses were actually paid. Schools also report some, but not all, scholarships received by students. So although, for taxpayers and the IRS, the receipt of a Form 1098-T serves as a notice that a particular student is enrolled at an eligible institution and therefore *may* be eligible for an education tax credit, it does not provide the information necessary for either the taxpayer or the IRS to confirm that he or she actually *is* eligible for a tax credit. Nor does the absence of a Form 1098-T indicate that a student is not eligible for a tax credit.

**Filing Requirement**

All postsecondary institutions whose students are eligible for Title IV funds<sup>8</sup> (e.g., Pell grants or Federal student loans) are required to file Form 1098-T for all enrolled students with the following exceptions. No reporting is required for: i) nonresident alien individuals; ii) students enrolled exclusively in noncredit courses; and iii) individuals whose qualified tuition and related expenses are waived, paid with scholarships, or covered by a formal billing arrangement.<sup>9</sup> As discussed further below, because of these exceptions some students who may be eligible for an education credit will not receive a Form 1098-T.

**Information Reported**

A copy of Form 1098-T is shown in Figure 1. Summary statistics for this form for Tax Year 2011 are shown immediately after in Table 3.

**FIGURE 1. Form 1098-T, Tax Year 2014**

CORRECTED

FILER'S name, street address, city or town, state or province, country, ZIP or foreign postal code, and telephone number		1 Payments received for qualified tuition and related expenses \$	2 Amounts billed for qualified tuition and related expenses \$	OMB No. 1545-1574  <span style="font-size: 2em; font-weight: bold;">2014</span>  Form 1098-T	<b>Tuition Statement</b>
FILER'S federal identification no.	STUDENT'S social security number	3 If this box is checked, your educational institution has changed its reporting method for 2014 <input type="checkbox"/>		<b>Copy B For Student</b>  This is important tax information and is being furnished to the Internal Revenue Service.	
STUDENT'S name		4 Adjustments made for a prior year \$	5 Scholarships or grants \$		
Street address (including apt. no.)		6 Adjustments to scholarships or grants for a prior year \$	7 Checked if the amount in box 1 or 2 includes amounts for an academic period beginning January - March 2015 ► <input type="checkbox"/>		
City or town, state or province, country, and ZIP or foreign postal code		8 Check if at least half-time student <input type="checkbox"/>	9 Checked if a graduate student . . . . <input type="checkbox"/>	10 Ins. contract reimb./refund \$	

Form **1098-T** (keep for your records) www.irs.gov/form1098t Department of the Treasury - Internal Revenue Service

<sup>8</sup> Title IV is the section of the Higher Education Act that describes direct Federal aid programs, including Pell grants, Federal student loans, and work-study. Nearly all domestic institutions participate in the Federal aid programs, along with foreign institutions that want their American students to be able to receive student loans. Although foreign schools participating in Title IV programs are generally required by statute to file this form for many of the American students enrolled in some of their programs, this requirement is not enforced.

<sup>9</sup> A formal billing arrangement is an arrangement in which a) the educational institution bills an employer, a government entity, or certain nonprofits for education provided and b) the educational institution does not maintain a separate account for that individual. An example would include an agreement between an employer and a local community college to provide statistical training to all employees at a fixed rate. If a student receives education through a formal billing arrangement, although the student receives the education, it is the student's employer, a government entity, or the relevant nonprofit that is billed for the education, and not the student. In this case, the school does not maintain a separate financial account for the individual student and under current law would not be required to issue a 1098-T. This term is defined in regulation 1.6050S-1 (26 CFR).

**TABLE 3. Summary Statistics for Form 1098-T, Tax Year 2011**

Box Number and Description	Mean of Nonzero Values (\$)	Percent with Nonzero Values
1. Payments received	5,203	19.1
2. Payments billed	23,650	76.1
3. Change in reporting method	N/A	2.4
4. Prior-year adjustments to Box 1 or Box 2	1,284	7.2
5. Scholarships or grants	5,664	49.2
6. Prior-year adjustments to Box 5	1,349	1.5
7. Includes amounts for next academic year	N/A	31.6
8. At least half-time student	N/A	80.7
9. Graduate student	N/A	13.7
10. Insurance contract refund	3,215	0.1

NOTE: Total number of forms in TY 2011: 27.6 million

*Boxes 1 and 2: Payments received or payments billed for qualified tuition and related expenses.* Under current law, schools may choose to report amounts billed or amounts received for qualified tuition and related expenses. The majority of the students (76 percent of the Form 1098-Ts filed and 80 percent of the Form 1098-Ts reporting positive tuition and related expenses) attend schools that choose to report payments billed for qualified tuition and related expenses. This reduces the usefulness of the Form 1098-T since only amounts paid in a given tax year are eligible expenses for the purpose of claiming a tax credit. Amounts billed during a tax year, even if ultimately equal to the total amounts paid, are unlikely to be the same as payments in a given tax year due to the mismatch between the academic year and the tax year. If the second semester begins in January, tuition amounts are commonly billed during the preceding few months but may not be paid until January.

*Box 3: Change in reporting method.* Occasionally institutions ask and receive permission from the IRS to switch whether they report “tuition billed” or “tuition paid.” Institutions that change their reporting method would check this box in the first year of the change.

*Box 4: Adjustments made for a prior year.* Sometimes the amount that should have been reported in Box 1 or Box 2 changes after the data were collected. This could occur if the student changes the number of credit hours, withdraws, and received a full or partial refund after reporting is complete, or if an error is corrected.

*Box 5: Scholarships or grants.* Schools are required to report scholarships that are “administered and processed” by the school. Different schools may interpret this requirement differently, but it is clear that not all scholarships are being reported on Form 1098-T. For academic year 2011, the College Board reports total grants and scholarships of \$114 billion<sup>10</sup> while the sum of all scholarships reported on all Forms 1098-T for Tax Year 2011 is \$77 billion.

*Box 6: Adjustments to scholarships or grants.* As with the adjustments to Boxes 1 and 2, this box provides an opportunity for corrections due to changed circumstances or error.

*Box 7: Check if tuition reported includes amounts for the next calendar year.* Credits may generally be claimed for payments made in the taxable year for attendance in the taxable year. However, payments made in the taxable year for attendance that begins in the first three months of the following taxable year also qualify for the credit. Checking this box alerts the taxpayer and IRS that reported amounts may reflect amounts billed for attendance in the following year that the taxpayer has not yet paid. Only amounts paid in the current taxable year are eligible for a credit.

*Box 8: At least half-time student check.* Box 8 is checked if the student is enrolled at least half-time for one academic period. Students must be enrolled at least half-time to be eligible for the AOTC. Students who do not have this box checked may still be eligible for the LLC. In 2011, 81 percent of all students with a Form 1098-T were enrolled at least half time.

<sup>10</sup> For the 2011–2012 academic year, the College Board reports a total of \$47.7 billion in Federal grants, \$9.5 billion in State grants, \$42.7 billion in institutional grants and \$14.3 billion in private and employer grants for a total of \$114 billion. Some portion of the institutional grants represents discounted tuition, which is generally excludable and would not be reported in Box 5. <https://trends.collegeboard.org/sites/default/files/student-aid-2013-full-report.pdf>.

*Box 9: Graduate student check.* Box 9 is a check if the student is enrolled as a graduate student. The HTC was limited to the first two years of postsecondary school and therefore excluded graduate students. In contrast, the AOTC is available to students in the first four years of postsecondary school which under unusual circumstances may include graduate students. Students who are in their fifth or later year of postsecondary school may still be eligible for the LLC. In 2011, some 14 percent of all students with a Form 1098-T were enrolled as graduate students.

*Box 10: Contractual reimbursement.* Sometimes students take out insurance against their tuition liability in case illness or other reasons leave them unable to complete the term. Occasionally such insurance would be required by the university for students in an extended payment plan. If there is an insurance payment, it would be reported here. Contractual reimbursements appear on very few forms.

Taxpayers face a complicated problem when they try to match education expenses with grant and tax benefits optimally and compliantly. The next section further describes the limitations of Form 1098-T for guiding taxpayers and as a compliance tool. The suggested changes, described in more detail in the subsequent section, would improve the usefulness to students and to the IRS of the information reported, and thus improve the accuracy of their returns.

## IV. Limitations of Form 1098-T

### *Not All Students Receive a Form 1098-T*

Under current regulations, most—but not all—students receive a Form 1098-T. As a result, outreach and enforcement are more challenging. If all students received a Form 1098-T, IRS would be able to determine the full population of students, and by extension, the nonstudents. Universality would enable all students to receive useful information that could guide them toward the benefits; all students would have the opportunity to be reminded of credit eligibility, and IRS' ability to conduct outreach to those who do not claim a benefit could be increased. In addition, extending the requirement to include all students would enable IRS to move toward denying credits claimed on behalf of individuals who are not truly students. In 2011, of the 12.8 million returns that claimed an AOTC, only 69 percent had a Form 1098-T. Some portion of these claims may represent noncompliant behavior, but without universal reporting and reporting of expenses paid (see below), it is not possible for the IRS to know the degree of noncompliance. Finally, in combination with additional information on full-time status, universality could also be used to improve administration of the dependent exemption and EITC.

### *Expenses Cannot Be Determined Using Form 1098-T*

Tuition paid is often not reported on Form 1098-T. Box 1 reports payments received for qualified tuition and related expenses. In 2011, only 19 percent of Form 1098-T recipients received a form with a positive value in this box.<sup>11</sup> Most institutions report only expenses that are billed in the tax year (Box 2), not that were actually paid in the tax year (Box 1). However, only expenses that are paid in the tax year for which the return is filed are eligible for a tax credit. So, for example, if a student is billed \$10,000 for tuition and fees in December of 2013 for a semester that begins in January of 2014, then the student's Form 1098-T for Tax Year 2013 from that school would report \$10,000 for the amount billed in Box 2. If the student (or someone acting on the student's behalf) pays the bill in December of 2013, the student would have \$10,000 of qualifying expenses for the education credits for Tax Year 2013 (all else equal). If instead, the student pays her bill in January of 2014, the Tax Year 2013 Form 1098-T would still report \$10,000 as billed in 2013 but because the bill was not paid in 2013, none of the \$10,000 would qualify for a 2013 education tax credit. Further, the \$10,000 amount (paid in January 2014) would not be reported on a Tax Year 2014 Form 1098-T even though (all else equal) it would be a qualifying expense for a 2014 education tax credit. As a result, most students cannot use the tuition information reported on their Form 1098-T to calculate eligible expenses for purposes of claiming a credit without verifying that they actually paid those expenses in the same year as the report.

### *Book Expenses Are Not Reported on Form 1098-T*

Fees for books and similar course materials that are required to be purchased from the institution before a student is allowed to enroll or attend class are qualifying expenses for both the AOTC and LLC. This narrow class of expenses is generally included in Box 1 or Box 2 on Form 1098-T. In contrast, expenses for course materials that are required for

<sup>11</sup> Five percent of Forms 1098-T report positive amounts for neither tuition paid nor tuition billed in that year.

enrollment or attendance but are not part of fees paid to the institution are qualifying expenses for the AOTC but are not qualifying expenses for the LLC. The amounts spent on this latter type of course materials are most likely unknown to the institution, and therefore cannot be reported by the institution on Form 1098-T. As a result, these AOTC-eligible expenses must be reported by the taxpayer and taxpayers need to keep their own records of these expenses.

### ***Not All Scholarships Are Reported on Form 1098-T***

Scholarships that are “administered and processed” by the institution are reported on Box 5 of Form 1098-T. Different institutions may have different interpretations of what it means to “administer and process” a scholarship.<sup>12</sup> For example, an institution might verify a student’s enrollment status for the purpose of qualifying for a scholarship but never handle the check. Does that qualify as being processed by the school? Differing interpretations of “administered and processed” could lead to inconsistent reporting of scholarships.

However, even if the regulations were clarified so that all schools had the same understanding of their reporting obligations for scholarships, reporting would still be incomplete because institutions are not aware of all scholarships received, since some scholarships are paid directly to the student, and are not handled by the school at all. There is no third-party reporting requirement on these amounts even though some of the scholarship amounts should be included in taxable income. Full reporting of scholarships would improve IRS’s ability to guide taxpayers to the optimal decision regarding whether to exclude scholarship funds from income or not, and if so, how much to exclude. Full reporting of scholarships would also help ensure that amounts that should be included in income actually were included in income.

Table 4 reports the growth of grant dollars by source, as reported by the College Board. These are the best estimates available of the total value of grants distributed each year. As shown in Table 4 and stated above, for academic year 2011-2012, the College Board reported over \$114 billion in scholarships and grants. In contrast, \$77 billion of scholarships were reported in Box 5 of Form 1098-T. Even allowing for differences between academic and tax years and that some share of the institutional grants would not be reported on Form 1098-T, it is clear that some share of scholarship income is not reported.

**TABLE 4. Growth of Federal, Institutional, Private and Employer, and State Educational Grant Dollars, Academic Years 2007–2008 to 2012–2013**

Academic Year	State Grants (\$ Billions)	Private and Employer Grants (\$ Billions)	Institutional Grants (\$ Billions)	Federal Grants (\$ Billions)	Total Grants (\$ Billions)
2007–2008	\$8.8	\$12.7	\$30.9	\$23.3	\$ 75.7
2008–2009	\$8.7	\$13.0	\$32.3	\$26.7	\$ 80.7
2009–2010	\$9.5	\$13.2	\$37.1	\$44.6	\$104.4
2010–2011	\$9.6	\$14.0	\$40.6	\$52.4	\$116.6
2011–2012	\$9.5	\$14.3	\$42.7	\$47.7	\$114.2
2012–2013	\$9.7	\$14.6	\$44.4	\$47.0	\$115.7

NOTE: This table was prepared by College Board in October 2013. All figures are in 2012 dollars. <http://trends.collegeboard.org/student-aid/figures-tables/grants#Types of Grants>.

### ***Full-Time Status is Not Reported on Form 1098-T***

As stated above, taxpayers with a full-time dependent student may qualify for an additional five years of child-related tax benefits. Taxpayers with a dependent under age 24 who attends school full time<sup>13</sup> may claim the student as a qualifying child for the purpose of filing as head of household or receiving the EITC or the dependent exemption. Although Form 1098-T is the only third-party report of student status received by IRS, reporting does not distinguish between half-time students and full-time students and is therefore of limited value toward informing families of their eligibility or identifying noncompliant taxpayers for purposes of administering these benefits.

<sup>12</sup> In a November 2013 Advisory Report, the National Association of College and University Business Officers (NACUBO) reported that since the Form 1098-T regulations were finalized in 2002, “considerable variation has crept into the community’s shared understanding of what needs to be reported on Form 1098-T”

<sup>13</sup> Full time for purposes of claiming a dependent child is defined in the statute as attending full time during each of five calendar months during the tax year.

## V. Evidence of Problems Created by 1098-T Limitations

Table 5 shows student and family characteristics for i) nondependent returns that claim an education credit or deduction (where the student may be the taxpayer or the taxpayer's dependent) by whether or not they received a Form 1098-T, and ii) nondependent returns that did not claim an education credit or deduction even though either the taxpayer or a dependent claimed by the taxpayer received a Form 1098-T. The student in the table may be either the taxpayer or a claimed dependent of the taxpayer. The results presented are for Tax Years 2010 and 2011 combined, and are restricted to returns with AGI that would not disqualify them for an education credit or deduction.<sup>14</sup>

As indicated earlier, 26 percent of returns claiming an education benefit did not receive a Form 1098-T over the two years in the table. Just as striking, 37 percent of returns that receive a Form 1098-T (and that are below the income limits for an education benefit) did not claim a benefit over the two years in the table.

Table 5 shows that returns claiming an education benefit without the presence of a Form 1098-T are substantially less likely to be claiming the benefit for a dependent student. Only 23 percent of the students on these returns are dependents, compared to about half the students who receive a Form 1098-T. Returns that claim benefits without a Form 1098-T also have relatively lower income (\$33,610) than returns that claim benefits with a Form 1098-T (\$53,136). In part, this may be because these returns are less likely to have two earners; only 24 percent of returns without a Form 1098-T file jointly compared to 50 percent of returns with a Form 1098-T.

Table 5 also shows that returns that receive a Form 1098-T but do not claim an education benefit have relatively older students and less income than returns that receive a Form 1098-T and claim an education benefit. The average age of the student (who about half the time is the taxpayer and about half the time is a dependent of the taxpayer) is 38 for taxpayers who do not claim a benefit and 27 for taxpayers who do claim a benefit. This suggests that at least some of the students who do not claim an education benefit may be eligible only for the LLC or tuition deduction, both of which are available to older students but neither of which benefit taxpayers without a tax liability. The AOTC, in contrast, is partially refundable, but since it is available only for four years, generally benefits just younger students.

**TABLE 5. Student and Return Characteristics for Income-Eligible Returns by Presence of Form 1098-T and Presence of an Education Benefit in Tax Years 2010 and 2011**

Student and Return Characteristics	With AOTC, LLC or TD		Without AOTC, LLC or TD
	Without 1098-T	With 1098-T	With 1098-T
Student Characteristics			
Age	34	27	38
Share that are male	48%	41%	52%
Share that are dependent	23%	48%	51%
Return Characteristics			
Average AGI	\$33,610	\$53,136	\$39,625
Share with paid tax preparation	54%	52%	53%
Share with joint filing status	24%	50%	44%
Average balance due (refund)	(\$3,651)	(\$3,172)	(\$2,866)
Number of returns (millions)	8.9	25.5	15.1
Share of all returns with 1098-T	N/A	63%	37%
Share of all returns w/ AOTC, LLC or TD	26%	74%	N/A

NOTE: The first two columns include all returns with credits or deduction, regardless of income. The third column excludes returns with incomes in excess of the income limits for the tuition deduction. All amounts are in 2011 dollars. The table presents averages for Tax Years 2010 and 2011 returns with claims and/or Forms 1098-T.

<sup>14</sup> The tuition deduction had the highest phaseout limits in 2011 so Table 5 is restricted to AGI less than the limits for the tuition deduction by filing status (\$130,000 for joint filers and \$65,000 for other filers).

Table 6 shows the type of tax benefit claimed and the percent of claimants with a Form 1098-T from Tax Years 2009 to 2011. The portion of returns that claim a HTC or AOTC without Form 1098-T ranges from a low of 69 percent in 2011 to a high of 78 percent in 2009.<sup>15</sup> The share of returns claiming a LLC ranges from 81 to 82 percent and the share of returns claiming a tuition and fees deduction without a Form 1098-T ranges from 82 percent to 83 percent. This table suggests that there needs to be further investigation into why the percentage of students claiming benefits without a Form 1098-T has fluctuated and why it varies between the AOTC and LLC. It may simply be that AOTC claimants (who are generally lower income) are more likely to receive scholarships that are in excess of tuition and required fees. Schools are not required to file a Form 1098-T for full-scholarship students even though they may have other expenses (e.g., books) that would still qualify them for an AOTC. Pell grant payments in particular were growing between 2009 and 2011. Alternatively, the lack of a Form 1098-T may be evidence of noncompliance. Better reporting would improve tax administration by allowing the IRS to differentiate between the two groups.

**TABLE 6. Education Tax Benefits and Presence of Form 1098-T, Tax Years 2009–2011**

Tax Benefit and Presence of Form 1098	Tax Year		
	2009	2010	2011
Hope/American Opportunity Tax Credit			
Number of Returns with a Credit (millions)	9.5	12.3	12.8
Share with a Form 1098-T	78%	73%	69%
Lifetime Learning Tax Credit			
Number of Returns with a Credit (millions)	3.3	2.7	2.8
Share with a Form 1098-T	81%	81%	82%
Tuition and Fees Deduction			
Number of Returns with a Deduction (millions)	2.5	1.9	2.0
Share with a Form 1098-T	82%	83%	83%

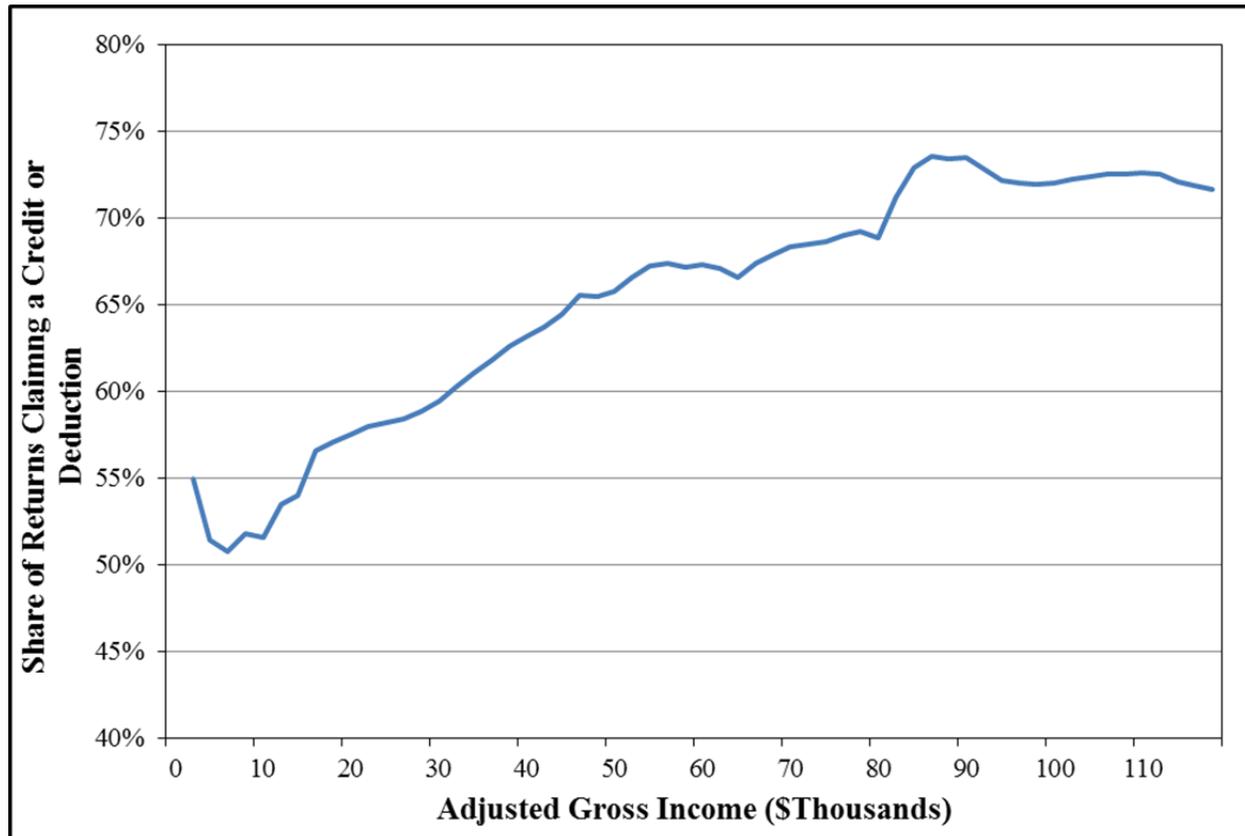
There is also evidence that currently many taxpayers are not aware that they could benefit (could lower their overall tax liability or increase the amount of their tax refund) by including some of their scholarships in income. Figure 2 shows that take-up of education credits and the tuition deduction was lower for low-income students than for middle and higher income students. For all returns with an associated Form 1098-T and income within the claiming range of the tuition deduction by filing status, this figure shows the share of returns by AGI that have an education credit or deduction claimed. After a brief dip between zero and \$5,000, we see a fairly steady increase in take-up rates as income increases. At incomes of \$30,000, the take-up rate is 59 percent. By \$82,000, take-up rates exceed 70 percent. Some of the variation in take-up by income is due to the fact that low-income families generally benefit only from refundable credits like the AOTC, whereas middle and higher income families may benefit from nonrefundable credits, like the LLC or tuition deduction. So students from low-income families who attend school parttime or who are in the 5<sup>th</sup> or more year of schooling may not qualify for any education benefit. The low take-up for low income families may also be the result of low-income families not optimizing the allocation of need-based grants (like Pell grants) between expenses that qualify for the AOTC and those that do not. Some families will be better off including Pell grants in income and claiming an AOTC, but this may not be well understood.<sup>16</sup>

The data presented in this section suggests that there is probably some noncompliance, and some students who are not making the right choices. However, for any given student's data (or tax return) it cannot be known with certainty whether the student is optimizing and compliant, or not. Students may be responding to information that is not available to IRS.

<sup>15</sup> Although for most students AOTC benefits exceeded HTC benefits at all levels of income in 2009, a few students still claimed a Hope credit that year because they were receiving an enhanced Hope credit as part of the Heartland Disaster Tax Relief Act of 2008.

<sup>16</sup> For more information on the interaction between Pell grants and education credits, including examples, see <http://www.treasury.gov/connect/blog/Documents/Pell%20AOTC%204%20pager.pdf>.

**FIGURE 2. Share of Tax Returns with an Associated Form 1098-T Claiming an Education Credit or Deduction, Tax Years 2010 and 2011 Combined**



## VI. Improving Education Reporting on Form 1098-T

This section begins with a discussion of some straightforward changes that would allow Form 1098-T to be aligned more closely with IRS' needs for enforcement and outreach, and taxpayers' needs for clarity and simplicity. It continues by presenting a revised worksheet for Form 8863 and concludes with a suggested set of questions for a revised Form 1098-T. Two of the changes discussed (eliminating the option of reporting tuition billed instead of tuition paid, and extending the Form 1098-T filing requirement to include scholarships not administered by the schools) are included among the Administration's tax proposals for Fiscal Year 2016.<sup>17</sup> Eliminating the option of reporting tuition billed is also included among the reforms to tax administration proposed by the Senate Finance Committee in November 2013.<sup>18</sup>

### *Expand and Clarify Reporting*

*Problem 1: Not all students receive a Form 1098-T.* Changes to existing requirements could make receipt of a Form 1098-T nearly universal. As stated earlier, universal reporting is of benefit to students and the IRS.

The following groups of students should receive a Form 1098-T, but currently do not. Extending the requirements to these students would make the Form 1098-T nearly universal without introducing additional forms of noncompliance.

**Students who begin study in January to March and prepay expenses:** All else equal, institutions are required to report only for students who are enrolled for an academic period beginning during the relevant tax year (or enrolled for an academic period in a prior calendar year who have a reportable transaction—e.g., a refund). So students who begin their studies in January and prepay in December will not receive a Form 1098-T for the December expenses.

<sup>17</sup> Fiscal Year 2016 Greenbook (February 2015).

<sup>18</sup> Tax Administration Reform Staff Discussion Draft Legislative Language (November 2013).

*Students whose tuition is less than or equal to scholarships administered and processed by the school (i.e., Full Scholarship Students):* These students may still have eligible expenses for the education credits. For example, if a student has \$5,000 of tuition, \$6,000 of living expenses and receives a \$5,000 unrestricted scholarship that is paid directly to the school, the school may choose to retain the scholarship to pay tuition.<sup>19</sup> The student, therefore, may not receive a Form 1098-T. Students like this one could interpret the absence of a tuition report as the absence of qualifying expenses or eligibility, and thus fail to claim a credit. However, allocating some scholarship income to taxable expenses allows an education credit to be claimed by this student. Since both tuition and scholarship amounts are reported on Form 1098-T, requiring that Form 1098-T be filed for these students need not induce improper claims, but could encourage more students to claim benefits to which they are entitled.

*Students in formal billing arrangements:* Although these students may have zero tuition due from them to the school, the student may have credit-eligible expenses. Again, the absence of a tuition report may be interpreted as the absence of eligibility. A report of zero tuition along with an added checkbox to identify those who are enrolled but in formal billing arrangements (and thus, have not paid tuition) would allow these students to receive a Form 1098-T without implying that they have tuition available against which to claim an education benefit.

*American students abroad:* Many students studying abroad for U.S. college credit, or who are attending foreign institutions, do not receive a Form 1098-T, even when enrolled at institutions that face a reporting requirement. To ensure that those enrolled abroad receive the form, foreign schools could be asked to comply with existing law as part of continued access to Title IV benefits for their students. To insure that those on exchange receive the Form 1098-T, organizations that provide study abroad opportunities could be required to cooperate with the student's home institutions to insure that the home institutions could calculate qualifying expenses and provide an accurate Form 1098-T.

*Problem 2: Expenses cannot be determined using Form 1098-T.* As stated above, the information on Form 1098-T does not suffice for taxpayers or the IRS to calculate actual expenses. The following changes would improve the reporting of expenses, although they would not achieve the reporting of all expenses.

*Report actual paid tuition (eliminate box 2):* Under current law, institutions have the option of reporting "tuition and related expenses billed" or "tuition and related expenses paid" on Form 1098-T. A redesigned form would remove this choice and require that the schools report "tuition paid." The amount paid would be the gross amount paid to the school from most sources (thus before considering scholarships, gifts paid directly to the school by a relative and other similar amounts, but after considering any amounts not charged to the student) for qualified education expenses. "Tuition and related expenses paid" is much closer to the definition of education expense that is required for claiming a credit, and is therefore the information actually useful to IRS and taxpayers. The FY 2016 Budget includes a proposal to eliminate Box 2 and require all schools to provide total tuition and required fees paid in Box 1 of Form 1098-T.

*Improve reporting of other expenses:* Expenses reported on Form 1098-T will always fail to capture all qualifying expenses for the AOTC, even if reporting were perfectly accurate. That is because some qualifying expenses are not known by the schools and therefore cannot be reported by the schools. A university can never know if a student bought, borrowed, or ignored any text book on a class syllabus, or how much the student spends on other qualifying supplies. These expenses are self-reported on Form 8863 by the student or taxpayer. Two options could improve accountability:

- i) All schools could be asked to provide the student with the Form 1098-T estimates of living expenses and supplies that the school uses as part of creating their "cost of attendance." This is a calculation all Title IV schools compute and provide to the Department of Education as a requirement of program participation. These estimates could guide taxpayers to a proper allocation of expenses across benefits received. Taxpayers would be encouraged to save evidence of actual expenses, and reminded that the information provided are estimates that would vary with intensity of study and other personal characteristics, and that the credits are based on actual expenses.

<sup>19</sup> This strategy makes it easier for the school to recapture funds should the student withdraw or otherwise fail to enroll (the school may be responsible for the repayment) and insure that tuition is paid in a timely fashion.

- ii) Alternatively, expenses for supplies not paid to and reported by the school could be capped at a relatively modest amount. The risk of this option is that some taxpayers may view the cap as a ceiling below which claims would not be challenged, which could lead to improper claims.<sup>20</sup>

*Problem 3: Scholarship reporting is incomplete and rules are not precise:* Two related changes could result in nearly universal reporting of scholarship income. Universal reporting would allow both IRS and taxpayers to determine the right allocation of scholarship income between taxable and nontaxable expenses. First, regulations could define “administered and processed” to mean all scholarships that are paid to the student via the school. All institutions would follow the same rules and report the same way for all students. Well-established rules regarding school processing could ensure that all of this income (even if excluded) is reported on Form 1098-T. Second, Form 1098-T reporting requirements should be extended to include *all organizations* that provide scholarships in excess of \$500 that are provided directly to the student, and thus not administered or processed by the school. Therefore, students might receive more than one Form 1098-T.<sup>21</sup> This requirement increases burden to organizations that currently have no information reporting requirement, but without this reporting, taxpayers may treat at least some of these funds as excluded income, even if it is not to their advantage to do so, and perhaps when they should not treat the funds this way. Evidence from IRS compliance studies shows that compliance is higher when income is subject to information reporting.<sup>22</sup> Clear definitions and increased reporting would mean that a student (or the IRS) could sum all Box 5s across all Forms 1098-T received, add in any small scholarships below the reporting threshold, and know exactly how much scholarship income was received relative to tuition and other expenses. The FY 2016 Budget includes a proposal to increase the requirements for the reporting of scholarships so that nearly all are reported on a Form 1098-T.

*Problem 4: Cannot identify full-time students:* Under current law, taxpayers are eligible for certain child-related benefits for dependents who are full-time students. Form 1098-T identifies those students who are at least half-time (the definition needed for the credits) but does not identify students who are fulltime. Form 1098-T could be augmented to make the contents of the form match the requirements of the key child-related provisions by requiring that institutions report the number of months that a student is enrolled for at least one day as a full-time student (as defined by the school).<sup>23</sup> Take-up of these benefits by taxpayers who are eligible could be improved since they would have confirmation that their child was a qualifying child. Compliance could be improved because it would allow the IRS to question the dependency exemption (and EITC) for students without the requisite number of months of full-time attendance.

## ***A Redesigned Form***

Figure 3 presents an example of the information that could replace the current content of Form 1098-T. The changes include eliminating the old Box 2, adding check boxes to identify formal billing arrangements and donors of scholarships, and more information about full-time status to assist in identifying those eligible for the AOTC and those meeting the definition of a student for purposes of the child-related benefits. The presentation in Figure 3 is consistent with the expansions and clarifications presented in the first part of this section, and it supports the simplified worksheet in the next section.

<sup>20</sup> Evidence from the literature on noncash charitable contributions suggests this is a valid concern. See Ackerman and Auten (2006) for figures that show spikes in giving at levels just below amounts required to be independently reported by donees.

<sup>21</sup> Form 1098-T is already used for reporting payments by tuition insurance providers.

<sup>22</sup> See U.S. Internal Revenue Service, 2012, *Tax Gap for Tax Year 2006: Overview*.

<sup>23</sup> According to the regulations for Section 151 a full-time student is one who is enrolled “for the number of hours or courses which is considered to be full-time attendance” by the program in which the student is enrolled, in accordance with Department of Education guidelines.

**FIGURE 3. Suggested Questions on a Redesigned 1098-T**

Content Questions on Revised Form 1098-T	
<b>1A</b>	Payments received
	\$
<b>1B</b>	Adjustments to payments received made for a prior year
	\$
<b>1C</b>	Check if student's fees were part of formal billing arrangement (see instructions) <input type="checkbox"/>
<b>1D</b>	Check if the amount in box 1 includes amounts for January-March of following year <input type="checkbox"/>
<b>2A</b>	Scholarships or grants
	\$
<b>2B</b>	Adjustments to scholarships or grants made for a prior year
	\$
<b>2C</b>	Check if issuer is provider of scholarship or grant not processed by the education institution the student attends... <input type="checkbox"/>
<b>3A</b>	Check if student was at least halftime... <input type="checkbox"/>
<b>3B</b>	Number of months of full-time enrollment
<b>4A</b>	Check if enrolled in a degree or certificate program... <input type="checkbox"/>
<b>4B</b>	Check if graduate student for entire period... <input type="checkbox"/>
<b>5</b>	Insurance contract reimbursement/refund
	\$

### *A Redesigned Worksheet for Form 8863*

Form 8863 is the form taxpayers use to claim education credits. It is attached to Form 1040 or Form 1040A and is filed with the IRS by the taxpayer. (See a copy of the Form in the appendix.) Parts I and II calculate the value of the education credits available to the taxpayer (refundable and nonrefundable portions are computed separately). Part III is filled out for each student the taxpayer may claim; it helps the taxpayer determine eligibility for each of the two credits, and then, subject to expenses, calculates the tentative credit for each eligible student. If a student qualifies for both credits, the AOTC will be the more valuable. It is a complicated form for taxpayers.

Receipt of a Form 1098-T tells taxpayers of their potential eligibility for an education credit. Ideally, the form would be received by all potentially eligible taxpayers and it would contain all the information needed to answer the questions on Form 8863 that confirm eligibility. An improved form would also provide the data needed to calculate "adjusted qualified education expenses" (line 27 or line 31 of Part III of the 8863).

If all students received a Form 1098-T, line 22 of Part III could be reduced from five subparts to a single line requiring students to fill in the EIN of the institution. Likewise, line 24, which asks about eligibility for the AOTC, could be simplified. Currently, it is long and potentially confusing:

Line 24 of the current 8863:

*Was the student enrolled at least half-time for at least one academic period that began in 2013 at an eligible educational institution in a program leading towards a postsecondary degree, certificate, or other recognized postsecondary education credential? (see instructions)*

If all students received a Form 1098-T and schools were asked to report more detail on the characteristics of a student's enrollment, this question could be replaced with:

Improved Line 24

*Is Box 3A checked?*

*Is Box 4A checked?*

If all students received a Form 1098-T and all schools reported payments received for qualified tuition and related fees, then students would have all the information needed to determine the maximum qualifying education expenses for the LLC and almost all the information needed to determine the maximum qualifying education expenses for the AOTC. For the AOTC, students would still need to provide information on books and other class materials not purchased from and reported by the school.

If, in addition, all scholarships received by students were reported on Form 1098-Ts, then the IRS could guide taxpayers to the compliant and optimal tax benefit. Such a worksheet for the AOTC might look like that in Figure 4.

**FIGURE 4. Example of a Worksheet for Expenses Qualifying for AOTC**

Qualifying Expenses Worksheet		
<b>Complete the qualifying expenses worksheet to determine your qualifying education expenses and the amount of qualifying education expenses you should claim.</b>		
<b>Line 1</b>	Payments for qualified tuition and fees	1. <Box 1 of 1098T>
<b>Line 2</b>	Expenses for course related materials	2. <provided by taxpayer>
<b>Line 3</b>	Payments for qualified tuition and related expenses before scholarships	3. <Add lines 1 and 2>
<b>Line 4</b>	Scholarships	4. <Box 2A of 1098T>
<b>Line 6</b>	Payments for qualified tuition and related expenses net of scholarships	6. <Line 3 minus Line 4>
<b>Line 7</b>	Check only one box:	
	a. Line 6 is greater than or equal to \$4,000, STOP Enter \$4,000 on line 27 of Form 8863. Do not include any scholarships in the student's gross income.	<input type="checkbox"/>
	b. Line 6 is less than \$4,000 and line 4 is zero STOP Enter line 6 on line 27 of Form 8863	<input type="checkbox"/>
	c. Line 6 is less than \$4,000 and line 4 is not zero STOP You may benefit from including some of the student's scholarships in the student's gross income. See instructions.	<input type="checkbox"/>

For students whose qualified tuition and related expenses exceeded their scholarships by \$4,000 (Box 7a checked) and for those without scholarships (Box 7b checked), the worksheet would tell them the level of expenses to enter on Form 8863. Just as importantly, the form would also tell certain students (Box 7c checked) that they might benefit from including their scholarships in income in order to qualify for a larger AOTC.<sup>24</sup> The instructions could be used to further guide taxpayers toward choosing the optimal amount of scholarship to include in income but optimizing might require multiple calculations of liability on the part of the taxpayer. Still, the worksheet in Figure 4 would go a long way toward narrowing down the number of taxpayers who would need to make those calculations and helping taxpayers make an optimal choice. Better guidance here could help ensure that low income students with scholarships are receiving the AOTC or LLC to which they are entitled.

## VII. Conclusions

Form 1098-T is an important resource for administering education-related tax provisions. It provides the IRS with the main third-party information about student status, student expenses, and scholarship income, and it helps some students claim education tax credits. However, it could do more. As discussed in the paper, it could be used to improve take-up of the tax credits. It could be used to guide taxpayers to the optimal tax benefit for their situation. And it could be used to ensure program integrity, to make sure that the education tax benefits are limited to those for whom the credits were intended. We proposed three main changes to advance these goals: 1) universal reporting on all students; 2) reporting of tuition and related expense paid, not just those that are billed; and 3) reporting of all scholarships or grants received. These three improvements would enable the IRS to offer the necessary outreach and guidance to students and their families as well as put in place effective compliance capabilities.

<sup>24</sup> See footnote 16.

# Appendix: Form 8863

Form **8863**

## Education Credits (American Opportunity and Lifetime Learning Credits)

OMB No. 1545-0074

Department of the Treasury  
Internal Revenue Service (99)

▶ Attach to Form 1040 or Form 1040A.  
▶ Information about Form 8863 and its separate instructions is at [www.irs.gov/form8863](http://www.irs.gov/form8863).

**2014**  
Attachment  
Sequence No. **50**

Name(s) shown on return

Your social security number



Complete a separate Part III on page 2 for each student for whom you are claiming either credit before you complete Parts I and II.

### Part I Refundable American Opportunity Credit

1	After completing Part III for each student, enter the total of all amounts from all Parts III, line 30 . . . . .	1	
2	Enter: \$180,000 if married filing jointly; \$90,000 if single, head of household, or qualifying widow(er) . . . . .	2	
3	Enter the amount from Form 1040, line 38, or Form 1040A, line 22. If you are filing Form 2555, 2555-EZ, or 4563, or you are excluding income from Puerto Rico, see Pub. 970 for the amount to enter . . . . .	3	
4	Subtract line 3 from line 2. If zero or less, <b>stop</b> ; you cannot take any education credit . . . . .	4	
5	Enter: \$20,000 if married filing jointly; \$10,000 if single, head of household, or qualifying widow(er) . . . . .	5	
6	If line 4 is: • Equal to or more than line 5, enter 1.000 on line 6 . . . . . • Less than line 5, divide line 4 by line 5. Enter the result as a decimal (rounded to at least three places) . . . . .	6	
7	Multiply line 1 by line 6. <b>Caution:</b> If you were under age 24 at the end of the year <b>and</b> meet the conditions described in the instructions, you <b>cannot</b> take the refundable American opportunity credit; skip line 8, enter the amount from line 7 on line 9, and check this box . . . . . ▶ <input type="checkbox"/>	7	
8	<b>Refundable American opportunity credit.</b> Multiply line 7 by 40% (.40). Enter the amount here and on Form 1040, line 68, or Form 1040A, line 44. Then go to line 9 below. . . . .	8	

### Part II Nonrefundable Education Credits

9	Subtract line 8 from line 7. Enter here and on line 2 of the Credit Limit Worksheet (see instructions)	9	
10	After completing Part III for each student, enter the total of all amounts from all Parts III, line 31. If zero, skip lines 11 through 17, enter -0- on line 18, and go to line 19 . . . . .	10	
11	Enter the smaller of line 10 or \$10,000 . . . . .	11	
12	Multiply line 11 by 20% (.20) . . . . .	12	
13	Enter: \$128,000 if married filing jointly; \$64,000 if single, head of household, or qualifying widow(er) . . . . .	13	
14	Enter the amount from Form 1040, line 38, or Form 1040A, line 22. If you are filing Form 2555, 2555-EZ, or 4563, or you are excluding income from Puerto Rico, see Pub. 970 for the amount to enter . . . . .	14	
15	Subtract line 14 from line 13. If zero or less, skip lines 16 and 17, enter -0- on line 18, and go to line 19 . . . . .	15	
16	Enter: \$20,000 if married filing jointly; \$10,000 if single, head of household, or qualifying widow(er) . . . . .	16	
17	If line 15 is: • Equal to or more than line 16, enter 1.000 on line 17 and go to line 18 • Less than line 16, divide line 15 by line 16. Enter the result as a decimal (rounded to at least three places) . . . . .	17	
18	Multiply line 12 by line 17. Enter here and on line 1 of the Credit Limit Worksheet (see instructions) ▶	18	
19	<b>Nonrefundable education credits.</b> Enter the amount from line 7 of the Credit Limit Worksheet (see instructions) here and on Form 1040, line 50, or Form 1040A, line 33 . . . . .	19	

For Paperwork Reduction Act Notice, see your tax return instructions.

Cat. No. 25379M

Form **8863** (2014)

**APPENDIX: Form 8863 Continued**

Form 8863 (2014)

Page **2**

Name(s) shown on return

Your social security number



**Complete Part III for each student for whom you are claiming either the American opportunity credit or lifetime learning credit. Use additional copies of Page 2 as needed for each student.**

**Part III Student and Educational Institution Information**

See instructions.

<p><b>20</b> Student name (as shown on page 1 of your tax return)</p>	<p><b>21</b> Student social security number (as shown on page 1 of your tax return)</p>
<p><b>22</b> Educational institution information (see instructions)</p>	
<p><b>a.</b> Name of first educational institution</p>	<p><b>b.</b> Name of second educational institution (if any)</p>
<p><b>(1)</b> Address. Number and street (or P.O. box). City, town or post office, state, and ZIP code. If a foreign address, see instructions.</p>	<p><b>(1)</b> Address. Number and street (or P.O. box). City, town or post office, state, and ZIP code. If a foreign address, see instructions.</p>
<p><b>(2)</b> Did the student receive Form 1098-T from this institution for 2014? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p><b>(2)</b> Did the student receive Form 1098-T from this institution for 2014? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p><b>(3)</b> Did the student receive Form 1098-T from this institution for 2013 with Box 2 filled in and Box 7 checked? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p><b>(3)</b> Did the student receive Form 1098-T from this institution for 2013 with Box 2 filled in and Box 7 checked? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>If you checked "No" in <b>both (2) and (3)</b>, skip <b>(4)</b>.</p> <p><b>(4)</b> If you checked "Yes" in <b>(2) or (3)</b>, enter the institution's federal identification number (from Form 1098-T).                  _____</p>	<p>If you checked "No" in <b>both (2) and (3)</b>, skip <b>(4)</b>.</p> <p><b>(4)</b> If you checked "Yes" in <b>(2) or (3)</b>, enter the institution's federal identification number (from Form 1098-T).                  _____</p>
<p><b>23</b> Has the Hope Scholarship Credit or American opportunity credit been claimed for this student for any 4 tax years before 2014? <input type="checkbox"/> Yes — <b>Stop!</b> Go to line 31 for this student. <input type="checkbox"/> No — Go to line 24.</p>	
<p><b>24</b> Was the student enrolled at least half-time for at least one academic period that began or is treated as having begun in 2014 at an eligible educational institution in a program leading towards a postsecondary degree, certificate, or other recognized postsecondary educational credential? (see instructions) <input type="checkbox"/> Yes — Go to line 25. <input type="checkbox"/> No — <b>Stop!</b> Go to line 31 for this student.</p>	
<p><b>25</b> Did the student complete the first 4 years of post-secondary education before 2014? <input type="checkbox"/> Yes — <b>Stop!</b> Go to line 31 for this student. <input type="checkbox"/> No — Go to line 26.</p>	
<p><b>26</b> Was the student convicted, before the end of 2014, of a felony for possession or distribution of a controlled substance? <input type="checkbox"/> Yes — <b>Stop!</b> Go to line 31 for this student. <input type="checkbox"/> No — Complete lines 27 through 30 for this student.</p>	



**You cannot take the American opportunity credit and the lifetime learning credit for the same student in the same year. If you complete lines 27 through 30 for this student, do not complete line 31.**

**American Opportunity Credit**

<b>27</b> Adjusted qualified education expenses (see instructions). <b>Do not enter more than \$4,000</b> . . . . .	<b>27</b>	
<b>28</b> Subtract \$2,000 from line 27. If zero or less, enter -0- . . . . .	<b>28</b>	
<b>29</b> Multiply line 28 by 25% (.25) . . . . .	<b>29</b>	
<b>30</b> If line 28 is zero, enter the amount from line 27. Otherwise, add \$2,000 to the amount on line 29 and enter the result. Skip line 31. Include the total of all amounts from all Parts III, line 30 on Part I, line 1 . . . . .	<b>30</b>	

**Lifetime Learning Credit**

<b>31</b> Adjusted qualified education expenses (see instructions). Include the total of all amounts from all Parts III, line 31, on Part II, line 10 . . . . .	<b>31</b>	
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# Convenience May Be Necessary for Widespread Pension Participation by the Poor

*Valrie Chambers, Stetson University<sup>1</sup>*

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## Introduction

How hard will low-income taxpayers work to increase their tax refund? Apparently, not very hard. With limited effort, low-income taxpayers could often increase their overall tax refund by using the deduction for an IRA or other qualified retirement plans in conjunction with the Retirement Savings Contribution Credit, or “Saver’s Credit,” but this would require setting up and funding a separate pension account if one did not already exist. Funding this account is relatively simple because by using Form 8888, *Allocation of Refund (Including Savings Bond Purchases)*, the funding can be directly allocated from the current year’s tax refund if that return is filed and the account is funded by the regular April due date.

In the first 6 weeks of the 2011 filing season (for Tax Year 2010), some 83 taxpayers at a Southwest Texas Volunteer Income Tax Assistance (VITA) site operated in a publicly open credit union were offered the opportunity to receive two stages of tax planning with regard to increasing their tax refund through the use of IRA deductions and the Saver’s Credit before filing their tax returns and before the April deadline. Only five people (6 percent) accepted the second, specific stage of free counseling and of those, three (4 percent of people, 60 percent of those counseled) opened a retirement account. Of those who were eligible for a pension deduction but did not further fund a retirement account, (11/48 =) 23 percent did not fund a retirement account because it was too inconvenient to open an account at their bank or to keep track of an account at the credit union *where they were having their tax return prepared*. This phenomenon existed even with taxpayers who had windfall refunds, defined as refunds in excess of the amount of the refund that they expected to receive.

Following this field experiment, convenience was examined further. A controlled exercise was performed where accounting students in the treatment condition could choose between getting a hypothetical tax refund of \$270 or funding an IRA of \$1,000 and receiving a larger hypothetical refund of \$1,370 with one extra step—acquiring the signature of the college department secretary, a task that normally takes about 5 extra minutes. Students should choose the larger refund, *ceteris paribus*, yet a significant number of students whose instruments required initials to select the higher refund chose the lower refund or did not acquire the required initials, even at the vague risk of less extra credit.

## Literature Review

### *Neo-classical Economics, Behavioral Economics, and Pension Savings*

Discounted utility theory predicts that taxpayers act rationally, as though market friction exists (Bohm-Bawerk, 1970). So, people will always optimize their overall wealth, except where individual random error occurs. Benartzi and Thaler (2007) challenge the idea that people make strictly rational choices and have the willpower to carry them out; instead, they assert that people use heuristics and welcome help with self-control. Bodie and Prast (2009) find that a combination of multiple behavioral biases and the complexity of life-cycle savings models often lead to suboptimal decision making for pensions. In pension plans, making participation in 401(k)s the default option increases participation sig-

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<sup>1</sup> The author is grateful to the IRS’ Volunteer Income Tax Assistance program (particularly Joann Govea), Coastal Community and Teachers Credit Union (particularly Gina Prince) and the United Way of the Coastal Bend (particularly Donna Hurley). Texas A & M University provided substantial support for this research. The author is also grateful to Tim Fogarty, Julia Camp and the participants of the 2013 AAA Conference, and to Robert Weinberger and the other participants at the 2014 IRS/TPC Research Conference.

nificantly (Madrian and Shea, 2001; Choi, 2004, 2002). Madrian and Shea (2001) found, for example, that enrollment of new employees with an opt-out plan reached 90 percent, versus 20 percent under the previous, opt-in plan.

Benartzi and Thaler (2007) discuss education to improve savings rates, but find little evidence that education is effective in increasing participation or savings rates. Carroll, *et al.* (2005), while offering a single asset allocation and holding the savings rate constant at 2 percent, were able to increase the participation rate in 401(k)s from 9 percent to 34 percent by making the enrollment extremely simple.

In 2005, participants of the Urban Institute roundtable on retirement policy called for more research on low-income savings behavior (Bell, *et al.* 2005). Camp, *et al.* (2009) found that on average, those with low income prioritized retirement savings above entertainment and clothing, but below travel and cable/cell/internet—even with the Saver’s Credit in place. Culture may be one factor in the retirement savings rate. Bell, *et al.* (2005) found that a large percentage of Hispanics do not participate in pension plans. Weinberger (2005) notes that (at that time), the U.S. had a spending—not savings—culture. However, that paradigm shifted somewhat in the Great Recession (Spencer and Chambers, 2012).

Weinberger (2005) asserts that people do not save for retirement because many households lack the available funds to begin saving. But, citing Hogarth and Anguelov (2001), Gale, *et al.* (2004) state that “60 percent of households at or below the poverty line indicate that they save at least something.” Further, Sherraden (2001) finds that poor families will save something if presented with appropriate incentives. Even the very poor frequently save, although their portfolios of assets and debts are more complex and volatile than those with more resources (Collins, *et al.*, 2009). Still, the scarcity literature ties being poor to a number of suboptimal conditions, and actually reduces the cognitive function of individuals (as we are in that condition) from how we would otherwise function (Mani, *et al.*, 2013). Scarcity is stressful, and has been linked to poor decisions in many areas of life. Mullainathan and Shafir (2013) assert, “[t]he poor fall short in many ways. The poor in the United States are more obese. In most of the developing world, the poor are less likely to send their children to school. The poor do not save enough. The poor are less likely to get their children vaccinated. The poorest in a village are the ones least likely to wash their hands or treat their water before drinking it. When they are pregnant, poor women are less likely to eat properly or engage in prenatal care” (p. 153). Being poor is hard work. The poor have to make more financial trade-offs (Spiller, 2011) and those trade-offs do not necessarily pay off (Van Ittersum, *et al.*, 2010). The poor in the United States, however, do have federally sponsored programs to assist them in life, including free federal income tax preparation.

### ***The Volunteer Income Tax Assistance (VITA) Program***

VITA is a program sponsored by the Internal Revenue Service (IRS) in conjunction with community partners to encourage federal income tax compliance among low-income taxpayers. Taxpayers bring their tax information to a VITA site, and if they qualify for the program, a trained volunteer prepares the current year’s tax return based on the information provided by the taxpayer, and (once approved by the taxpayer) electronically files the return and prepares a copy for the taxpayer. The amount due is remitted to the IRS by the taxpayer, or a refund due is calculated. If a refund is due, the taxpayer has the option of directly depositing that refund into one or more accounts, including an IRA account if the taxpayer has one established. If the taxpayer has provided information on contributions to a retirement account (either directly, or as shown on the W-2), a retirement savings credit (“Saver’s Credit”) is automatically calculated, which increases the amount of refund (or decreases the amount of tax currently due).

The VITA program is increasingly active in the Coastal Bend. In the 2009 Tax Year (2010 Calendar Year), the VITA partnership in the Coastal Bend filed 1,289 low-income tax returns (compared to 806 for the previous year), with refunds returned to the community of \$1.9 million (up from \$1.1 million for the previous year).

### ***The Saver’s Credit***

The Retirement Savings Contributions Credit or “Saver’s Credit” was enacted in 2001 for the 2002 Tax Year as Internal Revenue Code (IRC) Section 25B to encourage middle- and low-income taxpayers to save for retirement. Specifically, “[t]he credit was designed to address the fact that more than 75 million workers and their spouses have no employer plan coverage, to help correct the top-heavy distribution of benefits in our current pension system, and to counteract what might be the central defect of our pension tax incentive structure: that the incentives—whether exclusions from income of contributions and earnings or tax deductions—are based mainly on the individual’s marginal income tax rate or tax bracket,” (Iwry, 2003).

Taxpayers contributing to employer-sponsored plans, traditional IRAs, Roth IRAs and/or self-employed qualified retirement plans get a nonrefundable credit of up to 50 percent on the first \$2,000 of contributions to this plan *in addition to* applicable tax deductions (or exclusion from income if the plan is administered by an employer). The percent of credit available is tiered, and is reduced as income increases. The contribution used to figure the Saver's Credit is reduced by any (taxable or nontaxable) distributions in the current year, two previous years, and following year from qualified retirement plans that are not rolled over (IRS, 2012). To receive the Saver's Credit, a taxpayer must be 18 or older and cannot be a full-time student or claimed as a dependent on another's return. The credit is nonrefundable. So, those in very low tax brackets or in the zero income tax bracket cannot financially benefit from the credit. While the Saver's Credit applies where a taxpayer has invested in any of a number of retirement savings vehicles, there are a number of qualifying programs and the provisions of each are complex and often confusing. This confusion may extend by association to the Saver's Credit itself. Weinberger (2005) testifies that "savings incentives are most effective when they are clear and understandable, coupled with low-cost, accessible savings vehicles, linked to refunds and facilitated by a knowledgeable tax professional" (p. 8).

Awareness of the Saver's Credit is low (Spader, *et al.*, 2011). Camp, *et al.* (2009) surveyed 105 taxpayers entering a VITA site and found that only two were familiar with that credit. According to Duflo, *et al.* (2006), education alone is insufficient to optimize taxpayer adoption of retirement plans. Referencing a matching experiment they performed, they say, "a simple model of fully informed, rational savers is incomplete. Take-up rates were not only far below 100%, they never exceeded 20%, even among tax filers (whose pension contributions were matched at 50% and) who had substantial refunds, participated in other savings vehicles, or had higher incomes" (p. 1314).

The Saver's Credit is historically underutilized (AARP, 2008). Koenig and Harvey (2005) found that 34 percent of eligible taxpayers failed to claim up to \$496 million dollars in Saver's Credits. For the 2007 Tax Year (the most recent year available from the IRS at the time of the field experiment), approximately 65.6 percent of the population had a small enough Adjusted Gross Income (AGI) to qualify. In that year, 5,862,206 individual taxpayers (4.1 percent) filed for the Saver's Credit. Therefore, 61.5 percent of all individual taxpayers are eligible for this credit but do not claim it. This percentage is staggering, and represents a key opportunity for improvement of individual savings. However, since the credit is nonrefundable and does not carry over to other tax years, individuals may not receive the Saver's Credit at the full rate. Those making between \$20,000 and \$50,000 in AGI had the highest Saver's Credit participation: 10.2 percent of individual taxpayers in this income bracket received a Saver's Credit that averaged \$167.87 per taxpayer. For the 2010 Tax Year, taxpayers claimed just over \$1 billion in Saver's Credit on more than 6.1 million individual income tax returns. Saver's Credits averaged \$204 for joint filers, \$165 for heads of household, and \$122 for single filers (IRS, 2012). The Saver's Credit may interact with other credits. In some cases, additional pension savings reduce AGI, which increases the amount of the refundable Earned Income Credit. However, this benefit may be offset at least in part by the nonrefundable portion of the Child Tax Credit.

Ramnath (2014) finds that taxpayers are good about not gaming the credit by setting up a retirement plan, taking the credit, then withdrawing the pension. However, he finds that some taxpayers bunch deductions for AGI to maximize the percent of credit, but this phenomenon may occur after taxpayers realize they are eligible for the credit.

Spader, *et al.* (2011) studied the Saver's Credit in a VITA site. In their study, researchers attempted to partner with employers and VITA staff to educate employees about this credit and enroll them in suitable pensions. Ultimately, one employer participated, enrolling about the same number of employees that the employer normally enrolls during a comparable time period. The authors also attempted to recruit local financial institutions to provide suitable retirement savings accounts at the VITA site, but were unable to do so in time for filers to claim the credit until the following tax year. The authors conclude that "[a]lthough respondents were interested in both saving for retirement and the incentives associated with the credit, limited resources and uncertain incomes created obstacles to building and protecting retirement savings" (p.1). Finding an appropriate investment vehicle is potentially tricky. H & R Block "put on a full-court press to advise our tax clients and develop a low-cost 'Express IRA....' As a result....nearly a quarter of a million clients opened a new IRA through [Block]. A majority were first-time savers with an average income of \$27,000 a year; two-thirds were Earned Income Tax Credit recipients; and half were considered 'unbanked'" (Weinberger, 2005, p. 6). That firm was subsequently sued by the State of New York, accused of fraudulent business practices involving those IRAs because of the high fees and very low interest rates on those accounts, making them almost certain to lose money (Ellis, 2006). Block subsequently settled the suit by refunding all fees on Express IRA accounts beginning with the 2000 tax year and paying \$750,000 in fines and other costs to the state (Lipka, 2010).

Duflo, *et al.* (2006) performed a large-scale field experiment that measured the adoption rate and amount of contribution to an IRA when, unlike the Saver's Credit, a 0-percent, 20-percent or 50-percent match was immediately deposited directly into an IRA (rather than reducing income tax liability) as an incentive to save for retirement. They find that "taxpayers were much more responsive to variation in matching rates in our experiment than to equivalent variation in the incentives embedded in the Saver's Credit" (p. 1314). When a retirement savings amount was matched at 20 percent or 50 percent, the take-up rate for retirement savings was 10 percent and 17 percent respectively, and the average amounts of contributions were 4–8 times higher than for those whose savings were not matched. They believe that taxpayers prefer the matching to the Saver's Credit because it is simpler and more salient than the Saver's Credit. The authors conclude that tax preparer assistance, financial incentives, and information are likely influential factors in taxpayer adoption of pension savings plans at tax time, although the one-time aspect of matching in their experiment may also be significant. Subsequent to that experiment, the law changed to allow all taxpayers the opportunity to use part of their income tax refund to save for the prior tax year's retirement, increasing the refund immediately if the refund is directly deposited before the regular tax filing deadline.

In this paper, two experiments are performed. One provides the taxpayer with knowledge of these tax breaks and manipulates the ease of accessibility to savings vehicles over the normal population. The ease of accessibility comes in two forms: (1) the counseling and tax preparation physically took place in a credit union that accepts new accounts and where opening an account generally took about 15 minutes; and (2) counseling was framed toward savings from refunds, and especially saving from the nonbudgeted, refund windfall that happens when refunds are higher than what a taxpayer originally expects. The second experiment studies the effect of convenience on choosing to receive a hypothetical tax refund.

## Examples of Saving from a Windfall Tax Deduction and Saver's Credit

Low- and middle-income families may have very little disposable income, and may have budgeted how they will spend their expected tax refund. However, a tax refund in excess of the budgeted amount would seem to be a natural opportunity for additional savings, because this money would not represent a planned sacrifice on the part of taxpayers. For example,

### **Scenario 1:**

Suppose a taxpayer with no qualified retirement plan (hereafter, "IRA") expects a \$2,000 refund, which he plans to spend. (Note: the average refund for taxpayers up to \$50,000 in AGI was \$2,005 for 2007.) Suppose after preparing the tax return, the taxpayer is due \$2,200; this is a \$200 windfall to the taxpayer. The taxpayer could receive \$2,200 in the current tax filing season, and spend at least \$2,000 of it as planned.

### **Scenario 2:**

Suppose instead, the same taxpayer is encouraged to put the extra \$200 windfall into an IRA for next tax year, spending the original \$2,000 as planned. (That is, there's no real sacrifice from what the taxpayer expected to spend if the taxpayer saves the windfall amount.) The taxpayer will receive and spend \$2,000 in the current tax filing season, and receive both a tax deduction and a Saver's Credit on \$200 for next tax year. If the taxpayer is in a 15 percent marginal tax bracket (as most in the \$20,000—\$50,000 AGI bracket are), then the taxpayer receives a  $(15\% \times \$200 =)$  \$30 tax deduction and up to a \$100 Saver's Credit,<sup>2</sup> for a total of \$130 additional refund for next year. Notably, of the \$200 set aside in savings, the taxpayer gets \$130 back next year; he's lost only \$70 of spending power but has an extra \$200 in savings for retirement—and it was from money he never originally expected to receive. Further, if the taxpayer was prepared to file early, he could make a refund allocation for a \$200 IRA for the current year instead of next tax year, and that \$130 would be returned to him this year (almost immediately) instead of next year.

<sup>2</sup> 50 percent of \$200 = \$100. The Saver's Credit ranges from 10 percent to 50 percent, decreasing with income. For 2013, the 50-percent credit applies to joint filers with income up to \$34,500; the 20-percent credit applies to joint filers with income between \$34,500 and \$37,500; and it is 10 percent for those between \$37,500 and \$57,500.

### **Scenario 3:**

Suppose instead, the same taxpayer saved not only the original \$200 windfall for retirement, but also the additional \$130 tax refund from the windfall. He can still spend the anticipated \$2,000, but his retirement savings would increase to \$330 with no material sacrifice to his expected spending. This additional Savings may in turn qualify for more deductions/credits.

## **Hypotheses**

### ***The Field Experiment***

An experiment was designed to educate low- and middle-income taxpayers about pension deductions and the Saver's Credit immediately prior to tax preparation, with customized counseling available after the preliminary draft of a taxpayer's return was prepared. Those receiving additional education should save more than they were planning on saving before the counseling. Expressed as a hypothesis:

$H_1$ : Counseled taxpayers will increase their retirement savings significantly.

To control for the efficacy of the counseling, those not saving will be asked why, and their answers will be used to answer the research question:

$R_1$ : Among those eligible for tax deductions (and potentially the Saver's Credit) who do not increase their retirement savings, why did they decline to increase their retirement savings?

### ***The Class Experiment***

Additionally, a controlled experiment among college students currently enrolled in the federal tax classes were provided with an extra-credit assignment near the end of their semester. Students were given a choice between getting a hypothetical tax refund of \$270 or funding an IRA of \$1,000 and receiving a larger hypothetical refund of \$1,370 with one extra step: acquiring the signature of the college department secretary, located in the same building as the students' class, who was available during normal working hours (including Tuesday hours until 7 pm for night students). This task normally takes an additional five minutes. Students in the control condition received the same instrument, except that they simply chose which refund they wanted, without needing to procure the secretary's initials. (See Appendix 2 for both instruments.) The null hypothesis is:

$H_2$ : There will be no significant difference in the number of participants electing the higher refund between control and treatment groups.

## **Methodology**

### ***The Field Experiment***

In the first 6 weeks of a 12-week tax filing season in 2011, in an urban credit union (open to new members) serving as a VITA location, VITA was run as normal with an additional free service: taxpayers could, on a voluntary (and as available) basis, receive education on the Saver's Credit as it specifically applied to their particular income tax situation for the current tax year.<sup>3</sup> When early-filing taxpayers walked in to the appointed site(s) at the available time(s), they were offered free counseling on pension deductions and the Saver's Credit, with a (second-stage) chance to demonstrate the specific dollar amount on the individual's tax return prior to electronically filing that return. Duflo, *et al.* (2006) found that the level of enthusiasm in counseling (and who the tax preparer was) mattered. To avoid this complication, the same counselor was used for all taxpayers. Those not wanting the additional level of service were asked why, and these reasons were aggregated based on frequency. Those accepting the additional level of service were asked their expected level of refund, then had their initial federal income tax return prepared without additional pension savings, and then received tailored counseling based on their savings goals and amounts available (generally from their tax refund) for funding additional pension contributions during the current year. These sessions were generally meant to take about 15-20 minutes and answer the question, "what if I saved \$x?" Because refunds may take 6 weeks to process and tax

<sup>3</sup> See Appendix 1 for details.

refund allocations to pensions must be made before the April filing deadline, this counseling offer ended 6 weeks before the April filing deadline. If taxpayers wished to pre-fund retirement savings for the next year, then they were advised to set up the IRA, and return to have their 1040 recalculated and filed timely. Unlike Spader, *et al.* (2011) this set-up process took an estimated 15 minutes, and could be done in the same building on the same floor as the income tax return preparation. Also unlike Spader, *et al.* (2011), taxpayers could receive their credits on the income tax return being prepared at that time. It was also possible for taxpayers to use refunds to fund savings for the next tax year, but no taxpayers openly elected this option. All participants' files were subject to strict nondisclosure protections, consistent with the more stringent of the applicable AICPA or IRS rules. The number of taxpayers electing a tailored round of counseling was ultimately too small to be analyzable, and one of the primary reasons for not electing to save for retirement was convenience. To investigate convenience more deeply, a second experiment was developed using college students at a mid-sized public university as respondents. While low- and middle-income taxpayers are different from college students, both may value convenience, and Walters-York and Curatola (1998) have validated the use of students for experimentation.

### ***The Class Experiment***

At the end of the spring semester in 2011, an extra-credit experiment was distributed in class where 41 tax students in three classes (two junior classes and one masters' level class) could choose between getting a hypothetical tax refund of \$270 or funding an IRA of \$1,000 and receiving a larger hypothetical refund of \$1,370.<sup>4</sup> Both the \$270 scenario and the \$1,370 were realistic, rounded estimates of a particular hypothetical taxpayer in a position to benefit most from the tax incentives provided for pension savings, based on the tax law in effect in 2011. The clear choice for students is a refund of \$1,370: with a \$1,000 IRA investment, tax liability was reduced \$1,100, meaning that if \$1,000 of this amount funded the IRA, the cash refund available to spend still increased by \$100. Students in the control condition merely returned the document with their choice. Students in the treatment condition needed to take one extra step to secure the higher refund amount—acquiring the signature of the college department secretary, a task that normally takes about 5 extra minutes. The students were given enough time in class to complete the instrument and up to 1 week to turn the instrument in. The amount of extra credit offered was left intentionally vague, “up to 10 points” to motivate making the obvious (larger refund) choice among all groups. Ultimately, all students who participated received the 10 points (2.5 percent of the final grade), regardless of response. Differences between the responses of the two groups were analyzed using t-tests.

## **Results**

### ***The Field Experiment***

Eighty-three taxpayers at a Southwest Texas VITA site housed in a publicly open credit union were offered the opportunity to receive tax planning to potentially increase their tax refund through the use of IRA deductions and the Saver's Credit before filing their tax returns and before the April deadline. Sixteen people originally agreed to counseling. Of these, 58 percent were female (with one nonrespondent), 60 percent had a high school degree, and 40 percent had some college (with 4 nonrespondents), their self-reported experience level averaged 2.7 on a 5-point scale. Fifty-eight percent of them were aware of the IRA tax deduction but only 15 percent were aware of the Saver's Credit. All were banked (with one nonrespondent). Five people (6 percent) accepted the free counseling and of those, 3 (4 percent of people, 60 percent of those counseled) opened a retirement account. Of those who qualified but did not open a retirement account, many did not because it was too inconvenient to open an account at their bank or to keep track of an account at the VITA location credit union *where they were having their tax returns prepared* (Table 1).

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<sup>4</sup> See Appendix 2 for details.

**TABLE 1: Results of VITA Counseling Field Experiment**

	Number	Percent
Taxpayers Approached	83	100%
Less: Taxpayers Ineligible for Pension Deduction (Retired, Disabled, Student, Over Income Limit, Unemployed)	32	39%
Eligible Taxpayers Approached	51	61%
Counseled Taxpayers Who Increased/Opened (New) Pension Savings Account <sup>1</sup>	3	4%
Eligible Taxpayers Declining Additional Pension Funding	48	57%
<b>Reasons Taxpayers Did Not Want Additional Pensions:</b>		
1. Happy Savers: Pension Already Maximized or Happy with Current Pension Savings Level	12	14%
2. Inconvenient to Set Up/Increase Funding for Pension	11	13%
3. Destitute/Large Bills	10	12%
4. Nonspecific Reasons	5	6%
5. Owed Tax/No Tax Liability	3	4%
6. Miscellaneous Reasons for No Counseling @ 1 Answer Each	7	8%

<sup>1</sup> Five taxpayers went through two stages of counseling, but only three increased funding for pensions.

**The Class Experiment**

A total of 96 students participated in the experiment; 46 were in the control condition where they could claim the higher refund conveniently, and 50 were in the treatment condition, where they could claim the higher refund only by taking an extra step of securing initials from the department secretary, which added inconvenience. In the control condition, 44 of the 46 (96 percent) opted for the higher refund, but in the treatment condition where a minor inconvenience was required, 58 percent chose the higher refund. In the treatment condition, 8 of the 50 (16 percent) claimed the larger refund but did not secure initials; 21 of the 50 (42 percent) claimed the larger refund with the initials, complying with the experiment instructions. There was no significant difference between the results of day students and night students.

The difference between conditions in choosing the higher refund is significantly different from zero at  $p \leq .05$ , before considering whether initials were also included where necessary, thus refuting (the null)  $H_2$  (Table 2).

**TABLE 2. Effect of Convenience on Students\***

Treatment Group	Low refund	High refund	High refund and initials	Total respondents
Convenient Condition—no initials needed	2	44	N/A	46
Inconvenient Condition—initials needed to legitimately get higher refund	21	29	21	50

\* Difference in those choosing a Low Refund by condition is significant at  $p \leq .05$ . One respondent in the Inconvenient Condition checked both the Low and High Refund box, and had no corresponding initials. This response is excluded from the table above.

That is, only 42 percent of the treatment group (versus 96 percent of the control group) chose the higher refund *and* did the 5-minute paperwork to legitimately get the extra-credit as applicable, indicating that like in the field experiment, even minor inconveniences seem to matter.

**Discussion**

The IRA deduction requires an account in a bank (or bank-like) institution, which is a deterrent to the unbanked. While an employee who funds pensions through payroll withholdings is eligible for the Saver’s Credit, the establishment of a pension account is generally facilitated by the employer. The continuing contributions generally require little, if any, effort on the part of the employee because they are automatically withheld and accounted for by the employer or the employer’s designee. Discomfort with bank accounts or distrust of banks may be a reason for underfunding pensions among the poor, but less credible among tax students. Distrust of banks may be due in part from experience with banks that are perceived to be charging numerous high fees, eroding the benefit of (sometimes meager) interest

on savings through a formal institution. Fields and Jackson-Randall (2012) note that 8.2 percent of households are unbanked. Those households cite irritation over banking charges and a loss of confidence in traditional institutions as reasons for eschewing banks. In this experiment, however, none of the respondents admitted to being unbanked, so through circumstance rather than design, being unbanked should not be a significant factor in these results.

It is possible that the education on the Saver's Credit and pension deductions increased savings for a subsequent year. Perhaps taxpayers changed course, but wanted time to digest the information presented without delaying their refund. A limitation of this study is that the author did not measure the effect of savings on future years. However, people have a bias toward immediate gratification (Bodie and Prast, 2009), so a delayed savings may be unlikely to be frequent or large in amount.

The income tax effects of pensions are complex and hard for many to understand. Many taxpayers may be unaware of the credit, or, if aware, not understand the size of the impact this could have on their return. For this reason, a general counseling session was offered to taxpayers, after which they were aware of the credit and the general range of benefits. If the taxpayers then elected a second, tailored counseling session, they were shown the size of the impact that pension tax breaks had on their current-year return.

Taxpayers may already have plans for their refund money. The field experiment controlled for this by asking taxpayers what their expected refund for the year was. Once an amount was given, taxpayers were asked how much was earmarked for a specific use. Arguably, the rest of the refund was discretionary and could be used for pension savings. Where refunds exceeded the budgeted amounts, it makes sense to financial professionals that taxpayers would be open to funding pensions with at least the excess "windfall" amount because taxpayers do not have plans for this portion of the refund money yet and their overall wealth generally increases. Even so, eligible taxpayers as a rule did not additionally fund pensions.

Some of the taxpayers appear to be living hand-to-mouth. No encouragement to save for the long run is likely to be more persuasive than the need to buy medicine, pay rent, or put food on the table today. Ten of the 83 people we approached (12 percent) answered that they were in this category. While that is a sizable percentage, it is still a minority reason for not funding pensions. Further, 12 respondents (14 percent) of the 83 not only saved for retirement, but met their retirement savings goals, indicating that it is possible for many low- to middle-income taxpayers to be frugal, and perhaps "rich enough" in their own eyes when it comes to retirement savings.

Eleven of the 83 (13 percent) cited the lack of convenience for not saving. This reason does not appear to be remedied by education, either through counseling at the VITA center or in a classroom setting. Lack of convenience appears to be a significant deterrent to savings even among those students specifically educated in accounting, finance, and taxation. Taken together with the field results, this finding adds to literature that challenges the long-held wisdom that the poor do not save simply because they can't afford to. They also apparently do not save because it is inconvenient. Spader *et al.* (2011) list "little effort required to set up or make ongoing contributions" (convenience) as the fourth most important factor influencing whether savers saved (7.7 percent). They then note that among those *not* already saving, convenience was listed as more important than savers had listed it. Perhaps tolerance for this type of inconvenience is a significant factor distinguishing savers from nonsavers. Complexity can appear at many points in the account process. Gale *et al.* (2004) assert that the lack of easily accessible bank routing numbers for many pension investments is a barrier to contributions. Spader *et al.* (2011) find that too many asset-building choices overwhelm clients. Lack of simplicity has indirect effects as well. In Brookings (2004), Goldberg notes that Saver's Credits would be marketed more aggressively if they were not complicated.

Some might consider lack of savings if inconvenient as laziness or exhaustion or being already overwhelmed with the demands of life. *Why* convenience was important was not measured but it appears to be more important than may be commonly thought and appears to impede savings even when the poor can afford to save. Levitt and Dubner (2011) predict that respondents will act irrationally. The key is to determine if they are acting predictably irrational, and to leverage that irrationality. Scarcity theory suggests that all people, in a condition of scarcity, are more myopic and less able to make good (long-term) choices due to "limited bandwidth," or bounded discretionary intellectual capacity to make difficult decisions. Mullainathan and Shafir (2013) cite examples of how poorer farmers are less likely to purchase insurance and poorer Americans are hesitant to purchase health insurance (Medicaid), even though these populations

are least likely to be able to withstand negative economic shocks without this insurance. The reduced capacity presents as both diminished intellectual capacity and depletion of self-control. Education is of limited usefulness in the presence of limited bandwidth, but “economizing on bandwidth can yield high returns” (p.175).

Applying scarcity theory to saving from tax windfalls, lack of savings would be expected, and tailored education would be expected to have only a limited effect on the decisions of poorer households. The takeaway from this may be that in a time of reduced corporate and governmental pension sponsorship, poorer taxpayers have both a greater need for private pension savings *and* a reduced capacity to meet that need. Any tax policies designed to assist this group in saving for their retirement may work best if the savings account for contributions were very convenient to set up, funded in times of financial excess (if any), and funded at small, frequent interim deadlines.

The convenience effect, however, is not limited to the poor; university student participants also place a high premium on convenience by possibly forgoing real extra credit and hypothetical money for convenience sake, indicating that like in the field experiment, even minor inconveniences seem to matter.

### ***Why Do People Value Convenience So Highly?***

These experiments show that respondents value convenience in the extreme—not *why* they value convenience so highly. There is literature in psychology and in marketing that, while not tested in accounting domains, may explain this behavior. Maybe the rewards seem distant to respondents. Trope and Liberman (2000) predict that people will make the high-level choice when thinking about the distant future, but make the convenient (low-level) choice when making choices for the near future. McCrea, Liberman, Trope and Sherman (2008) find that events that are distant in time are construed more abstractly, and result in more procrastination than proximal, concrete events. This theory would account for the low retirement savings, but perhaps not the extra credit results.

Framing may come into play. Pension availability becomes affordably available at the end of a working life, and extra credit becomes useful at the end of the semester. Chandran and Menon (2004) found that the temporal framing matters: “day framing” makes risk appear closer and more concrete than “year framing,” which increases the perception of self-risk, and precautionary behavior, anxiety about the behavior and effectiveness of risk communications. However, what works for risk (which increases anxiety about behavior) may not be as effective for rewards. That is, day framing effects of behavior might be more effective in stopping negative behaviors than in inducing positive ones.

While gaming was not found by Ramnath (2014) on a large scale, Camp *et al.* (2009) note that such an opportunity is available: if a \$1,000 contribution results in a \$500 tax credit, then the taxpayer immediately withdraws the \$1,500 total at a 10-percent penalty (plus 10-percent FIT rate), the taxpayer is ahead by  $(\$1,500 - \$150 \text{ penalty} - \$150 \text{ FIT} - \$1,000 \text{ original investment}) = \$200$ . Similarly, taxpayers may be gaming the government systems in other ways by keeping their traceable savings low because some social programs like Food Stamps and Temporary Assistance for Needy Families reduce aid for IRAs, but not for employer-sponsored retirement plans.

Muravan, Tice and Baumeister (1998) argue that self-regulation is a limited resource subject to depletion. Prior exertion of self-regulation leaves less strength for future self-regulation. Baumeister, Vohs and Tice (2007) find that this phenomenon exists across many domains including spending, intelligent thought, and decision making. It is also influenced by blood glucose levels. Similarly, Vohs, Baumeister and Schmeichel (2008) found that making many choices impairs subsequent self-control, including reduced persistence in the face of failure and more procrastination. So, assembling documentation for tax preparation (or attending class/filling out extra credit surveys) may deplete one’s tolerance for any extra effort or decision making. This explanation is consistent with low take-up rates for Saver’s Credits and extra credit work. Lee and Zhao (2014) found that consumers preferred highly desirable products for the long run and convenient products for the short run, but reminding consumers of the convenience premium in the short run leads consumers to better short-run decisions; and framing convenience as added value leads consumers to more convenient long-term decisions. Karlan *et al.* (2010) find that reminders also increase savings.

### ***MyRA and State Initiatives***

In early 2014, President Obama announced that the U.S. Treasury will develop “My Retirement Account” (MyRA) for low- and middle-income employees to safely, simply, and affordably save for retirement. These retirement savings accounts are expected to be available in late 2014.

While the final details were not yet announced as of the writing of this paper, several key account features are public. Account principal will be made by after-tax dollars, and plan rules will mimic those of Roth IRAs, except that there will be no account fees. Principal will initially be guaranteed by the full faith and credit of the United States and interest will be paid at the same variable rate as the Government Securities Investment Fund of the Thrift Savings Plan for federal employees. Accounts will be available to anyone with an annual income of less than \$129,000 a year for individuals and \$191,000 for couples. Participating employers may distribute MyRA information. Employees will sign up online and fund the account with a minimum contribution of at least \$25. Additional regular contributions of at least \$5 per paycheck will automatically be withheld and deposited into the individual employee's account by the employer, but otherwise the employer will not contribute to, be charged for, or administer the retirement program. After the plan is established, employees may rollover MyRAs to private-sector retirement accounts, and *must* roll it over once the MyRA reaches \$15,000 or has been in place for 30 years. Principal contributions can be withdrawn tax free at any time, but earnings will generally be taxed unless the taxpayer is at least 59 ½ years old.

Several of these features would appear to facilitate pension saving among low- and middle-income taxpayers. The security of the principal and lack of fees ensure that, even at a low interest rate, amounts set aside for retirement will be available for retirement as long as they are in the public program. The MyRA employees forgo the discouragement that many employees saw when they actively saved in the stock market, but lost principal in the market decline of the Great Recession. Nor do they lose principal to fees. While contributions do not incur an exclusion or tax deduction up front, they will still often qualify for the Saver's Credit, and, as a Roth IRA, will generally be financially better for participants than traditional IRAs. As an IRA account (instead of a company-sponsored pension plan), the savings are portable in an economic environment where job changes are common. Further, the ability to make principal withdrawals without taxation is attractive, because the funding of the pension does not require a long-term sacrifice to liquidity that may be needed to sustain a subsequent financial shock. For taxpayers who are more risk-taking, the MyRA can be rolled over into a private plan, although private plans generally have higher initial account balances. Both mental and tax accounting for the plan are simplified. Mental accounting is facilitated because the money is saved before it is even seen. Employees also commit ahead of time to future contributions; the commitment has been shown to increase the amount saved in the mental accounting literature. Further, contributions in small, regular amounts match the receipt of income, consistent with mental accounting theory. Tax accounting for the Saver's Credit is arguably simplified, because an employer-sponsored plan may be shown in Box 12 of the W-2 reporting as a Roth IRA contribution, although such details are not yet certain. However, tax software products will need to be sensitive to this new account and automatically calculate the Saver's Credit (much like the Earned Income Credit is calculated automatically) in order for taxpayers to receive the maximum benefit from this plan.

Some states are also investigating whether to offer retirement accounts to private sector employees without current access to pension plans (Bradford, 2014). In 2012, California and Massachusetts enacted legislation to create state-sponsored IRAs that required no employer contribution for at least some employees not currently covered by employer plans. The idea is being studied in Oregon and Colorado. State involvement is supportive of continued federal government efforts.

### ***Third-Party Tax Preparation Changes May Help***

Tax software programs have been historically capable of this, as shown by their ability to maximize such complicated tax breaks as education exclusions/deductions/credits. It would be a feasible step for the software companies to include the MyRA calculation, and it's also feasible that some may similarly calculate how much more a taxpayer would need to contribute to a qualified retirement plan (perhaps up to the original refund amount) in order to minimize their tax liability for the year. A prompt could be added to the program (at least for early filers) that compares the taxpayer's current results with those of the tax minimization with an additional retirement credit and asks if the taxpayer would like to split their refund to accomplish that result.

Weinberger (2005) declared the Saver's Credit a success in part because "it leverages tax time to promote savings" (p. 6). In Brookings (2004), Weinberger calls tax time for many clients "a once-a-year financial check-up when they have their records..." (p 22). Spader *et al.* (2011) also suggests prescreening taxpayers at VITA sites who are potentially eligible for the Saver's Credit by having such parameters integrated into existing tax software.

## Limitations and Extensions

This study has several limitations and possible extensions, including possible extensions to the Saver's Credit in general. This study used a field experiment. Field experiments can be very useful for validating theory in real life. Goldberg (Brookings, 2004) said that when we think about tax incentive programs, "we tend to pay a lot of attention to the theory and, at least in my view, not enough attention to how it's going to work out there when you're interacting with real folks trying to cope with real rules" (p. 15). On the other hand, such experiments tend to have a low sample size—undermining the extent to which they truly represent the diversity of the real world. In this experiment, 83 taxpayers were approached, and only 51 were eligible for the Saver's Credit. In Spader *et al.*'s (2011) experiment, only 15 employees enrolled in the retirement plan following the start of the intervention. Additionally, in field experiments, it's more difficult to control for extraneous factors than in a lab experiment. In Duflo *et al.* (2006), the authors felt that the framing of the presentation by the tax professional to the taxpayer was very important. In this experiment, the same CPA presented to all the tax professionals, minimizing (but not eliminating) the variation in the presentations. The presentation included information on qualifying retirement investments, including traditional and Roth IRAs available at the credit union where the tax returns were being prepared, but no specific investment was recommended. If the taxpayer elected to open an account at the credit union, that deposit would have been federally insured, but other accounts may not be. Weinberger (Brookings, 2004) finds that taxpayers highly valued deposit insurance.

Taxpayers may have found the VITA site intimidating, or have been mistrustful of researchers at VITA sites. While no clients raised this issue in this study (and similar settings seem to have worked for Duflo *et al.* (2006) and Spader *et al.* (2011)), it's possible that taxpayers distrusted the research so much that they would not tell the researcher that they distrusted her. It's also possible that while the take-up rate for qualifying retirement accounts was low in the current year, it was higher in a subsequent year. Spader *et al.* (2011) observe that the optimal use of the Saver's Credit at VITA sites requires a relatively long time frame. One limitation of this study is that subsequent years of taxpayer behavior were not measured. And, because inflation somewhat outpaced the prevailing interest rate of financial institutions at that time, the financial environment might have been influential.

It's also possible that saving for retirement would adversely affect some taxpayers applying for federal benefit programs. Weinberger (2005) recommends that such retirement savings not be considered in determining eligibility for such programs. Were that the case, retirement savings would be treated in those contexts similar to how such savings are treated in bankruptcy, where they are generally not considered as available for satisfying current debts and treated as part of a largely impenetrable trust.

Several other changes in the Saver's Credit policy have been suggested. Many have suggested making the Saver's Credit refundable (Bell *et al.*, 2005; AARP, 2008; Gale *et al.* 2004; Iwry, 2003; Weinberger, 2005; Brookings, 2004), but there's limited data on how that would affect pensions savings and overall savings. In part because of its simplicity, others recommend matching dollars of savings rather than extending a credit (Duflo *et al.*, 2006; Spader *et al.*, 2011). Mensah *et al.* (2012) recommend replacing or supplementing the Saver's Credit with a refundable Freedom Savings Credit to save for all major life steps, not just retirement. This recommendation is consistent with Spader *et al.*'s (2011) finding that 33.6 percent of taxpayers named the ability to withdraw funds in an emergency as the most important factor in their retirement savings decision and provisions in the MyRA that allow for withdrawals of principal without tax penalty.

One limitation of this study (and the rationale for some of the recommendations to change the Saver's Credit) is that an increase in retirement savings does not necessarily increase overall savings. Bell *et al.* (2005) notes that "[h]ouseholds often borrow on one side of their ledgers (i.e., through a mortgage or home equity loan) what they deposit in tax-subsidized accounts on the other" (p. 6). Overall, the conclusions drawn from this study are more suggestive than definitive, and the alternatives discussed in this paper are not mutually exclusive from those proposed by others.

## Conclusion

In developing promising incentives for retirement savings, we might want to consider the level of convenience associated with the incentive, as even small amounts of inconvenience (such as are generally associated with setting up an IRA) appear to discourage pension savings. Such pension products can be designed by software companies and tax preparation businesses, and it is probably worthwhile to fund studies on what configurations work. While the reason

why convenience is needed for taxpayers to accept money (or students to accept extra credit) was not examined, further studies could explore whether respondents found these exercises relatively depleting. The study findings are important during a period when incentives like the Saver's Credit are given to individuals, because they work more poorly than the general public might expect. The convenience phenomenon also has pervasive implications in the efficiency of tax provisions when considering tax reform for low- and middle-class individuals.

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## Appendix 1 Field Experiment Instructions

### Principal Investigator's Note

The instrument that respondents will see will come in multiple parts:

1. Pre-tax-preparation instrument. Willing participants will also get (free) information at the end of this instrument regarding the tax breaks generally available to those funding IRAs. This is followed by an independent (non-investigator) preparation of preliminary tax return
2. Post-preliminary tax preparation instrument, including several "what if" scenarios. This will be generally followed by an independent (non-investigator) final preparation and electronic filing of the tax return.
3. And, if possible, post-return filing instrument.

### Pre-Tax Preparation Survey

1. What amount of tax do you expect to owe \$\_\_\_\_\_ or be refunded? \$\_\_\_\_\_
2. If you expect to receive a refund, how much (in dollars), if any, do you have pledged or promised or earmarked for a specific use? \$\_\_\_\_\_
3. If you expect to receive a refund, how much of the refund do you plan to (skip this section if you expect to owe money):
 

a. Invest (in stocks, bonds, savings account, etc.)?	\$
b. Use to pay off credit card debt?	\$
c. Use to pay off notes (e.g., mortgage, car note, etc.)?	\$
d. Use up about evenly every month for expenses? _____/mo. x 12 mo.=	\$
e. Use to buy a durable asset (e.g., car, boat, washing machine, furniture)?	\$
f. Use to save for an infrequent expense (e.g., vacation, bigger holiday gifts)?	\$

Amount must total your refund amount-----> \_\_\_\_\_
4. Are you aware of the Retirement Savings Contribution Credit? \_\_\_ Yes \_\_\_ No
5. Are you aware that most people can deduct an IRA that they've funded on their income tax return? \_\_\_ Yes \_\_\_ No
6. Do you have a bank account? \_\_\_ Yes \_\_\_ No
7. Which term best describes your business experience level?  
 \_\_\_ High      \_\_\_ Fairly High      \_\_\_ Moderate      \_\_\_ Fairly Low      \_\_\_ Low

Please list your: Zip Code \_\_\_\_\_ Highest education level: \_\_\_\_\_ Middle School \_\_\_\_\_  
 High School \_\_\_\_\_ Undergraduate \_\_\_\_\_ Graduate or above \_\_\_\_\_  
 Occupation: \_\_\_\_\_ Gender: Female \_\_\_ Male \_\_\_ Industry where you work \_\_\_\_\_

*THANK YOU FOR YOUR PARTICIPATION!!*

### Post-preliminary Tax Preparation Instrument

	Current 1040	Higher of windfall or bank minimum as IRA	Full refund	Taxpayer designated amount (optional)	Taxpayer designated amount (optional)	Full eligibility record per taxpayer
Cash refund (liquid)	(From preliminary 1040 prepared)	Estimated from "what if" program	Estimated from "what if" program	Estimated from "what if" program	Estimated from "what if" program	(Left blank for further analysis)
IRA	(From preliminary 1040)	Higher of windfall <sup>1</sup> or bank minimum as IRA	(Cash refund amount from preliminary 1040)	Client-generated amount	Client-generated amount	(Left blank for further analysis)
Total wealth	Sum of 2 preceding rows in column	Sum of 2 preceding rows in column	Sum of 2 preceding rows in column	Sum of 2 preceding rows in column	Sum of preceding rows in column	Sum of preceding rows in column

Note: Above are three IRA funding options, but you may pick a separate amount between the highest IRA # above and the lowest, (if you'd like). Based on these calculations, how much of an IRA, if any, would you like to fund? (If any, instructions on setting up an IRA will be provided to the taxpayer.)

### Post-filing Tax Preparation Instrument

1. Observation # (assigned)
2. How much of an IRA did you finally fund for the 2010 tax year?
3. How much of an IRA did you finally fund for the 2011 tax year?
4. What is the final tax due/refunded to you for the 2010 tax year?

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<sup>1</sup> Windfall amount is the difference between the taxpayer's originally expected refund, and the refund from the preliminary tax return.

## Appendix 2

### Extra Credit—Behavioral Tax Research Exercise

Tax faculty members also do tax research. Sometimes this is legal tax research, often with recommendations for new laws. Sometimes this is archival research, where we try to make sense of past income tax filing data. Another area of tax research is behavioral—how do people respond to Code provisions. This type of research is usually done either by using surveys or experiments. To familiarize you with academic tax research, the following extra-credit exercise is offered for up to 10 points.

Assume you are married filing jointly with no children and have \$2,000 in a bank savings account and currently have the following federal income tax results from the preliminary 1040:

Total Income	\$30,000
IRA Deduction	0
Adjusted Gross Income	30,000
Less: Standard Deduction and 2 Exemptions	( 18,700)
Taxable Income	11,300
Income Tax	1,130
Saver's Credit	0
Tax Liability	1,130
Federal Income Tax Withholding	1,400
Refund	270

Now assume you are eligible to make an IRA contribution and qualify for the Saver's Credit. If you convert \$1,000 (half) of your savings account to an IRA, your preliminary 1040 federal income tax results would be:

Total Income	\$30,000
IRA Deduction	1,000
Adjusted Gross Income	29,000
Less: Standard Deduction and 1 Exemption	( 18,700)
Taxable Income	10,300
Income Tax	1,030
Savers Credit	1,000
Tax Liability	30
Federal Income Tax Withholding	1,400
Refund	1,370

Which would you rather do? Check one box:

- File the current return resulting in a \$ 270 refund, or
- Take out a \$1,000 IRA and file the income tax return resulting in a \$ 1,370 refund.

If you pick the second (\$1,370 refund) option, have [Department Secretary's name] in the Dean's suite of [this] building initial in the grey box here =>

*(Author's Note: the sentence and box immediately above are omitted for control group participants.)*

# The Compliance Costs of IRS Post-Filing Processes

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## Introduction

Better measurement of tax administration costs will improve our understanding of factors that influence a tax system and its outputs. As discussed in Slemrod and Yitzhaki (2002), the public's compliance costs are considerably larger than the budget of the tax administrator (e.g., the Internal Revenue Service). The public's compliance costs are typically related to the filing of a tax return. However, there are instances when additional information is required by the tax administrator after a tax return has been filed, and as a result, additional costs are incurred by the taxpayer. Because it is impractical to measure these costs directly, they must be estimated. This paper provides a methodology and preliminary estimates of these post-filing compliance costs for U.S. Federal individual income taxpayers and how they vary based on taxpayer characteristics and administrative treatments.

Prior IRS individual taxpayer compliance cost research has focused on compliance costs incurred during pre-filing and filing activities.<sup>2</sup> An earlier effort (Connors, *et al.* 2007) compared discrete event simulation and econometric microsimulation as potential modeling frameworks for IRS post-filing processes. This paper extends the 2007 study, describing the associated data collection, modeling, and estimation efforts.

## Pre-Filing and Filing

The IRS Office of Research conducts surveys to collect data from taxpayers regarding the time and money spent in complying with U.S. Federal tax laws. To provide comparability across return preparation methods, we monetize time to produce a single measure of compliance costs: total monetized compliance costs. Marcuss, *et al.* (2013) estimated that for Tax Year 2010 the average total monetized compliance cost that individual taxpayers incurred during the pre-filing through filing period was \$373. In this study, IRS taxpayer-level administrative data allowed the IRS to identify a population of individuals who had completed the pre-filing and filing components of the compliance process for a particular tax year. A sample of those individuals was surveyed to solicit specific information from them about their pre-filing and filing compliance costs for a particular tax year. Framing questions were included in the survey instrument to help taxpayers recall the pre-filing and filing compliance activities associated with that year's tax return. The survey data were used in conjunction with IRS administrative data to develop models capable of producing population estimates of pre-filing and filing compliance costs.

## Post-Filing

For this study, our goal was to develop modeling capabilities that would allow us to produce compliance cost estimates for individual taxpayers who: (1) filed an amended tax return; (2) had accounts receivable with the IRS and made an attempt to reach an agreement as to how the account could reach resolution; (3) had a return examined and interacted with the examiners; or (4) appealed an IRS decision. Our ability to accomplish this task relied heavily on available administrative data related to relevant IRS post-filing processes. Beyond data availability, we carefully considered how to represent efficiently the essential characteristics of what can be a very complex administrative process.

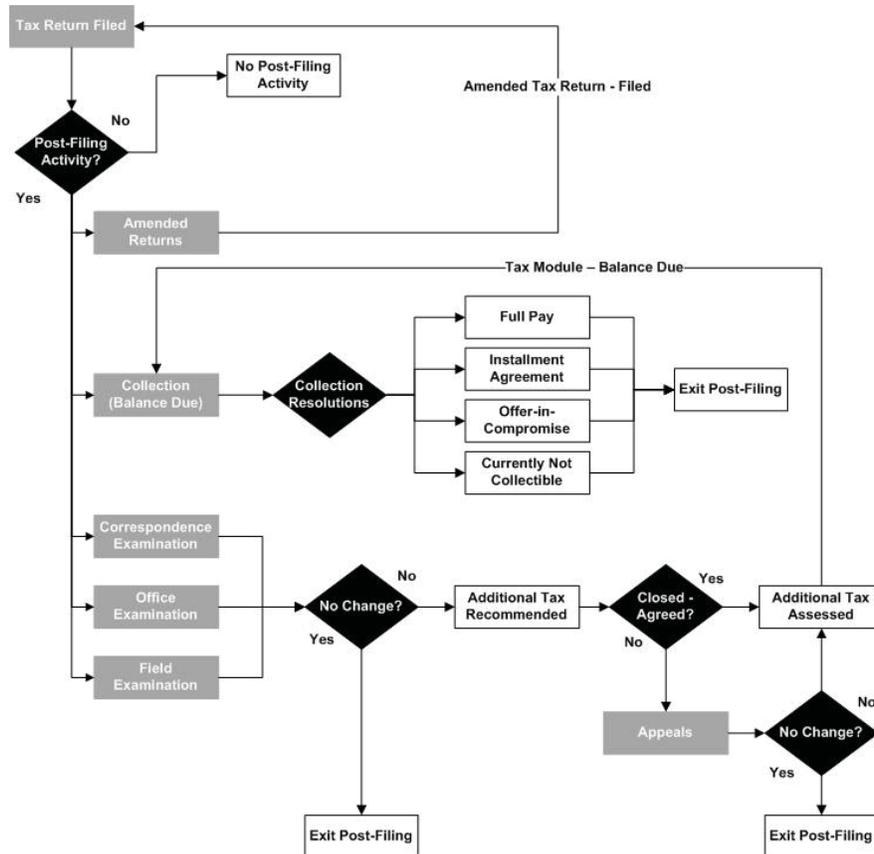
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<sup>1</sup> The authors wish to acknowledge comments and assistance from Bob Brown, Natalia Carro, George Contos, Steve Ellis, Ed Emblom, Janice Hedemann, Patrick Langetieg, Sandy Lin, Pat McGuire, Jennifer O'Brien, Mark Payne, Alan Plumley, Brenda Schafer, Michael Sebastiani, Laurie Tuzynski, Melissa Vigil, Leann Weyl and Naomi Dyer Yount. The views expressed are those of the authors and are not necessarily the official positions of the Internal Revenue Service.

<sup>2</sup> See Contos, *et al.* (2010) and Marcuss, *et al.* (2013).

From a tax administration perspective, the post-filing process can be complex for a taxpayer because it may cause him to interact with multiple IRS functions during an extended period of time after a tax return has been filed. For example, a tax return may be examined, resulting in the taxpayer being found to be liable for additional tax. Upon this determination, the taxpayer may both appeal the assessment and apply for various forms of relief with respect to the terms of meeting the financial obligation. In this example, the taxpayer would interact with the examination function, the appeals function, and more than one process within the collection function [Figure 1].

**FIGURE 1. Major Components of the IRS Post-Filing Process**



Each IRS post-filing function has its respective processes. Representing differences across and within these processes informs our understanding of how the associated taxpayer experience can vary. As an example, an examination may be conducted solely via correspondence or as a face-to-face meeting. These processes are very different in terms of the taxpayer experience. In certain instances, there may be differences within subprocesses as well. Consider, for example, two taxpayers who each undergo a correspondence examination, where the two examinations focus on different issues. The actions necessary to resolve the two cases may be different.

The sample frame for the post-filing compliance period was similar to that of the pre-filing and filing compliance cost research. However, significant heterogeneity in both activity and duration within the post-filing process made framing the compliance period difficult. To address these issues, we developed an analog sample frame for the post-filing process that considered data availability and allowed for the development of an appropriate reference period framing questions on the survey instrument.

## Defining the Post-Filing Period

The post-filing period begins when a taxpayer is made aware of an issue with an already-filed tax return and concludes when the issue has been resolved. The post-filing period is typically initiated by one of the Internal Revenue Service's enforcement functions through official correspondence sent to the taxpayer. However, post filing can be taxpayer-initiated when a taxpayer files an amended tax return. Identifying individuals who have a post-filing issue is the first step, but we are much more interested in those taxpayers who have completed the post-filing process and have actively worked to resolve their post-filing issue. Doing so is analogous to the pre-filing and filing compliance cost studies that use a filed tax return as an indication that the pre-filing and filing compliance period has concluded and the taxpayer has taken an active role in that process. Instances in which post-filing issues were resolved without any action on the taxpayer's part were excluded from this study (e.g., as when a taxpayer never responds to an IRS notification).

## Post-Filing Population

Although using a single tax year for the post-filing study is conceptually desirable, using the tax year as the primary survey frame poses some challenges. The enforcement process can be protracted, spanning many years in some cases. Because a small number of cases can take a decade or more to close, practical research considerations, such as limiting survey recall bias, dictate truncating the enforcement tail in some way for any tax year in the study. To aid us in determining a practical truncation point, we examined the calendar years within which a specific tax year's post-filing cases closed [Table 1].

**TABLE 1. Individual Income Tax Post-Filing Case Closures<sup>3</sup>**

		Calendar Year					
		2006	2007	2008	2009	2010	2011
Tax Year	2005	5,108,112	5,689,535	3,115,522	1,084,553	625,548	469,680
	2006	–	5,495,097	6,466,352	3,009,229	1,261,479	713,610
	2007	–	–	6,862,927	6,057,428	3,305,672	1,332,291
	2008	–	–	–	5,548,190	6,548,077	4,215,732
	2009	–	–	–	–	3,852,163	6,158,960
	2010	–	–	–	–	–	3,456,278

SOURCE: IRS, Office of Research, Taxpayer Analysis & Modeling

Upon reviewing the case closure data, we noticed that the vast majority of post-filing cases closed within the 3 calendar years immediately following the tax year in question (e.g., for TY 2005, the span would be CYs 2006–2008). If the tax year were the basis of the sample frame, then even this truncation of the tail of the case closure distribution would require that our survey ask taxpayers about their experience with cases that may have closed over 2 years earlier. Viewed instead from the perspective of the case closure year, we find the vast majority of post-filing cases that closed during a particular calendar year stemmed from returns filed for the 3 most recent tax years. By focusing our study on cases that closed in calendar year 2011 for tax returns from Tax Year 2008, 2009, or 2010 we were able to obtain an adequate population size while mitigating the challenges of recall bias.

## Survey Sample Design

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 of interest. The goal was an efficient design yielding data sufficient to estimate the model coefficients of interest. To design an adequate sample, we considered how a taxpayer's particular post-filing experience could impact his compliance costs. We categorized IRS post-filing processes as follows: (1) the amended returns process; (2) the collection process; (3) the audit process; and (4) the appeals process. To efficiently represent the heterogeneity within these processes, we sought to reflect important qualitative differences

<sup>3</sup> Case closures are across multiple IRS post-filing functions (e.g., Examination and Collection), and taxpayers may be counted multiple times.

within the taxpayer paths in each of these processes. For instance, the IRS Collection function seeks to have taxpayers pay outstanding debts. However, there are different ways by which taxpayers come into full payment compliance. Compliance costs are likely to differ depending on a taxpayer's behavior. Once it has been determined that a liability is owed, a taxpayer may pay immediately—with typically little direct effort involved in doing so. Alternatively, a taxpayer may enter into an installment agreement arrangement with the IRS, in which the taxpayer agrees to pay the liability over time. Applying for and paying the fee for an installment agreement results in additional activities and costs beyond actually making payments.

There are substantial variations within the Examination process as well. The majority of examinations are conducted via correspondence, but other examinations are conducted in person at an IRS office or the taxpayer's place of business. The scopes of these types of examinations differ because face-to-face examinations are generally reserved for more complex issues, while less complex issues can be examined remotely. We expected both taxpayer response to collection activity and the type of examination (if any) to influence taxpayer post-filing compliance costs. By reflecting these factors in the sample design, we can more efficiently control for differences in taxpayers' post-filing experience.

The sample design affects our ability to model differences in post-filing compliance costs across these segments of the post-filing population. Our sample design accounted for differences in three categories: (1) original return complexity; (2) post-filing issue (resolution) complexity; and (3) original return preparation method. A more detailed description of the three categories can be found in Appendix Tables A1-A3. In total, we considered two levels of original return complexity, seven types of post-filing issue resolution complexity, and two types of original return preparation method. This particular design would have resulted in 28 strata, but we collapsed a few cells, producing a final sample design with 22 strata [Appendix Table A4].

## Survey Development

IRS administrative data are a crucial element of this study because they allow us to determine our pool of potential respondents and to reconstruct many of the key events in a taxpayer's post-filing compliance experience. However, these data represent only a portion of what is necessary to successfully conduct a study of this nature. Linking administrative data with survey data on taxpayer costs allows us to associate and model differences in costs with differences in post-filing experiences. Therefore, the survey had to adequately frame the post-filing period so the respondent could provide reasonable estimates of time and money spent resolving their associated post-filing issues.

Recall that taxpayers who experience post-filing activity are likely to have widely different experiences. Heterogeneity of the post-filing population and lack of broad awareness on the part of taxpayers of the different post-filing subprocesses made developing tailored surveys based on a taxpayer's unique post-filing experience impractical. However, we were able to personalize each survey such that the appropriate tax year was referenced throughout the survey.

Since we could not take into account all aspects of a taxpayer's post-filing experience, we approached survey development from the perspective of how taxpayers would resolve their post-filing issue. Prior to asking questions about the post-filing issue resolution process we provided a uniform definition of "post-filing" and specifically stated the tax year being surveyed in order to aid respondents in providing time and money estimates for the appropriate time period [Figure 2].

**FIGURE 2. What Is Post-Filing? [Excerpt from survey instrument]**

<p><b>What is post-filing?</b></p> <p><b>If you received a notice from the IRS regarding your 2010 federal income tax return:</b>  Post-filing refers to the time beginning with IRS notification about an issue with your already-filed federal income tax return, ending with the resolution of the issue. Post-filing activities may include interactions with various divisions within the IRS such as Collection, Examination (Audits), and Appeals.</p> <p><b>If you amended your 2010 federal income tax return:</b>  Post-filing refers to the time beginning with the filing of your original federal income tax return and ending with the filing of your amended federal income tax return.</p>
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The survey was developed by an iterative process beginning with reviewing information from previously conducted compliance studies, background interviews with subject-matter experts, expert review by survey methodologists, and cognitive testing of survey items with actual taxpayers. This section describes these steps in more detail.

The first step was to review material from two previous post-filing compliance studies conducted in 2001 and 2005 to review lessons learned and the types of activities that occur during the different post-filing compliance period functions (e.g., examinations, collections.) A list of general activities was generated (e.g., read IRS notice, call IRS office, locate a tax professional) to develop a taxonomy of the activities that occur in the different post-filing functions. The purpose of this initial taxonomy was to help determine the extent to which one survey could be used to capture the activities across different post-filing functions. There was substantial overlap of the general activities taxpayers may engage in for the different post-filing compliance functions. Therefore, development of the survey moved forward with the goal of having one survey for different types of post-filing compliance functions.

We then conducted a series of seven one-hour background interviews with subject-matter experts who worked in the different post-filing compliance functions to determine the processes involved from the IRS perspective, how taxpayers enter their IRS function, how taxpayers leave their IRS function, and what other functions they might enter if the post-filing compliance issue was not closed. These subject-matter experts also provided their estimate of the taxpayer experiences and where compliance costs may be largest for the taxpayer.

Based on these efforts, a draft instrument was prepared for expert review by two survey methodologists. These experts reviewed the survey for consistency, proper item wording, clarity of item stems and response options, item flow, and for other areas that, based on their expertise, could pose problems for respondents. Edits were made based on the expert reviews and the surveys were prepared for pre-testing via cognitive interviews with taxpayers.

The survey underwent two rounds of cognitive interviews with 18 taxpayers to help identify and remove potential causes of response error. We attempted to recruit individuals experiencing a range of post-filing issues.

The IRS recruited respondents through their contacts working at tax professional associations and by posting a flyer in tax professional offices in the metropolitan Washington D.C. area, as well as by posting an ad on Craigslist. To be eligible, respondents had to be at least 18 years old, had experienced a post-filing compliance issue (i.e., an IRS audit, entered an agreement with IRS collections, appealed a decision from an IRS audit or collection, or filed an amended tax return) and had resolved the issue.

Respondents were asked to complete the survey prior to participating in a one-hour interview. Each respondent received \$75 for their time. The interviews were completed both in-person and over the telephone, depending on the location of the respondent. If the respondent did not reside in the Washington DC Metropolitan area, the interview was conducted by telephone. During the course of the interviews, respondents were asked their overall impressions of the survey, as well as how they interpreted key items and phrases. Interviewers administered a series of scripted probes addressing potential areas of concern and also asked follow-up probes on any unanticipated issues raised by participants. After the first nine cognitive interviews, the survey development team met to discuss all issues, and the survey was revised for the second round of testing. Based on the testing results, the survey and accompanying materials were extensively revised and finalized in June 2012.

The final survey items were grouped into the following sections: (1) General Questions About Your Post-Filing Issue; (2) Reviewing and Gathering Tax-Related Materials; (3) Interacting with the IRS and Using IRS resources; (4) Working with a Tax Professional; (5) Time Spent Resolving Your Post-Filing Issue; and (6) Money Spent Resolving Your Post-Filing Issue. By using these generalized representations of actions, interactions, and available resources that would be necessary to resolve a post-filing issue, we were able to make our survey instrument broad, yet comprehensive enough to be appropriate for any post-filing issue. Further, while the focus was on time and money spent, the first four sections were used to frame the post-filing compliance issues for the respondent so they could provide time and money estimates more accurately. Note that for time estimates we asked respondents to exclude elapsed time when they were waiting for an IRS response. For money estimates we asked respondents to exclude any tax, penalties, or interest paid to resolve their post-filing issue.

## Data Set

The compliance cost data used to develop the post-filing compliance cost model are from the IRS Taxpayer Compliance Burden Survey conducted in 2012. As discussed above, the sampling frame was Tax Year 2008, 2009, or 2010 individual taxpayers who resolved a post-filing issue during Calendar Year 2011. We employed a stratified sample design, which when weighted represents this population.

The surveys collected data on the time and money taxpayers spent resolving issues related to a specific, already-filed federal income tax return. Each survey response was then linked to that taxpayer's IRS administrative records. These records contain information from the original tax return and information regarding a taxpayer's post-filing experience. The linked survey data and IRS administrative data allowed us to create an estimation data set, which was used to estimate model coefficients. Survey and IRS administrative data were both cleaned for questionable data.

## Modeling Approach

The modeling approach used for this study is similar to the one used by the IRS for modeling pre-filing and filing compliance costs for small businesses as described in Contos, *et al.* (2009) and Marcuss, *et al.* (2013). The goal of this research is to develop a more comprehensive understanding of compliance costs. This study seeks to explain compliance costs incurred during post-filing across a wide variety of taxpayer experiences. Furthermore, we wanted to develop a model capable of estimating expected changes in these costs due to changes within the tax system—particularly changes in IRS post-filing processes.

## Econometric Model

To model the conditional distribution of post-filing compliance costs, we employed a log-linear regression specification in which the natural log of post-filing compliance costs is linearly related to a set of explanatory variables, following the approach used in Contos, *et al.* (2009). Post-filing compliance cost data are available from respondents of the survey. It was important that the explanatory variables in the model be based on IRS administrative data as this will allow us to apply the model to populations outside the respondent data set. The dependent variable, *Log Post-Filing Compliance Costs*, is based on survey data, and represents a monetized combination of time and money spent.

We wanted to control for the substitution of time and money across different compliance methods so we created a combined measure of compliance costs. Following the approach taken in Marcuss, *et al.* (2013), we used the taxpayer's after-tax income as a monetization rate. This has the virtue of consistency with the process for estimating pre-filing and filing compliance costs. There is also a downside because some taxpayers in the post-filing population have misstated their tax characteristics. This limitation likely results in a misstatement of the resulting monetized compliance cost estimates. Refining the monetization method remains an area for further consideration.

Contos, *et al.* (2009) employed a modeling framework for business taxpayers similar to the approach used in this study, controlling for various taxpayer characteristics such as return preparation method, industry classification, total assets, type of return filed, etc. The approach developed and used complexity categories as a means to both control and account for the volume and type of activities a taxpayer performs in complying with the federal tax laws. This allowed a reduced form representation of a wide variety of forms and schedules while also providing a framework for representing new forms or significant changes to existing ones. For this study, we have used a similar approach because post-filing compliance costs are largely driven by the processes that a taxpayer experiences as well as the resources available to them. It was from this perspective that we began model development.

As a first step in model development, we considered the IRS post-filing process and its goals. Major goals of this portion of tax administration are to: (1) determine unpaid liability of tax, penalty, and interest by collecting additional tax-related information; or (2) collect a liability determined to be due. These goals may be met by a variety of means, and it is the differences that affect compliance costs. Post-filing is a continuation of the overall compliance process, so some at-filing characteristics are expected to affect compliance costs in the post-filing period. At a high-level, the model controls for: (1) at-filing characteristics (such as original tax return complexity and preparation method, third-party designee, etc.); (2) post-filing characteristics (third-party representation, IRS administrative costs, post-filing results and post-filing case type); and (3) collection-related resolutions.

## Estimated Coefficients

Table 2 shows the coefficients of the post-filing compliance cost model. The model is intended to be comprehensive in the sense that it represents in some form or another all major components of IRS post-filing processes.<sup>4</sup> Recall that this study was meant to encompass individual taxpayers who have: (1) amended a tax return; (2) a tax return that has been examined by the IRS, regardless of examination technique; (3) attempted to resolve a collection issue with the IRS; or (4) appealed an IRS decision.

The Post-Filing Characteristics category contains variables that address the IRS post-filing processes related to the goals of this study mentioned above. All of these variables are positive and significant as we would expect, but some of these variables warrant further discussion.

The variable, *Power of Attorney Indicator (Post-Filing)*, indicates that a taxpayer had a Power of Attorney on file with the IRS with an effective date following the onset of post-filing. Its presence can indicate a certain level of difficulty, such that the taxpayer seeks professional assistance in order to resolve the issues.

During the post-filing process, a taxpayer may interact with various IRS functions, and provide additional tax-related information, yet not owe any additional tax. The model controls for this scenario with the *No Post-Filing Tax Assessed Indicator* dummy variable.

Cases in which the taxpayer was found to owe additional tax are represented by the *Log Post-Filing Tax Assessments* variable. This variable is the natural logarithm of the sum of all tax assessments for that taxpayer by IRS enforcement functions. Its coefficient, which is positive and significant, suggests that as a taxpayer's post-filing tax assessment increases, so do the associated compliance costs, but at a decreasing rate. This result is intuitive in that the more at stake for a taxpayer (in terms of potential post-filing tax assessments) the more incentive the taxpayer has to incur compliance costs to avoid the additional tax assessment.

**TABLE 2. Post-Filing Compliance Cost Coefficients**

	Variable	Estimate	t statistic
	Intercept	1.3569	5.4900**
<b>At-Filing Return Characteristics</b>	Log Income	0.1800	7.6100**
	Medium Complexity Indicator	0.2067	4.2800**
	High Complexity Indicator	0.6103	8.3300**
	Paid Indicator	0.2097	2.8400**
	Software Indicator	-0.1301	-1.6400
	Power of Attorney Indicator (At Filing)	1.3225	8.1300**
	Power of Attorney Indicator (Post-Filing)	1.0271	10.9900**
<b>Post-Filing Characteristics</b>	No Post-Filing Tax Assessed Indicator	0.4698	2.7500**
	Log Post-Filing Tax Assessments	0.0452	2.1100*
	Automated Underreporter Indicator	0.1525	2.3600*
	Log Administrative Costs - Examination	0.1886	10.6100**
	Log Administrative Costs - Appeals	0.2095	2.9400**
	Amended Tax Return Indicator	0.3808	4.8800**
	Account Balance Due Indicator	0.9324	3.4800**
<b>Collection Resolutions</b>	Account Full Paid Indicator	-0.9732	-3.6900**
	Installment Agreement Indicator	0.8103	3.1400**
	Offer in Compromise Indicator	1.3370	4.5000**
	Collection Due Process Indicator	0.7938	1.9500
	Currently Not Collectible - Hardship Indicator	0.0558	0.2700
Lien Release Indicator	0.2934	0.8600	
		<b>Adj. R<sup>2</sup> = 0.424</b>	

\*Statistically significant at the 5 percent level.

\*\*Statistically significant at the 1 percent level.

<sup>4</sup> As discussed in Contos, *et al.* (2009), transforming from log(costs) back to costs requires not only predicted log(costs) but also the predicted variance of log(costs). Appendix Table A5 provides the corresponding coefficients and T-statistics for the predicted variance.

We estimate coefficients for two administrative cost variables: examination and appeals. The motivation for including these variables is as follows. If the IRS is expending resources to request additional information to resolve post-filing issues, then the taxpayer must expend resources as well. To create the administrative cost variables, we use information on the time expended by IRS staff on a particular tax return and monetize the staff time to create a measure of administrative costs using a natural logarithmic transformation. As expected, these coefficients are positive and significant.

Several dummy variables are included in the model. The *Account Balance Due Indicator* denotes a taxpayer with an unpaid tax liability related to the post-filing issue. How and when a taxpayer chooses to respond to the balance due drives much of the collection-related compliance costs. The Collection Resolutions category addresses these differences. Taxpayers may pay now or pay later, or they may not be able to pay it all. If taxpayers decide to take the “pay now” option they simply remit the balance due and the collection issue is resolved. We expect the “pay now” option to require only modest compliance costs and our model indicates that. The coefficient on the *Account Full Paid Indicator* variable is negative and significant, which in isolation does not fit with our intuition. However, a more intuitive explanation is that if a taxpayer has a balance due and pays that balance in full, the net effect is close to zero. The coefficients indicate that the *Account Full Paid* variable offsets the *Account Balance Due Indicator* variable almost exactly.

For those taxpayers who are unable to pay in full immediately, the IRS generally allows these taxpayers to pay the balance due in installments. In some instances, the IRS and taxpayer reach a compromise on the original account balance due and the taxpayer is allowed to pay less than the original balance. In order for a taxpayer to take advantage of these particular collection resolutions, unlike the full-pay scenario, additional compliance costs are incurred. In order to set up an installment agreement with the IRS or to submit an offer in compromise, the taxpayer must complete the appropriate form and pay a user fee. These requirements represent post-filing compliance costs because they require the taxpayer to expend both time and money in an effort to resolve their post-filing issue. Thus, it is not surprising that the coefficients on both the *Installment Agreement Indicator* and *Offer in Compromise Indicator* variables are positive and significant. However, the difference in the magnitudes of these variables is encouraging and supports our intuition. We expect the impact of the *Installment Agreement Indicator* variable to be smaller in magnitude than the *Offer in Compromise Indicator*, as the user fee for completing an installment agreement is smaller, and the installment agreement form requires the taxpayer to provide less information than does the form for an offer in compromise.

At-filing characteristics may impact post-filing compliance costs as well. In choosing these variables we wanted to use variables that could provide causal interpretations about post-filing compliance costs, but also serve as key variables that control and account for differences in taxpayer characteristics. We also selected variables that could support integration with available models of pre-filing and filing compliance costs.

The coefficient on the *Log Income* variable suggests that as income increases, post-filing compliance costs also increase, albeit at a decreasing rate. Higher income suggests that a taxpayer has both more at stake and additional resources to invest in pursuing a more favorable post-filing resolution. The income variable used is “modified positive income” as defined in Marcuss, *et al.* (2013). The intuition is to include total income (taxable and nontaxable) rather than net income to proxy for the overall volume of reporting activity and economic activity at stake.

The return complexity dummy variables, *Medium Complexity Indicator* and *High Complexity Indicator*, control for taxpayer differences in the complexity of tax planning and recordkeeping, and are derived from pre-filing and filing compliance cost research. These coefficients are positive and significant, suggesting that when tax planning and recordkeeping are more complex during pre-filing and filing, then substantiating the associated reported amounts during post-filing is typically more complex as well.

We also include preparation method variables in the model, *Paid Indicator* and *Software Indicator*. We do not view these variables as having causal interpretations for post-filing compliance costs. Rather the coefficients seem to control for differences in taxpayers and may also proxy for post-filing issue complexities not picked up by the complexity variables mentioned above. The *Power of Attorney Indicator (At Filing)* variable, which is the counterpart to the *Power of Attorney Indicator (Post-Filing)* variable, can be viewed as an additional preparation method variable and its coefficient would be better viewed as a further control variable.

## Survey Respondent Population Estimates

A goal of the post-filing compliance cost model is to produce population-level estimates of post-filing compliance costs. For the study population, the current version of the model estimates these compliance costs to be on average \$400 per taxpayer with a median post-filing compliance cost of \$125. This amount is comparable to, but higher than, the average pre-filing and filing compliance costs of \$373 estimated in Marcuss, *et al.* (2013). A total of 11.4 million unique taxpayers resolved a post-filing issue in 2011 for Tax Year 2008, 2009, or 2010 and incurred an estimated \$4.58 billion in post-filing compliance costs [Table 3].<sup>5</sup> Since cases taking 4 or more years to close were excluded from the sample frame, this estimate provides a lower bound of the total post-filing compliance costs for individual taxpayers for a given year.<sup>6</sup>

Fortunately, available administrative data allow for a detailed look into post-filing compliance costs. We are able to estimate post-filing compliance costs based on the initial IRS post-filing process as well as the final IRS post-filing issue resolution. Available administrative data allow us to allocate post-filing compliance costs across particular post-filing processes (e.g., of the total post-filing compliance costs, how much can be allocated to IRS examinations). This allocation process is a subject of current research efforts.

**TABLE 3. Estimates of the Compliance Costs of IRS Post-Filing Processes for Taxpayers Resolving a Post-Filing Issue in 2011 Covering Tax Year 2008, 2009, or 2010**

	Population	Average Compliance Cost	Median Compliance Cost	Total Compliance Cost
<b>Total</b>	11,445,000	\$400	\$125	\$4,578,000,000

## Comparison with Pre-Filing and Filing Compliance Costs

As mentioned above, the previous IRS Office of Research studies have represented pre-filing and filing compliance costs. Compliance cost models have been developed using survey data linked with IRS administrative data. For these pre-filing and filing models, the explanatory variables are from filed tax returns. This places us in a unique position to be able to estimate pre-filing and filing compliance costs as well as post-filing compliance costs for the survey respondents. It should be noted that because post-filing survey respondents did not receive the pre-filing and filing survey, we assume that their pre-filing and filing compliance costs are similar to taxpayers with similar reported tax return characteristics. That being said, we must emphasize that the post-filing survey respondent population is not representative of the overall filing population. The estimated average pre-filing and filing costs for the post-filing population are \$640, much higher than the \$373 average pre-filing and filing compliance costs estimated for the general filing population [Table 4].

**TABLE 4. Estimates of Pre-Filing & Filing Compliance Costs (Post-Filing Survey Respondents)**

	Population	Average Compliance Cost	Median Compliance Cost	Total Compliance Cost
<b>Total</b>	11,445,000	\$640	\$260	\$7,300,000,000

Comparison with the population-level estimates for pre-filing and filing compliance costs meets our expectations in two ways. We expected these costs to be higher, on average, than the general population because: (1) these returns typically report higher income and are more complex than the average return; and (2) generally only some of the activity reported on the return is revisited during post-filing. This holds particularly true for taxpayers who are resolving post-filing issues that do not require them to gather material or otherwise substantiate material related to the original tax return. Table 5 shows a comparison of the average post-filing compliance costs for select post-filing categories. It should be noted that post-filing compliance costs reported here include both compliance costs associated with the

<sup>5</sup> By way of comparison, application of the regression coefficients to weighted survey population yields an estimated average compliance cost of \$410 after the anti-log transformation as discussed in Contos, *et al.* (2009). This compares with the weighted average post-filing compliance cost of \$400 reported in Table 3. An adjustment factor of 400/410 applied to the anti-log transformed model output is used in reporting compliance costs for the full population starting with Table 7.

<sup>6</sup> Excluding the cases taking 4 or more years to close from the sample frame is expected to understate the estimated total in two ways. First, these cases tend to be more complex and are thus expected to require more resources on average. Second, excluding these cases reduces the population count represented by the estimate.

function where the post-filing case initiated as well as all additional post-filing compliance costs associated with downstream IRS post-filing processes.

**TABLE 5. Comparison of Post-Filing Compliance Costs (Select Case Types)**

Initial Post-Filing Case Type	Average Pre-Filing and Filing Compliance Cost	Average Post-Filing Compliance Cost
Automated Underreporter	\$435	\$195
Correspondence Examination	\$590	\$580
Office Examination	\$1,295	\$1,550
Field Examination	\$3,095	\$4,000
Amended Return	\$1,040	\$340

*Automated Underreporter* cases typically do not require large amounts of return information to be gathered or substantiated. These cases are typically instances where the IRS uses third-party information reporting to identify discrepancies between what a taxpayer reported and should have reported. The third-party information documents are provided to both the IRS and taxpayer. To resolve these issues, a taxpayer may have to request an updated information document, explain the discrepancies, or simply agree with the IRS' determination. Regardless of the resolution, we do not anticipate the post-filing compliance costs to be greater than pre-filing and filing compliance costs for this population.

Typically a taxpayer files an *Amended Return* when: (1) something has been omitted from the original tax return; or (2) additional information is acquired and the taxpayer wishes to change the original tax return. When a taxpayer amends an original tax return, typically only a portion of the information reported on the original filed return is updated. As such, we would typically expect these costs to be less than those of filing an entire original return. Further, *Automated Underreporter* cases and *Amended Return* cases are also less likely to have substantial downstream post-filing compliance costs.

In an examination, the IRS typically identifies specific issues to examine on a tax return and requests information related to these issues. The taxpayer may or may not have the information at their disposal when the request is made. If the information is unavailable, the taxpayer may expend some effort to acquire the information. Further, complexity and the number of issues being examined are likely to impact the taxpayer's ability to quickly gather the necessary documentation. *Field Examinations* cover the most complex issues, followed by *Office Examinations*, with *Correspondence Examinations* typically covering the simplest issues. Further, *Field Examinations* and *Office Examinations* also cover more issues than *Correspondence Examinations*.

We would generally expect taxpayers under IRS examination to have to: (1) resolve issues with multiple functions within the IRS; (2) have more complex returns; (3) face a number of examined issues; and (4) incur additional downstream post-filing compliance costs. Thus, it is perhaps not surprising that post-filing compliance costs for complex returns subject to examination would at times exceed the associated pre-filing and filing compliance costs. We find it similarly intuitive that, controlling for the return characteristics, the post-filing compliance costs would be higher on average for campus and field exams than for correspondence exams.

## Time and Out-of-Pocket Cost Estimates

Survey respondents were asked about time and out-of-pocket money spent resolving post-filing issues to this point. We have monetized time to create a single measure of total monetized compliance costs and compared how those costs differ across taxpayer case types. We wanted to examine further how these costs differ across the components of our single compliance cost measure [Table 6] as different populations may respond differently to direct out-of-pocket costs incurred versus the opportunity costs associated with time spent.

In the previous section, we discussed how total compliance costs differ across case types and provided some motivations as to why this may be. The table below gives further insight into why these costs differ. It is interesting to note, not surprisingly, that both the time and out-of-pocket cost components vary in magnitude just as total monetized

compliance costs vary. One reason is that there are differences in the monetization rates. Since these are derived from taxpayer characteristics, they are driven by the composition of taxpayers who find themselves with a particular case type. The differences across monetization rates differ in a way that we would expect. For instance, *Field Examination* cases deal with much more complex issues and taxpayers with more complex issues typically are higher income taxpayers with business income. Whereas taxpayers with an *Automated Underreporter* case would typically have lower income since much of their income is derived from sources covered by third-party reporting.

The case types mentioned in the previous section required taxpayers to substantiate information regarding a previously filed tax return. We use those same case types for comparison of the time and out-of-pocket estimates.

**TABLE 6. Post-Filing Time and Out-of-Pocket Cost Estimates (Select Case Types)**

Initial Post-Filing Case	Average Monetization Rate (\$/Hour)	Average Time (Hours)	Average Out-of-Pocket Costs (\$)	Average Total Monetized Compliance Costs (\$)
Automated Underreporter	20	7	\$60	\$195
Correspondence Examination	15	30	\$130	\$580
Office Examination	25	38	\$600	\$1,550
Field Examination	60	34	\$1,950	\$4,000
Amended Return	25	9	\$115	\$340

Note: Totals may not add due to rounding.

## Creating a Post-Filing Population File

The survey population consisted of only Tax Years 2008-2010 taxpayers who concluded post-filing in Calendar Year 2011. While this made administering the survey more tractable, it excludes the post-filing cases in the tail of the compliance cost distribution (i.e., those that took longer to complete). We have developed a population file using only IRS administrative data. This allows us to deploy the post-filing compliance cost model to produce post-filing compliance cost estimates for an entire population, including the tail of the distribution. The survey respondent data set provided a representative sample that, when weighted, would represent only a specific population. Creating a population file allows compliance costs to be estimated for any population of relevant interest. IRS administrative data provide that flexibility and the model variables selected make it feasible.

For this particular study, we surveyed only Tax Year 2008, 2009, or 2010 taxpayers who resolved a post-filing issue during Calendar Year 2011. For comparability, we created a population file of all taxpayers who resolved a post-filing issue in Calendar Year 2011. We compare below the compliance costs of the survey respondents and taxpayers in the population file, as well as how the compliance costs are allocated across IRS functions.

## Full Population Estimates

Using the model we developed, we were able to produce estimates for a more general population of post-filing taxpayers [Table 7]. Prior to administering the survey, we realized that we would be excluding taxpayers who had post-filing cases that did not resolve within 3 years (since we surveyed only a subset of all taxpayers who resolved an issue in Calendar Year 2011). Our expectation was that if we included all cases that resolved in Calendar Year 2011, on average compliance costs would be higher than that of our survey population, and the results support that hypothesis. As expected, now that the tail of the distribution is included, the population file has more taxpayers than the survey population, and both average and median compliance costs are higher. Indeed, average compliance costs were approximately 20 percent higher than the survey respondent value.

**TABLE 7. Post-Filing Compliance Cost Estimates (Calendar Year 2011 Full Population)**

	Population	Average Compliance Cost	Median Compliance Cost	Total Compliance Cost
<b>Total</b>	11,977,000	\$455	\$130	\$5,450,000,000

Using the pre-filing and filing compliance cost model developed by the IRS Office of Research, we can also produce estimates of pre-filing and filing compliance costs for the taxpayers in the full population [Table 8]. As expected, pre-filing and filing compliance costs are higher, on average, than post-filing compliance costs for the full population, much like the survey respondent population. It should be noted that for the full population, average pre-filing and filing compliance costs are lower than those found in the survey respondent population. While we did not have a hypothesis on whether these costs would be higher or lower, it is encouraging to see that these costs are roughly the same value.

**TABLE 8. Pre-Filing and Filing Compliance Cost Estimates (Calendar Year 2011 Full Population)**

	Population	Average Compliance Cost	Median Compliance Cost	Total Compliance Cost
<b>Total</b>	11,977,000	\$615	\$230	\$7,366,000,000

Post-filing compliance costs are higher on average for the full population than for the survey respondent population. We would expect the compliance costs to be higher across the different case types as well. We find that for most of the case types that is true, with the exception of *Correspondence Examination* cases, where the full population value is lower than that of the survey respondents. The post-filing compliance cost model accounts for the impact of *Correspondence Examination* cases by way of the *Log Administrative Costs—Examination* explanatory variable. IRS examination administrative costs are driven by the compliance issues the agency feels are a priority, and this is likely to shift from year to year and across taxpayer interaction type. This would suggest more recent *Correspondence Examination* cases are requiring more effort on the part of the IRS and this could be issue-driven or driven by changes in taxpayer behavior regarding their interactions with the IRS, particularly IRS examination.

**TABLE 9. Comparison of Survey and Full Population Post-Filing Compliance Costs (Select Case Types)**

Initial Post-Filing Case Type	Average Post-Filing Compliance Cost (Survey Respondents)	Average Post-Filing Compliance Cost (Full Population)
Automated Underreporter	\$195	\$225
Correspondence Examination	\$580	\$500
Office Examination	\$1,550	\$2,105
Field Examination	\$4,000	\$4,670
Amended Return	\$340	\$440

## Compliance Costs By Enforcement Function

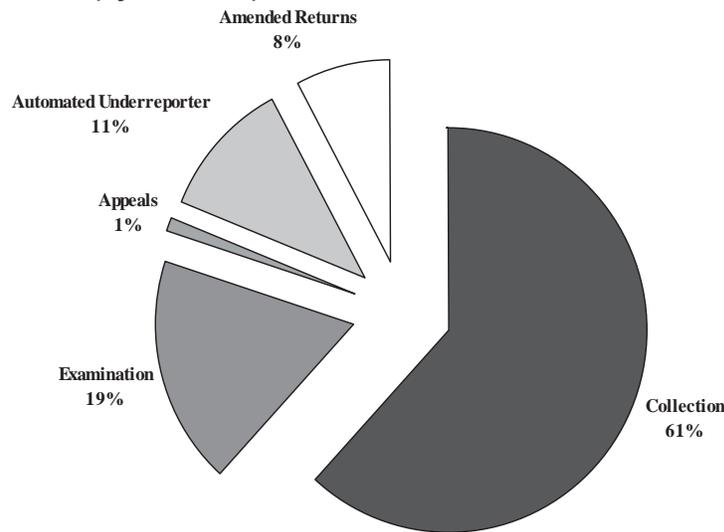
The post-filing compliance cost model allows us to run simulations to determine compliance costs for a population of interest. Using successive simulations and removing key variables from our population file, we were able to estimate how total compliance costs are distributed across the major IRS post-filing functions [Table 10 and Figure 3]. Population compliance costs are driven by two components: the compliance cost associated with a task, and the volume of taxpayers affected by that task. *Collection*, by far, is responsible for the majority of post-filing compliance costs, and this is due to the large number of taxpayers who have to resolve collection issues with the IRS. Nearly 45 percent of the total post-filing population is affected by *Collection* accounting for 61 percent of the compliance costs. In contrast, *Examination* has far fewer affected taxpayers—nearly 1/5 the amount of *Collection*—yet it accounts for 1/3 as much in post-filing compliance costs as *Collection*.

**TABLE 10. Distribution of Post-Filing Compliance Costs Across Major IRS Functions**

Enforcement Function	Number of Affected Taxpayers	Compliance Costs	Percentage Distribution
Collection	5,416,000	\$3,371,000,000	61%
Examination	1,082,000	\$1,014,000,000	19%
Appeals	29,000	\$59,000,000	1%
Automated Underreporter	3,916,000	\$609,000,000	11%
Amended Returns	1,534,000	\$425,000,000	8%
<b>Total</b>	<b>11,977,000</b>	<b>\$5,477,000,000</b>	<b>100%</b>

Note: Totals may not add due to rounding.

**FIGURE 3. Distribution of IRS Post-Filing Compliance Costs (by Function)**



We estimate the total (pre-filing, filing, and post-filing) compliance costs of the post-filing population to be approximately \$13 billion. How these costs are distributed across pre-filing and filing compliance and across post-filing function is shown below [Table 11 and Figure 4]. As expected, pre-filing and filing compliance costs dominate total compliance costs. From this we see that, on average, 60 percent of compliance costs for those with post-filing activity are associated with pre-filing, filing, and return amendment activities, with the other 40 percent of their compliance costs being associated with IRS enforcement post-filing issue resolution.<sup>7</sup>

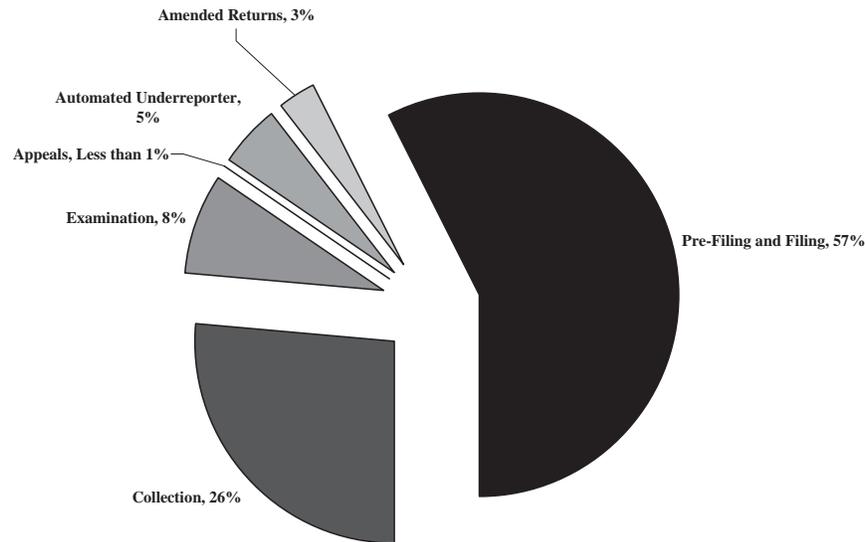
**TABLE 11. Total Compliance Costs Allocated Across Pre-Filing and Filing Activity and IRS Post-Filing Function**

Function	Compliance Costs	Distribution of Compliance Costs
Collection	\$3,371,000,000	26%
Examination	\$1,014,000,000	8%
Appeals	\$59,000,000	Less Than 1%
Automated Underreporter	\$609,000,000	5%
Amended Returns	\$425,000,000	3%
Pre-Filing and Filing	\$7,365,855,000	57%
<b>Total</b>	<b>\$12,843,855,000</b>	<b>100%</b>

Note: Totals may not add due to rounding.

<sup>7</sup> The 3 percent of these compliance costs associated with filing an amended return could be either taxpayer initiated or a taxpayer response to IRS enforcement activity. We do not attempt to distinguish between these two possible causes for this activity in this analysis and are treating return amendment as primarily taxpayer-generated activity.

**FIGURE 4. Distribution of Total Compliance Costs Across Pre-Filing and Filing Activity and IRS Post-Filing Function**



## Compliance Costs and Revenue Collection

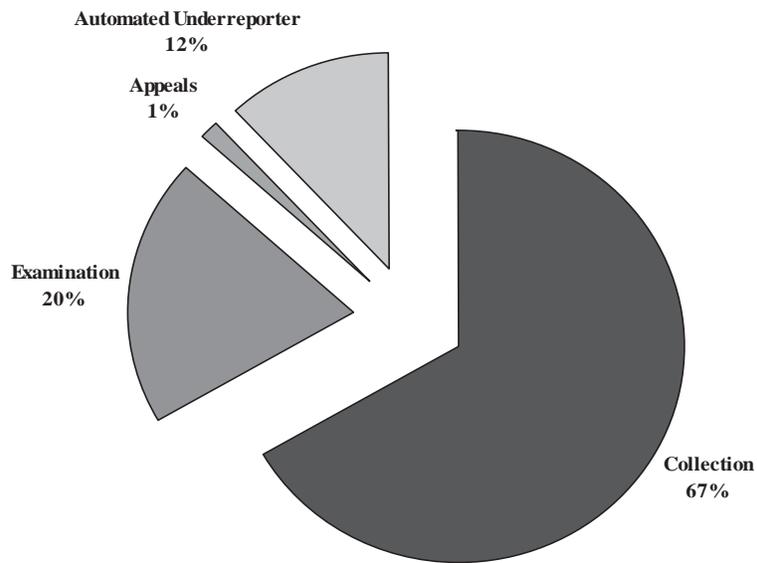
Compliance costs and IRS administrative costs are key components of the cost of the U.S. Federal tax system. Compliance costs in particular represent costs incurred by the public (outside the agency budget) for providing information critical to effective tax administration. More specifically, post-filing compliance costs are costs incurred by the public outside the agency budget for information critical to issue resolution associated with IRS enforcement functions. Focusing on these enforcement functions, we use information from Table 11 and Figure 4 to focus on the distribution of individual taxpayer compliance costs across enforcement functions [Table 12 and Figure 5]. Obviously, the relative shares across functions remain the same but this perspective allows for more direct comparison with the distribution of IRS Enforcement Revenue, which is separated into the same four functions [Figure 6]. While Figure 6 does include all tax types, the differences across enforcement functions are roughly comparable to the distribution of individual taxpayer compliance costs across the same functions.

**TABLE 12. Distribution of Post-Filing Compliance Costs Across IRS Enforcement Functions**

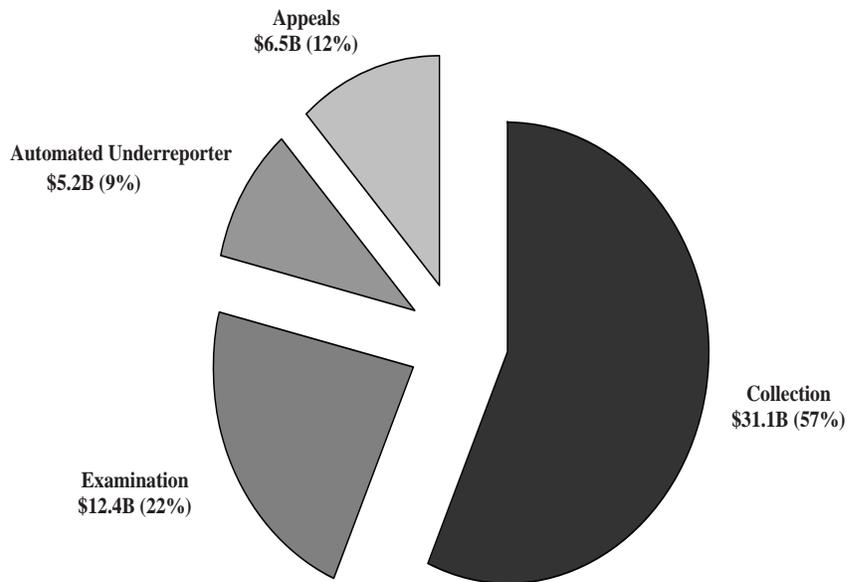
Enforcement Function	Number of Affected Taxpayers	Compliance Costs	Percentage Distribution
Collection	5,416,000	\$3,371,000,000	67%
Examination	1,082,000	\$1,014,000,000	20%
Appeals	29,000	\$59,000,000	1%
Automated Underreporter	3,916,000	\$609,000,000	12%
<b>Total</b>	<b>10,443,000</b>	<b>\$5,052,000,000</b>	<b>100%</b>

Note: Totals may not add due to rounding.

**FIGURE 5. Distribution of IRS Post-Filing Compliance Costs (by Enforcement Function)**



**FIGURE 6. IRS Enforcement Revenue Collected, Fiscal Year 2011 (All Tax Types)**



Source: *IRS Data Book*, Fiscal Year 2011, Publication 55B (Rev. 3-2012)

Expanding the analysis to include the revenue and compliance costs of taxpayers not subject to enforcement activities provides a broader context for post-filing compliance costs as part of the public cost of tax administration. Table 13 shows that post-filing enforcement compliance costs represent 9 percent of the direct compliance costs for individual taxpayers. In comparison, Table 14 shows that enforcement revenue accounts for roughly 3 percent of total revenue collected.<sup>8</sup>

**TABLE 13. Individual Taxpayer Compliance Costs, TY 2010/CY 2011**

Activity	Compliance Costs	Distribution
Pre-Filing and Filing TY 2010 and Amended Returns CY2011	\$53.4B + \$0.4B = \$53.8B	91%
Post-Filing Enforcement CY 2011	\$5.1B	9%
<b>Total (TY 2010/CY 2011)</b>	<b>\$58.9B</b>	<b>100%</b>

**TABLE 14. Total Revenue Collected, FY 2011**

Revenue Source	Revenue	Distribution
Voluntary Compliance and Nonenforcement Revenue	\$1,944B	97%
Enforcement Revenue <sup>1</sup>	\$55B	3%
<b>Total Net Revenue<sup>2</sup></b>	<b>\$1,999B</b>	<b>100%</b>

<sup>1</sup> [http://www.irs.gov/pub/newsroom/fy\\_2011\\_enforcement\\_results\\_table.pdf](http://www.irs.gov/pub/newsroom/fy_2011_enforcement_results_table.pdf).

<sup>2</sup> *IRS Data Book Fiscal Year 2011*, Publication 55B (Rev. 3-2012), Table 1, p. 3.

## Conclusion

The goal of this study was to develop a model and produce preliminary estimates of the compliance costs incurred by individuals in resolving issues with an already-filed income tax return. This is the first IRS study to have collected post-filing compliance cost data and to build an econometric model using that data and available IRS administrative data. The post-filing compliance model has estimated coefficients for variables that the IRS has in available administrative data, making model deployment and population-level estimation a relatively straightforward task for any population of relevant interest. This capability was shown in the development of estimates for the full post-filing population. We find that taxpayer compliance costs differ not only across different taxpayer types, but differ across the variety of post-filing experiences encountered by different taxpayer types. In particular, we find that the relationship between pre-filing/filing costs and post-filing costs depends on the degree of post-filing substantiation required by the taxpayer. This research has provided not only great insight into the additional costs incurred by taxpayers experiencing post-filing, but provides insight into the additional administrative costs incurred by the IRS in conjunction with these taxpayer compliance costs. We further find that voluntary compliance revenue has lower per dollar direct compliance costs and administrative costs than the associated direct compliance costs and administrative costs associated with IRS enforcement functions. Current research involves refinements of the monetization method, integration of the modeling with pre-filing and filing compliance cost research, IRS process redesign support, and extending the research to cover post-filing compliance costs for corporations and partnerships.

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<sup>8</sup> The authors recommend caution in comparing the compliance costs and revenue tables in that the compliance costs are reported for individual income taxpayers and the revenue tables report revenue for all tax types (income employment, excise, etc.) for all taxpayers types (individuals, partnerships, corporations, etc.).

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## Appendix

**TABLE A1. Return Complexity**

Return Complexity Category	Description
<b>Low</b>	<p><b>Reports at least one of the following:</b></p> <ul style="list-style-type: none"> <li>Wage income</li> <li>Interest income</li> <li>Dividend income</li> <li>Capital gains income</li> <li>Retirement income</li> <li>Unemployment income</li> <li>Nonbusiness adjustments to income</li> <li>Nonrefundable personal credits (includes child and dependent care expenses, education credits, child tax credit, elderly or disabled credit)</li> <li>Household employment tax</li> <li>Withholding</li> <li>Estimated tax payments</li> <li>Earned income tax credit</li> </ul> <p>And—</p> <p>Does not meet any of the conditions for high level of return complexity</p>
<b>High</b>	<p><b>Reports at least one of the following:</b></p> <ul style="list-style-type: none"> <li>Sole-proprietorship income (or loss)</li> <li>Farm income (or loss)</li> <li>Partnership or S-corporation income (or loss)</li> <li>Rental or royalty income (or loss)</li> <li>Distributions from estates or trusts</li> <li>Foreign income, expense, tax, credit, or payment</li> <li>Moving expenses</li> <li>Itemized deductions</li> <li>Alternative minimum tax</li> <li>Prior-year alternative minimum tax credit</li> <li>General business credit</li> </ul>

**TABLE A2. Post-Filing Issue Complexity**

Post-Filing Issue Complexity Category	Description
Appeals	Case closed by Appeals (CY 2011)
Collection—Low	Case closed by Collections (CY 2011) and <ul style="list-style-type: none"> <li>• Completed an Installment Agreement; or</li> <li>• Paid Balance in Full;</li> </ul> And— Does not meet any of the conditions for high level of Collection complexity
Collection—High	Case closed by Collections (CY 2011) and <ul style="list-style-type: none"> <li>• Account was placed in Currently Not Collectible Status Due to Hardship; or</li> <li>• Balance Due Exceeded \$25,000; or</li> <li>• Requested a Collections Due Process Hearing; or</li> <li>• Requested an Equivalent Hearing; or</li> <li>• Had a Federal Tax Lien Released; or</li> <li>• Submitted/Completed an Offer in Compromise</li> </ul>
Examination—Low	Case Closed by Examination or by Automated Underreporter (CY 2011); <sup>1</sup> Examination technique was Correspondence; Does not meet any of the conditions for higher levels of Examination complexity
Examination—Medium	Case Closed by Examination (CY 2011) and Examination technique was Office; and Does not meet condition for high level of Examination complexity
Examination—High	Case Closed by Examination (CY 2011) and Examination technique was Field
Amended	Filed an Amended Individual Income Tax Return (CY 2011)

<sup>1</sup> The Automated Underreporter (AUR) Program matches what taxpayers report on their tax returns with the information sent to the IRS by third parties, and contacts taxpayers about mismatches; the process is somewhat like a correspondence examination.

**TABLE A3. Return Preparation Method**

Preparation Method	Description
Assisted	Prepared by a paid professional (paid)
	Prepared using tax software (soft)
Unassisted	Prepared by hand (self)

**TABLE A4. Final Sample Design**

Strata	Post-Filing Issue Complexity	Return Complexity	Preparation Method	Sample Allocation
1	Appeals	Other than High and Assisted		591
2	Examination—High	Other than High and Assisted		591
3	Appeals	High	Assisted	591
4	Examination—Medium	Other than High and Assisted		591
5	Collection—High	High	Unassisted	591
6	Collection—High	Low	Unassisted	591
7	Amended	High	Unassisted	591
8	Amended	Low	Unassisted	591
9	Examination—High	High	Assisted	591
10	Collection—High	Low	Assisted	591
11	Examination—Low	High	Unassisted	591
12	Examination—Medium	High	Assisted	591
13	Examination—Low	Low	Unassisted	591
14	Collection—High	High	Assisted	591
15	Amended	Low	Assisted	591
16	Collection—Low	High	Unassisted	591
17	Collection—Low	Low	Unassisted	591
18	Amended	High	Assisted	591
19	Examination—Low	Low	Assisted	591
20	Examination—Low	High	Assisted	591
21	Collection—Low	Low	Assisted	591
22	Collection—Low	High	Assisted	591

**TABLE A5. Post-Filing Compliance Costs Variance Coefficients**

	Variable	Estimate	t Statistic
	Intercept	0.8456	2.0400
<b>At-Filing Return Characteristics</b>	Log Income	0.0464	1.1600
	Medium Complexity Indicator	0.0156	0.1900
	High Complexity Indicator	-0.0988	-0.8000
	Paid Indicator	0.0327	0.2600
	Software Indicator	-0.0096	-0.0700
	Power of Attorney Indicator (At Filing)	-0.0329	-0.1200
<b>Post-Filing Characteristics</b>	Power of Attorney Indicator (Post-Filing)	0.4468	2.7800*
	No Post-Filing Tax Assessed Indicator	0.0164	0.0600
	Log Post-Filing Tax Assessments	-0.0246	-0.6800
	Automated Underreporter Indicator	0.2197	2.1100*
	Log Administrative Costs—Examination	0.0535	1.8000
	Log Administrative Costs—Appeals	0.0083	0.0700
	Amended Tax Return Indicator	0.2841	2.2100
	Account Balance Due Indicator	0.6505	1.4300
<b>Collection Resolutions</b>	Account Full Paid Indicator	0.1050	0.2300
	Installment Agreement Indicator	-1.1913	-2.7100*
	Offer in Compromise Indicator	-0.9038	-1.7900
	Collection Due Process Indicator	-0.1279	-0.1800
	Currently Not Collectible—Hardship Indicator	0.1510	0.4300
	Lien Release Indicator	-0.5064	-0.8800
		<b>Adj. R<sup>2</sup> = 0.0708</b>	

\*Statistically significant at the 5% level.

2



## **Innovative Enforcement Strategies**

**Gould ♦ Rablen**

**Miller ♦ Orlett ♦ Turk**

**Osofsky**

# Offshore Voluntary Disclosure Schemes: A Preliminary Analysis

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## 1. Introduction

In recent years, tax authorities around the world have begun to enforce tax rules on offshore funds with forms of enforcement that combine aggressive information acquisition (but through non-audit means) with amnesty-type incentives for voluntary disclosure. This new form of enforcement may be broadly characterized by a two-stage process. In the first stage, the tax authority acquires (non-audit) information on the offshore assets of a set of taxpayers. In the second stage, the tax authority communicates the acquisition of information with a set of taxpayers (which will include, but may be larger than, the set of taxpayers on which it has information), and offers a one-off and time-limited opportunity to make a voluntary disclosure through a facility that offers overt incentives for honesty (in the form of lower fine or interest rates). We term schemes of this form Incentivized Offshore Voluntary Disclosure Schemes (IOVDS).

IOVDS mix together what have so far been three largely distinct strands of literature. The first is a literature that examines tax amnesties, which offer taxpayers reduced penalties if they wish to revise (upwards) their past tax returns (see, e.g., using theoretical (e.g., Andreoni, 1991; Malik and Schwab, 1991; Stella, 1991), empirical (e.g., Alm and Beck, 1993) and experimental (Alm, *et al.*, 1990) methods (Franzoni 2000)). IOVDS differ from an amnesty, however, in that the acquisition of information by the tax authority alters the taxpayer's beliefs over the likelihood of detection. Voluntary disclosure, therefore, takes place in the shadow of a credible threat of sanctions for those who choose to under-disclose (or make no disclosure at all). In contrast, an amnesty provides no new information to the taxpayer. Accordingly, a fully rational individual with perfect information—the type of individual considered in the standard economic model of tax compliance (e.g., Allingham and Sandmo, 1972)—might choose to make a positive disclosure in an IOVDS, whereas it is well known that such an individual would not participate in an amnesty (Andreoni, 1991; Malik and Schwab, 1991).<sup>1</sup>

The second strand of literature is that on the optimal design of audit rules for the probability of audit conditional upon an observed income disclosure (e.g., Reinganum and Wilde, 1985; Mookherjee and Png, 1989; Sanchez and Sobel, 1993) and other signals correlated with income (Scotchmer, 1987; Macho-Stadler and Pérez-Castrillo, 2002). An IOVDS differs from a pure audit program in that, for such programs, the audit cost must be sunk before information leading to the recovery of unpaid tax can be found. In contrast, under an IOVDS, the tax authority may find itself knowing of the existence of unpaid tax without having carried out any audits. It may, nevertheless, still need to perform costly audits (purely for the purposes of formal legal verification) if it wishes to levy fines on the unpaid tax. Schemes that facilitate voluntary disclosure are of interest in these circumstances, for they provide the tax authority a means to avoid these additional verification costs.

The final strand of literature is that on the design of whistleblower incentive schemes, such as that run by the United States Internal Revenue Service (IRS) since 2006.<sup>2</sup> The whistleblowing literature has tended to focus on the effect on levels of compliance of the presence of potential whistleblowers (Mealem *et al.*, 2010), and the optimal level of incentives for whistleblowing (Yaniv, 2001). Unlike whistleblowing programs, whose aim is to facilitate and incentivize potential informants, the focus of IOVDS is on collecting tax on undisclosed income so as to maximize receipts net of costs.

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<sup>1</sup> To overcome this difficulty, the amnesty literature posits that taxpayer's learn new information regarding their own characteristics after the time of the initial reporting decision. In Andreoni (1991), taxpayers learn about their future consumption, and in Malik and Schwab (1991) taxpayers learn about their disutility of tax evasion. Such assumptions are not necessary in the current context.

<sup>2</sup> According to the IRS Whistleblower Office, an award worth between 15 and 30 percent of the total proceeds that IRS collects can be paid under the scheme if the amount identified by the whistleblower (including taxes, penalties and interest) is more than \$2 million (IRS, 2013).

To date, tax authorities have found various means of acquiring information on offshore holdings. First, in some instances, tax authorities have aggressively exploited legal powers that impel financial organizations to reveal tax-related information. One of the first such IOVDS, the 2007 Offshore Disclosure Facility (ODF), was implemented in the UK following legal action by the tax authority to force five major UK banks to disclose details of the offshore accounts held by their customers. The ODF offered affected taxpayers time-limited access to a reduced 10 percent fine rate if they made a full disclosure. Ireland (2004) and Australia (2009) have also implemented IOVDS following similar legal action.

Second, tax authorities have co-operated with whistleblowers. Following the receipt of information that Swiss bank UBS was actively assisting and facilitating the concealment of taxable income, the IRS launched the 2009 Offshore Voluntary Disclosure Program (OVDP), which offered a time-limited 20 percent penalty to those who made a full voluntary disclosure. This was followed by the 2011 Offshore Voluntary Disclosure Initiative (OVDI), which operated along similar lines, but which targeted clients of other institutions.<sup>3</sup> In 2009 the UK implemented two further IOVDS—the New Disclosure Opportunity (NDO) and the Liechtenstein Disclosure Facility (LDF)—in response to, for instance, information acquired on the offshore accounts of around 100 UK citizens from a former employee of a Liechtenstein bank and the receipt from a whistle-blower of information relating to all British clients of HSBC in Jersey (Watt *et al.*, 2012). A list of offshore account holders of HSBC's Geneva branch—seized by French police in 2009—is still the subject of investigation by tax authorities worldwide.<sup>4</sup> A second list concerning ten offshore jurisdictions is also now in the public domain (see Center for Public Integrity, 2013). To address these and other sources of information, Italy, France, Canada and Hungary are also known to have implemented IOVDS to recover tax on offshore funds (see, e.g., OECD, 2010; Thomson Reuters, 2009).<sup>5</sup>

Third, tax authorities have sometimes exploited changes to legislation. In 2003, for instance, a new European Savings Directive (European Union, 2003) was a part of the impetus for the UK's NDO. Last, tax authorities have taken steps to improve international co-operation through the signing of tax information exchange agreements. For instance, part of the motivation for the UK's LDF was to deal with cases flowing from the signing of a tax information exchange agreement with Liechtenstein in 2009.<sup>6</sup>

IOVDS have proved effective net revenue raisers: the 2009 OVDP in the United States, for instance, raised some USD 3.4 billion (GAO, 2013). In the UK, the 2009 ODF raised nearly £500 million (Treasury Committee, 2012: 14) and cost £6 million to administer (Committee of Public Accounts, 2008: 9)—implying a return of £67 for every £1 spent. This compares favorably with reported yield/cost ratios in the UK of around eight-to-one for traditional audit-based enforcement programs (HMRC, 2006).<sup>7</sup> Moreover, IOVDS typically raise revenue much faster than does a system relying on (often lengthy) audits.

To our knowledge, however, little systematic is yet understood concerning the optimal design of IOVDS. In particular, we examine how tax authorities should optimally set the rule that determines whether disclosures under an IOVDS are accepted or audited, and the optimal fine rate to apply to accepted disclosures. When the tax authority has information on only some fraction of the clients of a particular financial institution, it faces an additional choice: the set of taxpayers to whom it sends a letter. For instance, prior to the OVDP in the United States, the Swiss authorities agreed to hand the IRS the names of approximately 4,450 United States clients with accounts at UBS. The IRS then had the choice of (i) requiring UBS to write to the 4,450 affected taxpayers informing them that the details of their offshore holding had been handed to the IRS; or (ii) requiring UBS to write to a wider set of its clients (up to the set of all UBS clients with offshore holdings) informing them that the details of their offshore holding *might* have been handed to the

<sup>3</sup> See Table 1 and Appendix II of Government Accountability Office (2013) for a full account of the background to, and operation of, these two IOVDS.

<sup>4</sup> A subset of this list is the so-called Lagarde List—which contains 1,991 names of Greeks with accounts in Switzerland. It was passed to the Greek authorities in 2010 by the then French Finance Minister, Christine Lagarde (Boesler, 2012).

<sup>5</sup> Rather than implement a bespoke IOVDS, some tax authorities have chosen to handle offshore information through standing mechanisms for voluntary disclosure. In particular, Germany has not to date implemented an IOVDS, but is thought to have raised around €4 billion in voluntary disclosures following the acquisition of data from a Liechtenstein whistleblower (OECD, 2010). Rather than implement a letter campaign, such countries have instead relied on media coverage to inform taxpayers of the information the tax authority has obtained. In this paper, however, we analyse only the optimal design of a bespoke IOVDS in relation to a particular acquisition of offshore information, rather than the optimal design of a general-purpose mechanism for voluntary disclosure.

<sup>6</sup> Following the signing of tax information exchange agreements with the Isle of Man, Jersey and Guernsey, the UK is now also implementing three identical IOVDS (one for each dependency).

<sup>7</sup> The ratio of 8:1 is based on the estimated yield/cost ratio for self-assessment non-business enquiry work in 2005-06 of 7.8-to-one.

IRS. In actuality, the IRS chose the second option, and—to prevent taxpayers from inferring whether their information had been handed over—negotiated a confidentiality clause with the Swiss that concealed the criteria by which the 4,450 accounts were selected until after the 2009 OVDP deadline had passed (GAO, 2013). We therefore also examine who tax authorities should communicate with.

In this paper we develop, and analyze with simulation, a two-stage principal agent model of an unanticipated IOVDS. In common with the amnesty models of Andreoni (1991) and Malik and Schwab (1991), we examine both the initial decision by the taxpayer to evade, as well as the taxpayer's subsequent disclosure under the IOVDS. In the first period, taxpayers—who are heterogeneous in respect of initial wealth—decide on a level of offshore evasion (not anticipating a future IOVDS). At the start of the second period, the tax authority acquires information, and commits to the design of an IOVDS.<sup>8</sup> Taxpayers then make a disclosure (which may be zero) under the IOVDS. Final payoffs are determined when the tax authority responds to each disclosure (by accepting it or by marking it for audit) according to its precommitted rule. Within this setting it is possible to examine a rich range of design questions, including when an IOVDS is a cost-effective enforcement strategy; how generous amnesty incentives should be; which taxpayers should be sent a letter; whether the tax authority should promote strategic ambiguity over the signal it has received; and how it will respond to disclosures.

The principal-agent approach adopted here involves the assumption that the tax authority (principal) can commit to both offering a discounted fine rate to accepted disclosures, and to an auditing rule. If the tax authority cannot commit to the discounted fine rate it communicates to taxpayers it will renege on this rate *ex post*. The IOVDS implemented to date, however, show that tax authorities can commit to discounted fine rates. As in other contexts, one reason this might be the case is that an IOVDS is, in a wider context, only one stage in a repeated game between taxpayers and the tax authority. While renegeing on lower fine rates might be optimal in a one-shot game, the loss of reputation and integrity this action would entail might harm the long-run effectiveness of such IOVDS, and potentially other compliance activities. Regarding commitment to auditing, Stella (1991) notes that most amnesties—even those that are not associated with the receipt of new information—are presaged by claims of increased future enforcement activity. When, however, the tax authority has information on significant amounts of tax liability, this claim seems inherently credible. The tax authority might, nonetheless, be tempted to exaggerate *ex ante* the amount of subsequent auditing it will perform. Commitment here could come from the observation that the record of the tax authority in auditing and prosecuting the taxpayers identified in large information acquisitions is often the subject of close scrutiny by public bodies (see, e.g., GAO, 2013, for the U.S. and Committee of Public Accounts, 2012, for the UK) and the media (e.g., Peev, 2012).

The paper proceeds as follows: Section 2 presents a model of the operation of an IOVDS; Section 3 describes a simulation of the model, and Section 4 presents the main results. Section 5 concludes.

## 2. Model

In this section we present a two-stage model of the strategic interaction between taxpayers and the tax authority under an IOVDS.

### 2.1. Offshore Evasion Decision

Let there be a set of taxpayers  $\mathbf{T}$  of mass  $|\mathbf{T}| = 1$ . Each taxpayer in  $\mathbf{T}$  possesses an offshore account with a particular bank on which the tax authority will subsequently acquire information. Taxpayers enter period 0, endowed with an exogenous initial wealth  $w$  on which the government seeks to levy tax at a marginal rate  $\theta$ . Initial wealth is distributed across taxpayers according to  $g_w(\cdot)$ , with mean  $\mu_w$ , and there exists a continuum of taxpayers at each level of wealth.<sup>9</sup> We

<sup>8</sup> The principal-agent approach adopted here involves the assumption that the principal can commit to an audit policy which the agent takes as given. Though important, as in many other contexts, we do not elaborate upon how the principal can create commitments. For detailed discussion of this point, see, e.g., Reinganum and Wilde (1986) and Melamud and Mookherjee (1989). We note that the type of Scheme we examine is based upon those actually implemented in the UK. Empirically, therefore, tax authorities do appear to be able to commit in this way.

<sup>9</sup> In practice, of course, the set  $T$  will be finite, and so all subsets of  $T$  are finite too. We explore the case with a continuum of taxpayers as, otherwise, our simulation results are sensitive to the realisations of the random variables contained in the model, making inference uncertain. These difficulties can be overcome in a finite setting by allowing for sufficiently many taxpayers but, in practice, this is feasible only if the taxpayers face a sufficiently simple underlying maximisation problem (ideally with an analytic solution). We, however, explore a relatively complex optimization that must be solved numerically, which limits the feasible number of individual taxpayers we can consider. The infinite setting considered here can be viewed as yielding the long-run average performance of an IOVDS if it were repeated many times.

model an offshore investment as a form of evasion technology that hides income, with probability one, from the tax authority's regular audit program.<sup>10</sup>

Taxpayers are assumed to behave as if they (i) possess a utility function  $U(\cdot)$ ; (ii) have monotone ( $U' > 0$ ) and risk averse ( $U'' \leq 0$ ) preferences over wealth; and (iii) maximise expected utility. As, for many years, offshore accounts were considered to be entirely untraceable by national tax authorities, we assume that the IOVDS that will subsequently occur in period 1 is wholly unanticipated by the taxpayer at time zero. Accordingly, a  $w$ -taxpayer's problem in period 0 may be written as

$$\max_{E_w \in [0, w]} U([1 - \theta][w - E_w]) + \delta U([1 - \theta][w - E_w] + E[1 + r]).$$

An interior optimum is characterized by the first order condition

$$\frac{\delta[r + \theta]}{1 - \theta} = \frac{U'([1 - \theta][w - E_w])}{U'([1 - \theta][w - E_w] + E[1 + r])}. \quad (1)$$

The distribution of offshore evasion implied by condition (1) we write as  $g_{\mathbf{T}}(E_w)$ .

## 2.2. IOVDS

### 2.2.1. Information and Communication

At the beginning of period 1 the tax authority requires a given financial institution to hand over information concerning the offshore holdings of a subset,  $\mathbf{I} \subseteq \mathbf{T}$ , of the affected bank's clients. We write the distribution of  $\mathbf{I}$  as  $g_{\mathbf{I}}(E_w) = \phi g_{\mathbf{T}}(E_w)$ , where  $\phi \in [0, 1]$  is the proportion of the taxpayers in  $\mathbf{T}$  that belong to at each level of wealth. We assume that the tax authority knows  $\phi$ , so, having observed  $g_{\mathbf{I}}(\cdot)$ , it can infer  $g_{\mathbf{T}}(\cdot)$  as  $\phi^{-1} g_{\mathbf{I}}(\cdot)$ . The tax authority may incur costs in acquiring information. In several of the IOVDS discussed in the Introduction, however, the tax authority acquired information at essentially zero-cost. In other cases payments to whistleblowers were made, but the amounts involved (to be the extent these are observed) appear relatively modest in relation to the revenue generated.<sup>11</sup> As the optimal reward to whistleblowing is the subject of its own dedicated literature (e.g., Yaniv, 2001), we assume that the tax authority acquires its information at zero cost, so as to focus on other aspects of the analysis.

The tax authority's signal need not permit a fully accurate assessment of the undisclosed tax liability. Whistleblower data, for instance, could be inaccurate or incomplete; especially as the whistle-blowers motives for blowing the whistle are not known. We wish to emphasize, however, that tax liabilities remain uncertain even when the tax authority observes perfectly the amount of a taxpayer's offshore assets (such as when this information is provided directly by a financial institution). At one extreme, identified taxpayers may be fully compliant, for possessing an offshore account is not, in itself, illegal, if properly declared to the tax authority. Alternatively, the offshore assets may have been properly taxed at source, making the taxpayer liable only for undeclared interest and capital gains on the assets. The largest liabilities occur if the offshore assets themselves are liable for, e.g., inheritance tax.

Accordingly, we suppose that the tax authority's private signal is noisy (but unbiased).<sup>12</sup> In particular, the signals are generated according to  $s_i = q_i \theta E_w$ , where  $q_i$  is drawn for each taxpayer from a random variate  $\tilde{q}$  with cumulative distribution function (cdf)  $G_q(\cdot)$ , mean one, and support  $(\underline{q}, \bar{q}) \in \mathbf{R}_+$ . We treat the variance of  $\tilde{q}$ —denoted  $\sigma_q^2$ —as measuring the quality of the tax authority's signal. We shall assume that both the tax authority and taxpayers observe  $\tilde{q}$  but neither observes the realization  $q_i$  for any individual taxpayer.

<sup>10</sup> A cost to offshore evasion, as allowed for in, e.g., Lee (2001), can readily be added to the model with predictable consequences—higher evasion costs lower optimal evasion. We assume a zero cost therefore.

<sup>11</sup> The UBS employee who acted as an IRS informer allegedly received a payment of USD 104 million, but in the context of some USD 3.4 billion that was eventually raised by the resulting IOVDS (GAO, 2013). The British tax authority is reported to have paid a former Liechtenstein bank employee a fee of just £100,000 for information regarding more than £100 million of offshore funds (Oates, 2008). The German tax authority is also understood to have paid an undisclosed sum to the same individual for information regarding the accounts of its citizens.

<sup>12</sup> If the tax authority knows its signal to be biased, it may simply inflate its observed signals by the average degree of bias to obtain unbiased estimates. Hence, we do not investigate this possibility.

Having observed the signal, the tax authority chooses a letter set,  $\mathbf{L} \supseteq \mathbf{I}$ . It then requires the affected financial institution to write to all clients belonging to  $\mathbf{L}$  outlining the terms of an IOVDS. The distribution function of  $\mathbf{L}$  we denote by  $g_{\mathbf{L}}(E_w)$  and its cdf by  $G_{\mathbf{L}}(E_w)$ . To investigate the choice of  $\mathbf{L}$  we specify the density of  $\mathbf{L}$  as  $g_{\mathbf{L}}(\cdot) = g_{\mathbf{I}}(\cdot) + \kappa[g_{\mathbf{T}}(\cdot) - g_{\mathbf{I}}(\cdot)]$ , where  $\kappa \in [0, 1]$  is a choice parameter of the tax authority. At one extreme, if  $\kappa = 0$ , then  $g_{\mathbf{L}}(\cdot) = g_{\mathbf{I}}(\cdot)$ , which we interpret as every member of  $\mathbf{L}$  belonging to  $\mathbf{I}$ . At the opposite extreme, if  $\kappa = 1$  then  $g_{\mathbf{L}}(\cdot) = g_{\mathbf{T}}(\cdot)$  in which case all taxpayers in  $\mathbf{T}$  receive a letter ( $\mathbf{L} = \mathbf{T}$ ). For intermediate values  $\kappa \in (0, 1)$  a fraction  $\kappa$  of the taxpayers in  $\mathbf{T} \setminus \mathbf{I}$  at each level of wealth are sent a letter (in addition to all members of  $\mathbf{I}$ ). Note that if  $\mathbf{I} = \mathbf{T}$  then necessarily  $\mathbf{L} = \mathbf{T}$ , so any choice of  $\kappa$  is weakly optimal.

### 2.2.2. Responses, Penalties and Costs

The letter invites taxpayers to make a voluntary disclosure of an amount of offshore income. The amount the taxpayer chooses to disclose we denote by  $x \in [0, E]$ , and we treat choosing not to make a disclosure as equivalent to making the disclosure  $x = 0$ . In connection with this disclosure, the tax authority commits to an *audit rule* and a fine rate for accepted disclosures. Based on the design of the NDO in the UK (see HMRC, 2009), we assume the audit rule takes the following form: (i) if  $i \in \mathbf{I}$  and  $s_i - \theta x_i \leq a$  then accept the disclosure (state  $A$ ); (ii) if  $i \in \mathbf{I}$  and  $s_i - \theta x_i > a$  perform an audit (state  $H$ ); (iii) if  $i \notin \mathbf{I}$ —as will be the case for taxpayers in  $\mathbf{L} \setminus \mathbf{I}$ —then accept the disclosure.<sup>13</sup> The parameter  $a$ , the value of which is assumed not to be communicated in the letter, determines the leniency of the tax authority in accepting disclosures.

Let  $f_H > 0$  be the applicable regular, or unincentivized, fine rate prescribed in national legislation, that we assume the tax authority takes as given. Offshore evasion revealed at audit that was not disclosed under the Scheme is assumed to be subject to this rate. If a disclosure is accepted, however, the taxpayer faces a fine—the level of which is chosen by the tax authority—on the implied tax liability at an incentivized rate,  $f_A \in [0, f_H]$ . The assumption that only  $f_A$  is actively chosen by the tax authority is in one sense a simplification for reasons of tractability, but, in another, reflects practice in the UK, where IOVDS been designed, wherever possible, to fit into existing penalty legislation so as to minimize, or mitigate altogether, the need for new legislation.

The two response states entail different administration costs for the tax authority. If the tax authority accepts a disclosure, we assume there are no further administration costs (in the UK, taxpayers were told to include a fine payment, at rate  $f_A$ , in their disclosure). If, however, the tax authority audits the disclosure it incurs a per-disclosure cost of  $c_H > 0$ .<sup>14</sup>

### 2.3. Optimal Disclosure

Taxpayers enter period 1 with an (endogenous) initial post-tax wealth of  $W_w = w(1 - \theta) + \theta E$ , of which an amount  $E$  is hidden offshore. The threshold parameter  $a$  is not known to taxpayers. We suppose, however, that each taxpayer holds a common belief,  $\tilde{a}$ , which is a probability distribution  $g_a(\cdot)$  over  $a$ , with mean  $\mu_a$  and variance  $\sigma_a^2$  on the support  $[\underline{a}, \bar{a}]$ .

Taxpayers who receive a letter must assess the likelihood that the tax authority has observed a signal,  $p_{\mathbf{I}\mathbf{L}}$ . We assume that taxpayers know the size of both  $\mathbf{I}$  and  $\mathbf{L}$  (but not the identities of the taxpayers belonging to either set), in which case  $p_{\mathbf{I}\mathbf{L}} = |\mathbf{I}|/|\mathbf{L}|$ . The subjective expected utility of a  $w$ -taxpayer who receives a letter is then given by

<sup>13</sup> The assumption that disclosures from taxpayers in  $\mathbf{L} \setminus \mathbf{I}$  are always accepted (and that taxpayers know this) is clearly a simplification. The tax authority might, in practice, want to follow up positive disclosures with audits.

<sup>14</sup> The assumption that the tax authority must perform an audit for legal verification purposes (even if it knows the true liability with certainty) is standard in the optimal auditing literature (see, e.g., Reinganum and Wilde, 1985; Morton, 1993).

$$\begin{aligned}
EJ(x_w) &= [1 - p_{\mathbf{IL}}]U(W_A(x_w)) \\
&+ p_{\mathbf{IL}} \int G_q \left( \frac{\varphi + \theta x_w}{\theta E_w} \right) U(W_A(x_w)) dG_a(\varphi) \\
&+ p_{\mathbf{IL}} \int \left[ 1 - G_q \left( \frac{\varphi + \theta x_w}{\theta E_w} \right) \right] U(W_H(x_w)) dG_a(\varphi)
\end{aligned} \tag{2}$$

where  $W_j(x)$  is the payoff in state  $j$ :

$$\begin{aligned}
W_A(x_w) &= W_w - \theta[1 + f_A]x_w; \\
W_H(x_w) &= W_A - \theta[1 + f_H][E_w - x_w].
\end{aligned}$$

Each  $w$ -taxpayer's problem is to choose an income disclosure  $x_w \in [0, E_w]$  to maximize expected utility, subject to the equilibrium consistency condition

$$\mu_a = a, \tag{3}$$

which implies that taxpayers' beliefs over the threshold  $a$  are centered on the true value. The first order condition for the taxpayer implicitly defines a *disclosure function*,  $x_w = d(E_w)$ , which maps each level of offshore evasion to an optimal disclosure.

#### 2.4. Optimal Enforcement

The tax authority commits to a choice of the set of parameters  $\{a, f_A, \kappa\}$  before taxpayers choose  $x$ . Owing to the stochastic nature of  $q_i$ , two identical agents who evade the same amount, and make the same disclosure, may nevertheless experience different response states. For a given choice of  $\{a, f_A, \kappa\}$  the proportion of  $w$ -taxpayers belonging to  $\mathbf{I}$  that will experience response state  $j$  is given by

$$\begin{aligned}
p_{wA}(E_w) &= G_q \left( \frac{a + \theta d(E_w)}{\theta E_w} \right); \\
p_{wH}(E_w) &= 1 - p_{wA}(E_w);
\end{aligned}$$

and receipts  $r_j$  from a  $w$ -taxpayer in state  $j$  are given by

$$r_{wj}(E_w) = \begin{cases} \theta[1 + f_A]d(E_w) & \text{if } j = A; \text{ and} \\ r_{wA}(E_w) + \theta[1 + f_H][E_w - d(E_w)] & \text{if } j = H. \end{cases}$$

Hence, total revenue—which, by the law of large numbers, is certain—is written as

$$r_w(E_w) = \begin{cases} \theta[1 + f_A]d(E_w) & \text{if } j = A; \text{ and} \\ r_{wA}(E_w) + \theta[1 + f_H][E_w - d(E_w)] & \text{if } j = H; \end{cases} \tag{4}$$

and total costs are

$$C = p_{\mathbf{IL}}c_H \int p_{wH}(E_w) dG_{\mathbf{L}}(E_w).$$

The tax authority's problem is then to choose  $\{a, f_A, \kappa\}$  to maximize revenue net of costs,  $R - C$ , given taxpayers' optimal choice of  $x_w$  and  $f_A \in [0, f_H]$ . As is standard, we also assume that the tax authority cannot fine a taxpayer by an amount that exceeds their wealth, such that, for all  $w$ ,  $W_H(x_w) \geq 0$ .<sup>15</sup>

### 3. Simulation

In this section we detail a version of the model of section 2 that we shall go on to simulate in section 4. We begin by specifying functional forms for taxpayer utility (power), evasion cost (quadratic), and the distribution of initial wealth (bounded Pareto):

$$U(c; \gamma) = \frac{c^{1-\gamma} - 1}{1-\gamma}; \quad (5)$$

$$\rho(E, w) = \beta \left[ \frac{E}{w-E} \right]^2; \quad (6)$$

$$g_w(w) = \frac{\alpha w^\alpha \bar{w}^{-\alpha-1}}{1 - \left[ \frac{\underline{w}}{\bar{w}} \right]^\alpha}; \quad (7)$$

where  $\gamma \geq 0$ ,  $\alpha > 0$ ,  $\beta > 0$ , and  $\{\underline{w}, \bar{w}\}$  are the minimum and maximum of observed initial wealth. In period 0, when taxpayers make a riskless choice, the parameter  $\gamma$  is best interpreted as the elasticity of the marginal utility of wealth. When, however, in period 1, the taxpayer makes a decision involving risk,  $\gamma$  is more conventionally interpreted as the Arrow-Pratt coefficient of relative risk aversion.<sup>16</sup> The parameter  $\beta$  varies the marginal cost of evasion. The Pareto distribution provides a close fit to the far right tail of the wealth distribution (see, e.g., Coelho *et al.*, 2008; Klass *et al.*, 2006), which is disproportionately where the taxpayers affected by IOVDS are located.<sup>17</sup> The parameter  $\alpha$  is a shape parameter that we use to vary the degree of skewness.

The noise in the tax authority's signal is assumed to be a truncated normal distribution on the support  $[0, 2]$ . The public signal  $\tilde{a}$  is assumed to be a discrete distribution with non-zero mass at the values  $\{a_k\}_{k=1}^3 = \{\mu_a [1 + \delta \kappa]\}_{k=1}^3$ , where  $\delta \in (0, 1)$ . The probabilities assigned to each  $a_k$  are taken from a normal distribution centered on  $\mu_a$ :

$$\left\{ \frac{N[a_k; \mu_a, \sigma_a]}{\sum_{m=1}^3 N[a_m; \mu_a, \sigma_a]} \right\}_{k=1}^3.$$

The results we present are for the following set of parameter values:

$$\begin{aligned} \alpha &\approx 0; \beta = 0.04; c_H = 1.00; \delta = 0.80; f_H = 1.75; \gamma = 2.00; \\ \phi &= 1.00; \sigma_a = 1.00; \sigma_q = 0.45; \theta = 0.30; \underline{w} = 5.00; \bar{w} = 15.0. \end{aligned} \quad (8)$$

We term the parameter values in (8) as the baseline values. When we wish to examine the effects of varying the value of an individual parameter while holding the remaining parameters constant, we use these baseline values to

<sup>15</sup> We focus on specifications of this problem that give a unique optimum for  $a$ . This rules out two degenerate versions of the model, one (low  $a$ ) in which all taxpayers know ex-ante that their disclosure will be audited, whatever the realisation of  $\tilde{q}$ , and another (high  $a$ ) in which all taxpayers know ex-ante that their disclosure will be accepted, whatever the realisation of  $\tilde{q}$ . In both these cases the taxpayer's expected utility in (2) becomes independent of  $\mu_a$  (and so, in equilibrium, also  $a$ ).

<sup>16</sup> Other specifications of utility such as constant absolute risk aversion or mean-variance utility can instead be used and yield similar results. However, the assumption of constant absolute relative risk aversion has stronger empirical support (Wakker, 2008).

<sup>17</sup> For the purposes of simulation, we employ a discrete approximation to  $g_w(\cdot)$ . In particular, the discrete distribution places a mass  $n^{-1}$  on each of  $n$  values,  $\left\{ \frac{c}{\bar{w}} + \left[ \frac{w - \underline{w}}{\bar{w} - \underline{w}} \right] \frac{\bar{w} - c}{n-1} \right\}_{c=\underline{w}}^{\bar{w}}$ .

specify the remaining parameters. The unincentivized fine rate  $f_H$  reflects the 2009 OVDP, in which U.S. taxpayers in state  $H$  were liable, in addition to fines payable in state  $A$ , for a fraud penalty of 75 percent of the unpaid tax. In the UK, civil fraud legislation sets  $f_H \in [0.3, 1]$ , the lower bound applying if noncompliance is judged to be through careless error (see, e.g., HMRC, 2012). Most empirical estimates of the coefficient of relative risk aversion are in the neighborhood of two (Meyer and Meyer, 2005), so we adopt this value for  $\gamma$ . We set  $\phi$  to unity (which implies  $I = T$ ) as this choice enables us to examine the optimal choice of  $a$  and  $f_A$  separately from the choice of the letter set. That is, when  $\phi$  takes its baseline value, any  $\kappa$  is weakly optimal, so this parameter effectively drops out of the model. When, however, we lower  $\phi$  below the baseline value we are then able to examine the optimal size of the letter set. The shape parameter  $\alpha$  in the Pareto distribution is set arbitrarily close to zero: this choice minimizes the skewness of initial wealth, such that, when we raise  $\alpha$  above zero, we can then investigate the effects on the optimum as skewness increases.

We choose the remaining parameter values such that the model predicts an interior optimum for both  $a$  and  $f_A$ ; and where the optimum is broadly in line with the oral testimony of HMRC officials in Committee of Public Accounts (2012), which stated that the overwhelming majority of disclosures under the ODF and NDO Schemes were accepted. The specification in (8) is not necessarily unique in meeting these desiderata, yet, having simulated many specifications of the model, we find no evidence that our qualitative results are sensitive to the precise choice of the baseline parameters: qualitatively similar results to those we present here are obtained for a wide range of plausible specifications consistent with an interior maximum for both  $a$  and  $f_A$ .<sup>18</sup>

We locate the solution to the taxpayer's problems in periods 0 and 1 using a simple direct search (compass) algorithm.<sup>19</sup> For the government's problem, which involves a potentially more complex objective function, we first perform a fine grid search over  $(a, f_A, \kappa)$  space to find the region of the solution, before using compass search to locate the solution precisely.<sup>20</sup> At the equilibrium associated with the baseline parameter values in (8) we obtain  $a = 1.04$  and  $f_A = 0.59$ , which implies that taxpayers whose disclosure are accepted receive an 22 percent reduction relative to the unincentivized fine rate. At these equilibrium values the proportion of taxpayers that have their disclosure accepted is decreasing in wealth: no  $w$ -taxpayers have their disclosure audited, up to around seven percent for  $\bar{w}$ -taxpayers. Offshore holdings are increasing absolutely in initial wealth, but declining as a fraction of initial wealth: the latter measure varies between 32 percent for  $w$ -taxpayers, and 21 percent for  $\bar{w}$ -taxpayers. Disclosures are found to be increasing absolutely and relative to offshore assets, where again the latter measure varies between 41 percent for  $w$ -taxpayers, and 59 percent for  $\bar{w}$ -taxpayers.

## 4. Analysis

In this section we analyze the version of the model set out in section 3 using analytical and simulation approaches.

### 4.1. Offshore Holdings

Although the full model is too complex to admit an analytic treatment, the taxpayer's choice of offshore investment amount in period 0 is sufficiently simple to be theoretically tractable. Although this choice is not our principal interest, an understanding of the separate properties of each choice made by taxpayers is instructive for interpreting the later results for optimal enforcement. We have the following Proposition on the comparative statics properties of the optimal level of offshore assets (the proof being in the Appendix):

**Proposition 1** For  $\gamma \in [0, 2]$  and  $\bar{w} \geq [1 - \theta]^{-1}$  the following hold for a taxpayer at an interior maximum:

$$\frac{\partial E}{\partial \beta} < 0; \quad \frac{\partial E}{\partial \gamma} < 0; \quad \frac{\partial E}{\partial \theta} > 0; \quad \frac{\partial E}{\partial w} > 0.$$

<sup>18</sup> Quantitatively, however, the locations of various kink- and break-points in the model are sensitive to the precise parameter values used. Given the uncertainty over the true empirical values of some of our parameters, we would therefore caution against interpreting our results in a strict quantitative sense.

<sup>19</sup> For a description of the compass search algorithm and a wider review of direct search methods see, e.g., Kolda *et al.* (2003). We employ the method in Lewis *et al.* (2007) when searching close to one or more parameter boundaries.

<sup>20</sup> At this solution we obtain an average for the ratio for the total disclosures to total hidden income of 0.54, and with just over 95 percent of disclosures accepted.

According to Proposition 1, wealthier individuals place more assets offshore, which is consistent with the prevalence of high net worth individuals within the lists released by whistleblowers. Higher marginal tax rates provide a greater incentive to move wealth offshore, but higher costs act as a disincentive. The comparative static effect for  $\gamma$  is more complex, but under the two conditions in the Proposition—both of which are satisfied by the baseline specification in (8)—can be shown to be negative. Note that, as we model the period 0 problem as a choice under certainty,  $\gamma$  cannot be formally interpreted as a risk parameter in this context. Proposition 1 shows that higher values of  $\gamma$  lower the optimal offshore investment, just as an increase in risk aversion reduces evasion in the canonical evasion decision under uncertainty (e.g., Allingham and Sandmo, 1972). The offshore investment is independent of the remaining model parameters that do not appear in Proposition 1.

#### 4.2. Optimal Disclosure

We now characterize the period 1 problem of taxpayer's choice of a disclosure  $x \geq 0$  for a given choice of the set  $\{a, f_A, \kappa\}$  by the tax authority. When  $\{a, f_A, \kappa\}$  are chosen endogenously, the disclosure is affected indirectly by every parameter of the model, but it is instructive to distinguish between (i) the set of parameters that affect the disclosure through this indirect route only— $\{a, \alpha, c_H, \mu_w\}$ —and (ii) the sets of parameters that affect the disclosure: (1) directly— $\{f_A, f_H, \kappa, \mu_a, \sigma_a, \sigma_q\}$ ; (2) indirectly through the endogenous determination of  $E - \{\beta\}$ ; and (3) through both the routes in (1) and (2)— $\{\gamma, \theta, w\}$ . Taking these sets in turn, note that the two parameters we use to characterize the distribution of initial wealth belong to the set in part (i), for only a taxpayer's own initial wealth enters the expected utility function in (2). The parameters  $a$  and  $c_H$  also belong to this set, the former as it enters the optimal disclosure problem only through the equilibrium consistency condition in (3), and the latter as it affects only net revenue.

The majority of parameters directly affect the optimal disclosure. The comparative statics for some elements of this set can be shown analytically to be unambiguously of a given sign.<sup>21</sup> First, as the fine rates  $\{f_A, f_H\}$  enter equation (2) only in the payoffs, it is possible to show that these parameters have opposite effects: an increase in the incentivized fine rate decreases the optimal declaration ( $\partial x / \partial f_A < 0$ ), but an increase in the unincentivized fine rate increases the optimal disclosure ( $\partial x / \partial f_H > 0$ ). It is also possible to show that an increase in the taxpayer's mean belief,  $\mu_a$ , must reduce the optimal disclosure ( $\partial x / \partial \mu_a < 0$ ), for it unambiguously reduces the subjective probability a taxpayer assigns to the event of their disclosure being audited. Taking together the findings for  $f_A$  and  $\mu_a$ , it follows that *a tax authority seeking to maximize disclosures under an IOVDS always chooses  $a$  and  $f_A$  to attain their respective lower bounds*. A net-revenue maximizing tax authority might, however, set both  $a$  and  $f_A$  parameters above their lower bounds, in the former case as it must take into account the cost of performing audits, and in the latter as fine payments contribute positively to revenue.<sup>22</sup>

The parameter  $\kappa$  enters expected utility only through  $p_{\mathbf{L}}$ , which itself enters expected utility linearly. Using the definitions in section 2, we obtain

$$p_{\mathbf{L}} \equiv \frac{|\mathbf{I}|}{|\mathbf{L}|} = \frac{|\mathbf{I}|}{|\mathbf{I}| + \kappa[1 - |\mathbf{I}|]},$$

which implies  $\partial p_{\mathbf{L}} / \partial \kappa < 0$ . As it is also possible to show that  $\partial x / \partial p_{\mathbf{L}} > 0$ , these results together imply that an increase in  $\kappa$  lowers the optimal disclosure.<sup>23</sup> The fundamental trade-off facing the tax authority when choosing the size of the letter set is therefore between the marginal revenue from receiving a disclosure from one extra taxpayer (who would not otherwise have made a disclosure under the Scheme); and the marginal revenue loss from a reduction in the disclosures of all existing members of  $\mathbf{L}$  (from a fall in  $p_{\mathbf{L}}$ ). The signs of the comparative statics effects for the two remaining variables that directly affect the optimal disclosure ( $\sigma_a$  and  $\sigma_q$ ) are much more difficult to ascertain

<sup>21</sup> The proofs for the analytical results given in this section use the same techniques as used in the proof of Proposition 1. We do not give them here, however, as the workings are burdensome, and offer little or no insight beyond what is readily intuitive.

<sup>22</sup> Similarly, Rablen (2014) shows that a net-revenue maximizing tax authority does not maximize voluntary compliance.

<sup>23</sup> To see the second result intuitively, observe that, if  $p_{\mathbf{L}} = 0$  (such that taxpayers give no weight to belonging to  $\mathbf{I}$ ) then a disclosure  $x = 0$  is always optimal. As  $p_{\mathbf{L}}$  is increased, the subjective probability that a taxpayer assigns to the event that their disclosure is accepted unambiguously falls, which pushes up the optimal disclosure.

analytically. We therefore numerically compute the sign of these effects when the exogenous parameters of the model are set according to the baseline values in (8) and the endogenous parameters take their equilibrium values. We use the subscript  $N$  to distinguish numerical derivatives from those determined analytically.<sup>24</sup> We find that taxpayer's disclose more as their uncertainty over the true value of  $a$  increases, but less as the quality of the tax authority's signal worsens:  $\partial x / \partial \sigma_a >_N 0$ ;  $\partial x / \partial \sigma_q <_N 0$ .

The cost of offshore evasion is the only parameter that directly affects the offshore investment decision, but not the disclosure decision. From Proposition 1 we have  $\partial E / \partial \beta < 0$ , and we numerically obtain  $\partial x / \partial E >_N 0$ , which (by the chain rule) implies  $\partial x / \partial \beta < 0$ . As  $\beta$  lowers both offshore evasion and the amount disclosed, what is the overall effect on the undisclosed liability,  $E - x$ ? We find (numerically) that evasion is more sensitive to  $\beta$  than is the disclosure, such that the undeclared liability is decreasing in evasion costs. The comparative statics effects for the remaining three parameters—those that affect the optimal disclosure both directly and through  $E$ —cannot be unambiguously determined analytically. Using the numerical procedure described above, we obtain:

$$\frac{\partial x}{\partial \gamma} <_N 0; \quad \frac{\partial x}{\partial \theta} >_N 0; \quad \frac{\partial x}{\partial w} >_N 0.$$

At first blush, the finding that an increase in risk aversion lowers the optimal disclosure appears counter-intuitive. It arises as an increase in  $\gamma$  lowers the offshore evasion in period 0, such that, although  $x$  falls absolutely, it represents a larger proportion of the offshore investment.<sup>25</sup> An increase in  $\theta$  increases the optimal disclosure, both directly and through its effect on  $E$ . Although there are competing effects ( $\theta$  increases both evasion and the disclosure) we find the undisclosed liability,  $E - x$ , to be increasing in the tax rate. Last, we find that the optimal disclosure is increasing in wealth, but the direct and indirect effects that make up this result go in opposite directions. Holding  $E$  fixed, an increase in initial wealth induces a taxpayer to disclose *less*—a result that follows from the property of decreasing absolute relative risk aversion of the utility function in (5). On the hand, wealthier taxpayers, choose a higher  $E$  in period 0, which induces them to disclose *more*. Once again, as  $w$  increases both offshore evasion and the amount disclosed, its effect on the undisclosed liability is unclear. We find, however, that the amount evaded increases faster with  $w$  than does the amount disclosed, such that  $E - x$  is an increasing function of initial wealth.

### 4.3. Optimal Enforcement

We now examine the tax authority's optimal choice of the parameter set  $\{a, f_A, \kappa\}$ . As the analysis of these parameters is much too complex for analytic methods to be tractable, we now rely wholly on the findings of the simulation. Figure 1 presents the results of an exercise in which we vary each individual parameter across an interval of values, holding all other exogenous variables at their baseline value. The panels are presented in pairs: the left panel of each pair shows the results for the optimal  $a$  and  $f_A$ , and the implied optimal proportion of taxpayers who have their disclosure accepted,  $|A| \in [0, 1]$ . The right panel of each pair shows the tax authority's net revenue ( $R - C$ ) and the measures

$$\mu_E \equiv \frac{\int E_w \mathbf{d}G_L(E_w)}{\int \mathbf{d}G_w(w)}, \quad \mu_x \equiv \frac{\int d(E_w) \mathbf{d}G_L(E_w)}{\int E_w \mathbf{d}G_L(E_w)},$$

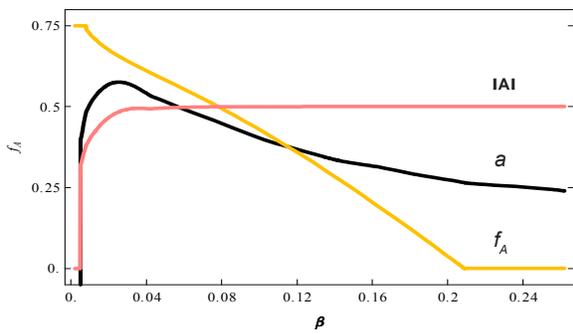
where  $\mu_E \in [0, 1]$  is an aggregate measure of the fraction of initial wealth invested offshore by the members of the letter set, and  $\mu_x$  is an analogous measure for the fraction of offshore evasion disclosed.

Before considering the individual results in detail, we remark on two features of the optimal determination of the incentivised fine rate that feature in several of the results: in panels {g, i, k, m, q}  $f_A$  is observed to hit its upper bound,  $f_A = f_H$ , while in panels {a, o, q} it is observed to hit its lower bound  $f_A = 0$ .

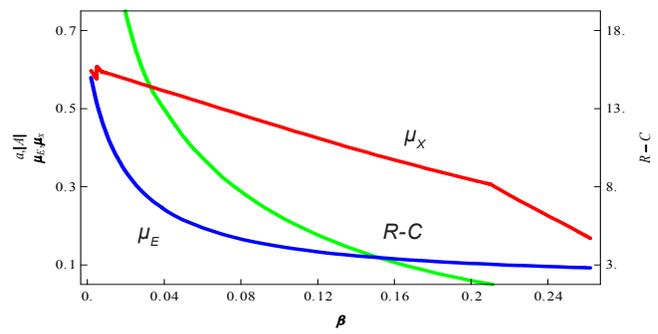
<sup>24</sup> We stress that, whereas the analytical derivatives hold in general, the numerical derivatives are for the particular specification of the model in (8). Although we find the signs of the numerical effects we examine to be robust across many specifications, they cannot be assumed to hold in general.

<sup>25</sup> Accordingly, if  $E$  is held constant, then indeed we find that an increase in  $\gamma$  increases the optimal disclosure.

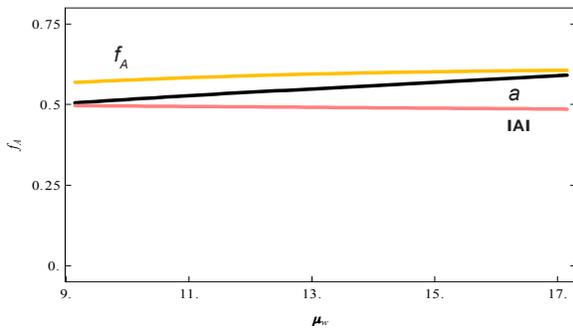
**FIGURE 1. Effect of parameter shift on  $f_A$  (yellow);  $a$  (black);  $|A|$  (pink);  $\mu_E$  (blue);  $\mu_X$  (red); and  $R-C$  (green).**



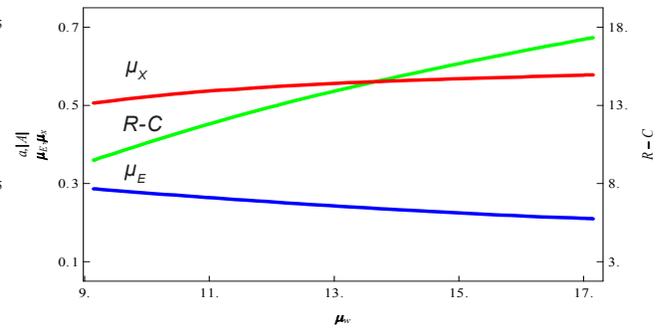
(a) Cost of offshore evasion



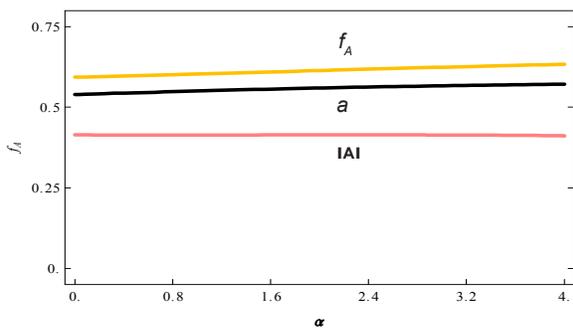
(b) Cost of offshore evasion



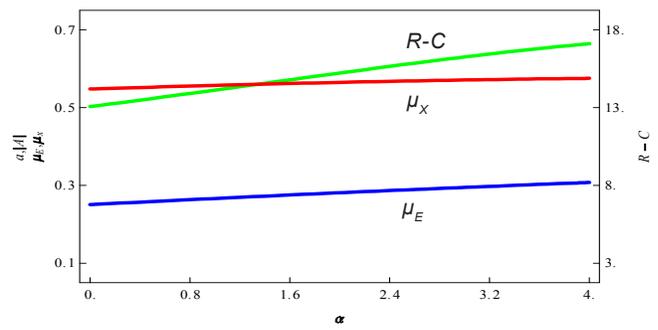
(c) Mean initial wealth



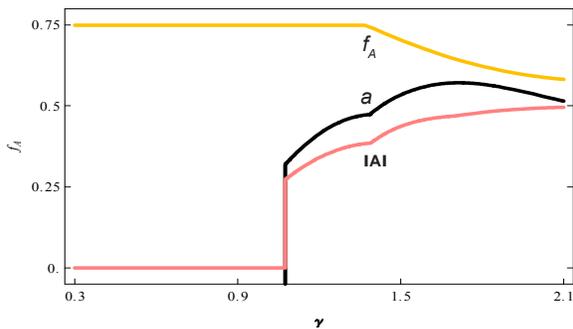
(d) Mean initial wealth



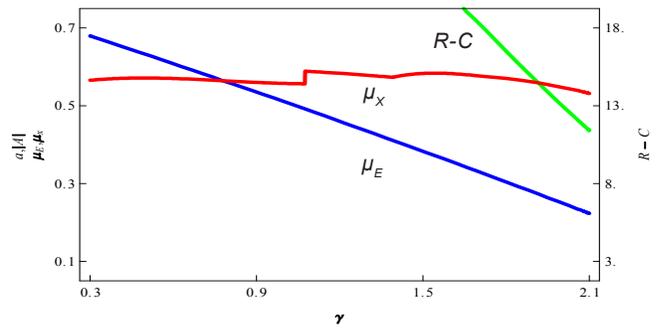
(e) Skewness of initial wealth



(f) Skewness of initial wealth

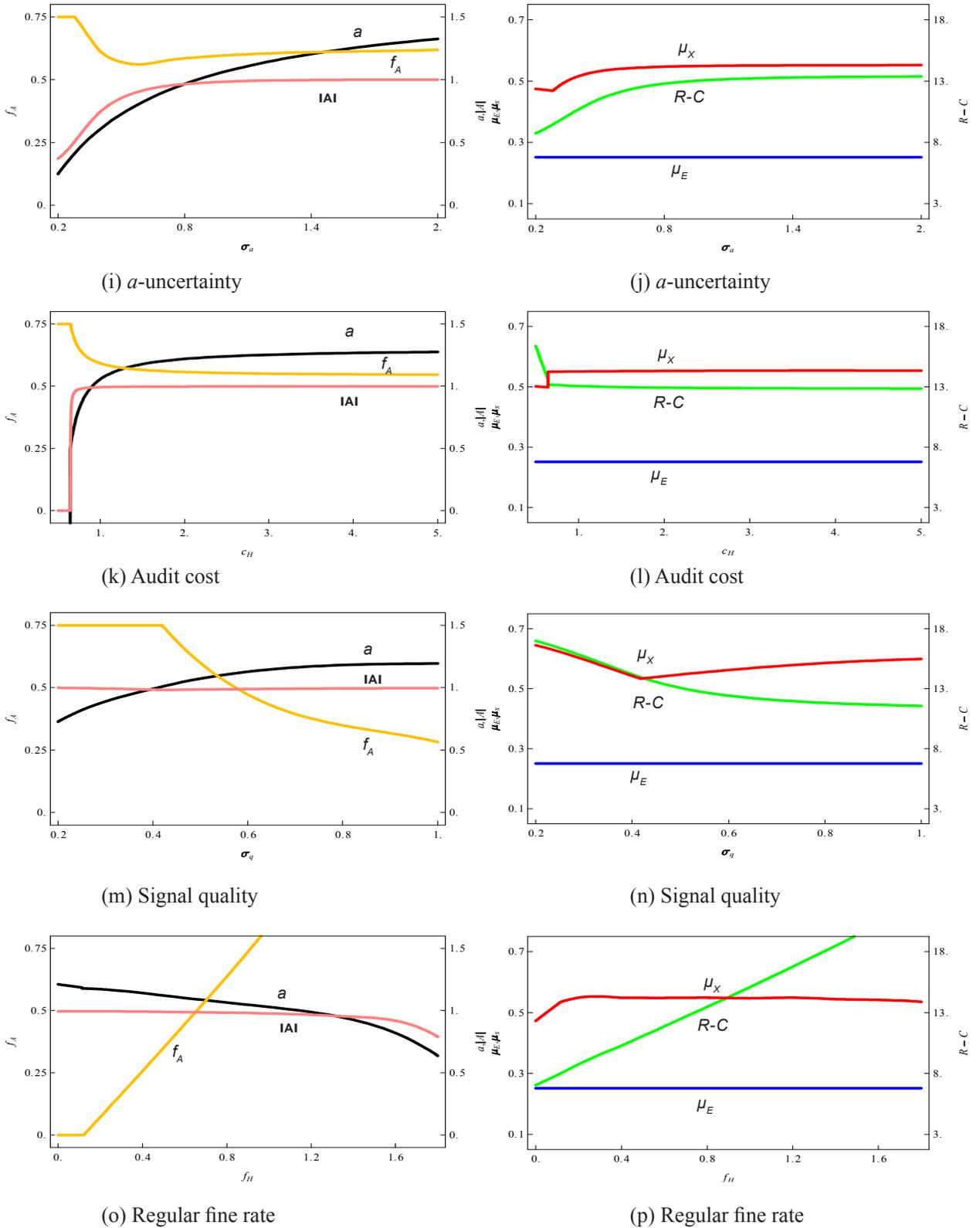


(g) Curvature of utility

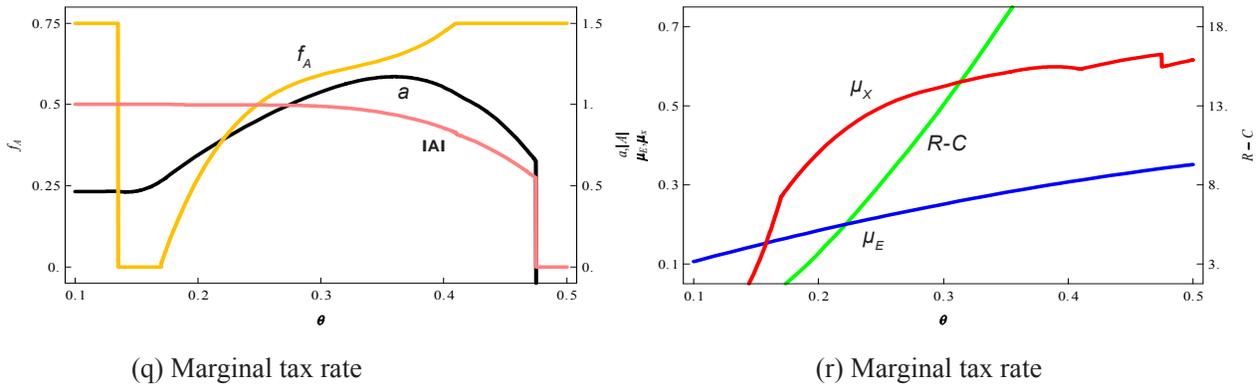


(h) Curvature of utility

**FIGURE 1 (Continued).** Effect of parameter shift on  $f_A$  (yellow);  $a$  (black);  $|A|$  (pink);  $\mu_E$  (blue);  $\mu_X$  (red); and  $R-C$  (green).



**FIGURE 1 (Continued).** Effect of parameter shift on  $f_A$  (yellow);  $a$  (black);  $|A|$  (pink);  $\mu_E$  (blue);  $\mu_X$  (red); and  $R-C$  (green).



**REMARK 1** A net-revenue maximizing tax authority may optimally wish to set

- (i)  $f_A > f_H$ ;
- (ii)  $f_A < 0$ .

Part (i) of Remark 1 may at first seem perverse, for it apparently rewards dishonesty. To understand this finding, note that if a disclosure is accepted the taxpayer pays a fine on the amount  $x \leq E$ , whereas if a disclosure is audited the taxpayer pays a fine on  $E$  in full. Hence, for  $x < E$ , a taxpayer might still face a smaller fine if their disclosure is accepted even when  $f_A > f_H$ . Recognizing this, the tax authority can levy a higher fine on accepted disclosures without all taxpayers migrating to state  $H$ . Part (ii) of the remark is that a tax authority may not simply wish to offer reduced penalties—the situation considered in the tax amnesty literature—but to forego some of the tax owed by applying a rate of tax less than  $\theta$  to disclosures under the Scheme. This eventuality arises in the model when the cost of audits outweighs their expected return, such that the tax authority rationally wishes to perform very few audits, or none at all. In these circumstances the use of extreme incentives for honesty can be optimal.

**4.3.1. Taxpayer variables**

We now turn to the individual results in detail. Panels (a)-(j) of Figure 1 show results for the set of variables that describe characteristics of the taxpayers:  $\{\alpha, \beta, \gamma, \mu_w, \sigma_a\}$ . We begin with the parameter  $\beta$  that regulates the cost of offshore evasion, the results for which are shown in panels (a) and (b). For very low  $\beta$ , undisclosed liabilities are significant, implying high returns to auditing. In this case the tax authority audits all disclosures, which is performed in a manner consistent with net-revenue maximization by setting  $a$  to its lower bound and by offering no incentive for honesty. Conversely, at very high  $\beta$ , undisclosed liabilities become so small that audit activity is undesirable. In this case the tax authority audits no disclosures, which is performed in a manner consistent with net-revenue maximization by offering maximal incentives for honesty, and by being maximally lenient. Over the an intermediate range of  $\beta$  (the range most empirically plausible) the tax authority responds to the decline in undisclosed liabilities as  $\beta$  increases by offering *stronger incentives* for honesty, and by being *more lenient* over accepting disclosures. Note that the tax authority becomes less lenient in an absolute sense ( $a$  declines) once the majority of disclosures are being accepted. Note however, that even when the tax authority does become less lenient, it nonetheless does so to a sufficiently small extent that the proportion of disclosures that are accepted continues to increase (panel (a)).

How does the distribution of initial wealth affect optimal enforcement? Beginning with the effects of the mean, panels (c) and (d) of Figure 1 show the results of an exercise in which we simultaneously increase  $\underline{w}$  and  $\bar{w}$ . We see that increases in  $\mu_w$  are associated with decreasing incentivization of honesty but increasing leniency. The tax authority performs gradually fewer audits, yet disclosures drift upwards, as does net revenue. The size of these effects is observed to be quite modest, which is a consequence of the observation in section 4.2 that the distribution of initial wealth has only an indirect impact on the optimal disclosure via its effects upon  $\{a, f_A, \kappa\}$ .

Published data from the 2009 OVDP in the U.S. shows that the mean assessed offshore penalty (which reflects the mean initial wealth) was around 3.5 times the median (GAO, 2013: 12), suggesting a heavy degree of skewness of initial wealth. In panels (e) and (f) we report the results of an exercise in which we increase the skewness of initial wealth by increasing the parameter  $\alpha$  in (7) while adjusting  $\beta$  to hold aggregate offshore evasion constant. The effects of increasing skewness in this way affect. As skewness increases in this way, undisclosed liabilities becomes more concentrated among a smaller set of taxpayers, allowing the tax authority to focus its auditing effort on a smaller number of taxpayers (by becoming more lenient). To offset the negative effect on accepted disclosures of becoming more lenient, the tax authority simultaneously reduces the incentive for honesty.

We next consider the effects of the preferences and beliefs of an individual taxpayer, in particular the curvature of the utility function ( $y$ ) and the degree of uncertainty over the value of  $a$  ( $\sigma_a$ ). Panels (g) and (h) of Figure 1 the effects of increasing the curvature of utility (risk aversion). When taxpayers are close to being risk neutral, undisclosed liabilities are significant enough that the tax authority audits all disclosures and offers no incentive for honesty. As taxpayers become more risk averse, offshore evasion decreases, and disclosures increase, implying dwindling undisclosed liabilities. The tax authority responds both by becoming *more lenient* and by offering *stronger incentives* for honesty.

Unlike the taxpayer's utility function, which is wholly outside the control of the tax authority, the degree of uncertainty of a taxpayer over the value of  $a$  may at least partially be influenced by the tax authority. At one extreme, the tax authority could communicate the value of  $a$  in its letter to taxpayers, and at the other extreme it could purposefully promote confusion over its value by sending contradictory signals. Does a net-revenue maximizing tax authority promote or dispel uncertainty over  $a$ ? Panels (i) and (j) of Figure 1 investigate this question. Panel (j) shows that *net-revenue is increasing in taxpayer uncertainty over  $a$* . When uncertainty over  $a$  is low, taxpayers are relatively able to judge how much under-disclosure the tax authority will tolerate. Hence, most disclosures are accepted.<sup>26</sup> The tax authority principally reacts to growing uncertainty over how lenient it will be by becoming *more lenient*.<sup>27</sup> It also offers *stronger incentives* for honesty, but only on a relatively modest scale.

#### 4.3.2. Tax authority variables

We now turn to the variables that characterize the tax authority: its cost of audit ( $c_H$ ) and the quality of its signal ( $\sigma_g$ ). Panels (k) and (l) of Figure 1 show the results for the cost of audit. As is intuitive, when  $c_H$  is very low the tax authority optimally audits every disclosure, and when  $c_H$  is very high it accepts every disclosure. On an intermediate range, however, the tax authority's growing reluctance to conduct audits sees it become *more lenient*, and offer *stronger incentives* for honesty. The quality of the tax authority's signal matters, for a lower quality signal causes it not to audit taxpayers that it should audit, and to audit taxpayers that it should not audit. Consequently, the tax authority's growing unwillingness to conduct audits as its signal worsens sees it become *more lenient*, and offer *stronger incentives* for honesty (panels (m) and (n) of Figure 1). Note that, on the interval in which  $f_A$  is unconstrained, these effects are sufficiently strong that disclosures are seen to be increasing in  $\sigma_g$ , thereby reversing the sign of the effect we find in section 4.2 (where  $a$  and  $f_A$  are fixed).

#### 4.3.3. Fiscal/legal variables

We view the marginal tax rate and the unincentivized fine rate as two parameters set by government, but which the tax authority nevertheless treats as fixed when designing a IOVDS. As discussed in Rablen (2014) and elsewhere, tax authorities typically do not set tax rates, while fine rates are prescribed in legislation, making them slow and costly to change. How does a net-revenue maximizing tax authority set  $f_A$  as  $f_H$  increases? The results presented in panels (o) and (p) of Figure 1 imply that this ratio is increasing in  $f_H$ , such that the tax authority offers *weaker incentives* for honesty. The intuition for this finding is that a higher unincentivized fine rate increases the returns to audit activity, making the tax authority less keen to incentivize taxpayers to make a disclosure that will be accepted. This intuition also accounts for the finding that the tax authority also chooses to be *less lenient* in its choice of  $a$ .

<sup>26</sup> In the extreme version of the model, with uncertainty over neither  $a$  nor  $q$ , every taxpayer would make the (accepted) disclosure  $x = \max(0, E - [a / \theta])$ .

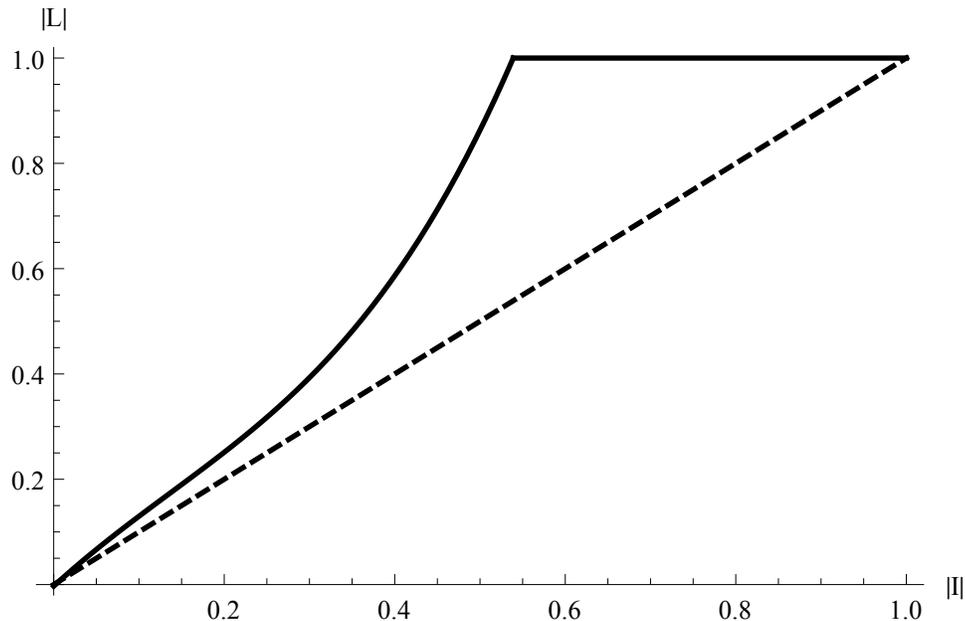
<sup>27</sup> Note in panel (j) of Figure 1 that, on the interval in which  $f_A$  is held constant at its maximum, the endogenous increase in  $a$  is sufficiently strong that disclosures are decreasing, overturning the positive effect found in section 4.2 for a fixed  $a$ .

As discussed in section 4.2, increases in the marginal tax rate drive up evasion. At very low levels of  $\theta$  the tax authority performs no audits, as there is relatively little offshore evasion, and the tax liability associated with this evasion is also small. Conversely, at very high values of  $\theta$  the tax authority audits all disclosures, for by this time there is significant offshore evasion carrying a substantial tax liability.

#### 4.3.4. Choice of letter set

The final design aspect that we are able to address within the model is the choice of size of the letter set, conditional upon the size of the information set. We model this choice through the parameter  $\kappa$ , where  $\kappa = 0$  implies that communication is only with taxpayers belonging to  $\mathbf{I}$ , and  $\kappa = 1$  implies that communication is with all taxpayers in  $\mathbf{T}$ . We find (Figure 2) that the tax authority always finds it optimal to communicate with more taxpayers than it truly has information on, and the extent to which this is so is increasing in the size of  $\mathbf{I}$ . Thus, for  $|\mathbf{I}|$  above around one-half, it is optimal for the tax authority to communicate with all taxpayers in  $\mathbf{T}$ . We therefore find some theoretical support for the approach of the IRS in suppressing the criteria used to determine which UBS customers had their offshore assets revealed. When  $\mathbf{I}$  is small relative to  $\mathbf{T}$ , however, the model suggests against communication with all taxpayers, as the revenue from additional disclosures from taxpayers outside  $\mathbf{I}$  is outweighed by the reduction in revenue from disclosures by taxpayers inside  $\mathbf{I}$ .

**FIGURE 2. Optimal size of the letter set conditional on the size of the information set.**



## 5. Conclusion

In this paper we present a theoretical model of IOVDS. We characterize the optimal behavior of taxpayers in such Schemes, and use this characterization to investigate the optimal choice of the key design parameters. Our main findings are that tax authorities can raise revenue while reducing their costs by running IOVDS; that shrouding the audit rule for disclosures under an IOVDS raises net revenue; and that some broadening of the base of IOVDS beyond taxpayers for whom information has been observed is always optimal, though broadening the base too much can ultimately reduce revenue. We also show how the optimal degree of incentivization is related to characteristics of the tax authority and of the taxpayers.

Although this study represents an important first step in our understanding of IOVDS, we believe that it represents no more than a preliminary exploration. In particular, the model relies heavily on the notion of pre-commitment, although it is unclear that tax authorities can commit in the way supposed. Three important next steps will be to: (1) endogenize the formation of beliefs, which in this model are exogenously asserted; (2) give taxpayers an explicit choice

as to whether or not they make a disclosure under an IOVDS (in the present framework the closest a taxpayer can get to not participating in a Scheme is to disclose zero); and (3) analyze the choice of letter set without recourse to the assumption that disclosures from taxpayers outside the information set are necessarily accepted. We hope to take up these challenges in our future research.

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## Appendix

**Proof of Proposition 1** Assuming  $E \in (0, w)$ , we may totally differentiate the taxpayers' first order condition (foc1). Letting  $\gamma = -xU''(x)/U'(x)$  be the coefficient of relative risk aversion,  $v_0 = [1-\theta][w-E]$ , and  $v_1 = v_0 + E[1+r]$ , we obtain

$$\begin{aligned}\frac{\partial E}{\partial w} &= \frac{E}{w} \frac{E[v + \gamma w[1-\theta]] + w[2v - \gamma w[1-\theta]]}{[1-\theta]}, \\ \frac{\partial E}{\partial \theta} &= \frac{E}{\theta} \frac{[w-E][v + \gamma \theta[w-E]]}{v[E+2w] + \theta \gamma E[w-E]} > 0; \\ \frac{\partial E}{\partial \beta} &= -\frac{E}{\beta} \frac{v[w-E]}{v[E+2w] + \theta \gamma E[w-E]} < 0; \\ \frac{\partial E}{\partial \gamma} &= -\frac{Ev[w-E]\log(v)}{v[E+2w] + \theta \gamma E[w-E]}.\end{aligned}$$

Hence

$$\begin{aligned}\frac{\partial E}{\partial w} > 0 &\Leftrightarrow \gamma < 2 + \frac{E}{w} \left[ \frac{\theta E + w[3-\theta]}{[w-E][1-\theta]} \right] > 2; \\ \frac{\partial E}{\partial \gamma} < 0 &\Leftrightarrow v > 1.\end{aligned}$$

Therefore, for  $\gamma \in [0, 2]$  we have  $\partial E / \partial w > 0$ . Noting that  $v > w[1-\theta]$ , if  $\underline{w} \geq [1-\theta]^{-1}$  then  $v > 1$  for all  $w \geq \underline{w}$ . We choose  $\underline{w} > [1-\theta]^{-1}$ , where  $\bar{\theta} = 0.5$  is the highest value of  $\theta$  considered in the analysis, hence  $\partial E / \partial \gamma < 0$ .

# Uncollectible Versus Unproductive: Compliance Impact of Working Collection Cases That Are Ultimately Not Fully Collectible

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## Background and Introduction

Each year a fraction of voluntary and enforcement tax assessments are not paid timely. Many taxpayers resolve these tax debts during the balance due notice process. The remaining (delinquent) accounts make up the potential workload for the Internal Revenue Service's (IRS's) collection call sites or field collection offices. As of the end of FY 2012, nearly 11.5 million taxpayer delinquent accounts owed over \$124 billion dollars in tax, penalties and interest.<sup>1</sup> There is little benefit from using the IRS's scarce resources to attempt to collect from taxpayers who cannot pay and who are not at risk for future noncompliance. Therefore, some accounts are moved out of the collection work streams and identified as Currently Not Collectible (CNC) when the taxpayers are unable to pay anything further due to significant hardship or when the IRS is unable to locate them.

The IRS and various stakeholders closely monitor the rate of cases identified as CNC. A common misconception is that a case identified as CNC is not a productive case. Furthermore, the CNC determination is sometimes used as evidence that the IRS should not have worked the case at all. However, this is not necessarily true. There are specific guidelines for determining if a case is CNC. Thus, a CNC determination is a tax administration policy decision based on the case's situation—not a payment compliance outcome. Many cases identified as CNC are associated with significant enforcement revenue and the IRS intervention may have curtailed future noncompliance. Unfortunately, there has been little research to quantify the direct revenue impacts and the future compliance impacts of IRS treatments.

In this paper, we estimate the impact of IRS collection treatments on taxpayers' payment of delinquent taxes and their payment of future tax liabilities. We analyze individual and business accounts having unpaid assessments for Calendar Years 2008–2010 that do not fully resolve during the notice process. For cases identified as CNC, we estimate the impact of various collection treatments on resolving the unpaid amounts and on the taxpayer's subsequent payment compliance.

We find positive impacts of IRS treatments on the amount of delinquent taxes collected and the taxpayer's future payment compliance for cases that are ultimately CNC. Thus, working cases that close as CNC can be beneficial for tax administration. This implies that attempts to evaluate the efficacy of IRS's collection treatments and allocation of collection resources based on CNC determinations, without considering the benefits and costs of working CNC cases, are likely incomplete.

## Summary of the IRS Collection Process

The collection process is illustrated in Figure 1. Unpaid taxes generally come from two situations: voluntarily filed returns, and IRS enforcement assessments from audits and delinquent returns. A taxpayer that has unpaid taxes will enter the collection balance due notice process and receive one or more notices. Any taxpayer that does not resolve a balance due during the notice process becomes available collection inventory to work. Cases in available inventory may be routed to collection treatments such as the call site or a field office to help the taxpayer pay the balance due.

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\* 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.

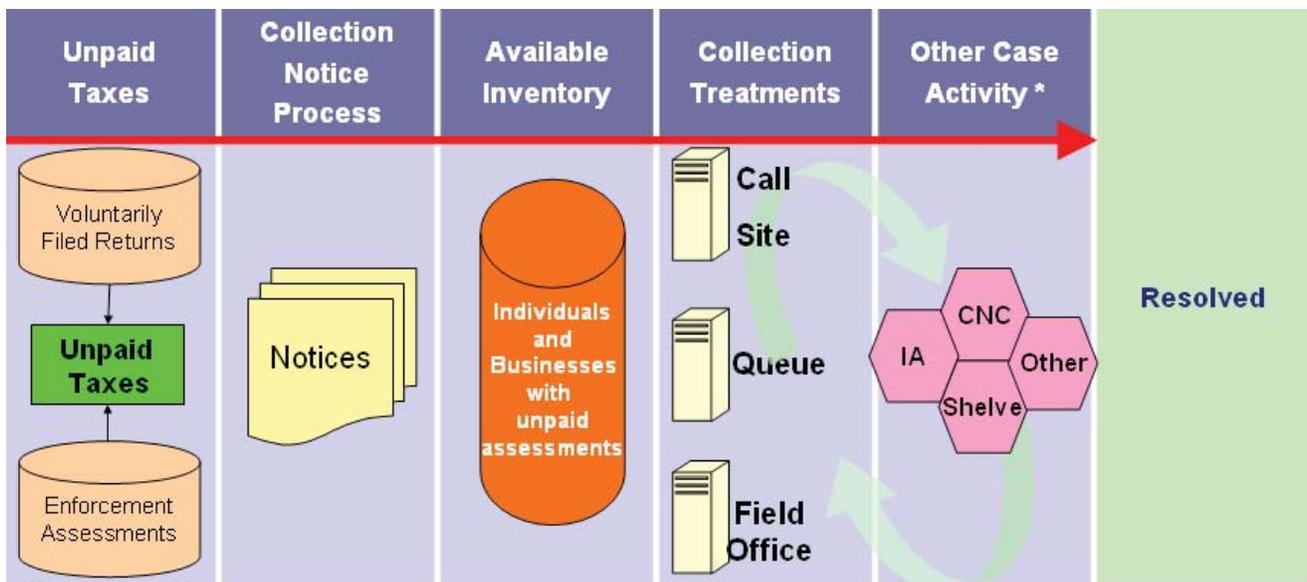
<sup>1</sup> Publication 55B (Rev. 3-2013). Catalog Number 215671. Department of the Treasury. *Internal Revenue Service Data Book, 2012*. <http://www.irs.gov/pub/irs-soi/12datbk.pdf> (accessed November 2013).

In addition, the taxpayer’s account may go into certain statuses such as CNC,<sup>2</sup> depending on collection treatments or other circumstances. Treatments and statuses may change over time depending on the characteristics of the case.

**Currently Not Collectible Determination**

The criteria for a CNC determination are not observable using available tax administration data at the time the case is selected for treatment. A call site or field collection office employee makes the CNC determination after investigating the case and gathering all the relevant case characteristics, facts and circumstances. Thus, we model those characteristics as exogenous and existing at the time of selection, but not being observable with the tax administration data available at that point in time. If in fact the call site and field collection treatments influence characteristics associated with the CNC determination, then we would need to treat CNC determination as an endogenous outcome. We develop the models under the assumption it is not influenced by the treatments and can be used as an explanatory factor without controlling for possible endogeneity.

**FIGURE 1. Basic Overview of the IRS Collection Process**



\* A case may have other activity or statuses based on certain conditions and characteristics of the case. For example, the Service may determine after reviewing the case that it is Currently Not Collectible (CNC). Another example is an Installment Agreement (IA) where the taxpayer requests and enters into a payment plan to make payments over time to resolve the deficiency. Alternatively, a case may be shelved (i.e., set aside) based on case characteristics and having insufficient resources available to work the case.

**Theoretical Model**

Assume taxpayers must decide: (1) how much of a composite good,  $C$ , to consume; (2) how much to pay toward unpaid tax liabilities,  $P_p$ ; and (3) how much to pay toward the next tax liability,  $P_f$ , which is reported on a future tax return.

Assume the price of the composite good has been normalized to one.

Furthermore, let  $I$  be the taxpayer’s income,  $A_p$  be the amount of unpaid past tax assessment, and  $A_f$  be the taxpayer’s tax assessment as reported on future tax returns.

Also let  $T$  be a vector of treatments that could be applied by the taxing authority,  $i$  be the interest rate on unpaid taxes, and  $r$  be the penalty rate on unpaid taxes.

<sup>2</sup> A case may have other activity or statuses based on certain conditions and characteristics of the case. For example, the Service may determine after reviewing the case that it is Currently Not Collectible (CNC). Another example is an Installment Agreement (IA) where the taxpayer requests and enters into a payment plan to make payments over time to resolve the deficiency. Alternatively, a case may be shelved (i.e., set aside) based on case characteristics and having insufficient resources available to work the case.

Assume that taxpayers make choices based on the following utility maximization problem:<sup>3</sup>

$$\text{Max } U = U(C, (A_p - P_p), (A_f - P_f), T, i, r)$$

$$\text{Subject to: } I \geq C + P_p + P_f$$

Assuming that delinquent and future tax debts have a negative impact on utility,  $\partial U/\partial(A_p - P_p)$  and  $\partial U/\partial(A_f - P_f)$  would both be less than zero. Solving the optimization above would yield the following optimal payment functions:

$$P_p^* = V_p(I, A_p, A_f, T, i, r)$$

$$P_f^* = V_f(I, A_p, A_f, T, i, r)$$

The optimal payment functions provide the basis for developing separate empirical models of taxpayers' payments of delinquent tax liabilities and their payments toward their current tax liabilities that they will report on their next return.

## Empirical Model

We estimate models of payments to current and future tax liabilities as a function of observable case characteristics and IRS policy and treatments. Let  $X$  be a vector of case characteristics and  $T$  be a vector of indicators for various IRS treatments. Treatments include automated call site contact, field Revenue Officer contact, and the decision to close the case as not collectible. This specification assumes that each treatment stream is uniformly applying CNC guidelines as defined in the IRS Internal Revenue Manual, and that those guidelines do not vary over time.

Payment on current unpaid tax liabilities is modeled as

$$\begin{aligned} \ln(P_p) &= X_t \beta + T \beta_T + \varepsilon_p && \text{if } P_p^* > 0 \text{ and} \\ \ln(P_p) &= 0 && \text{otherwise.} \end{aligned}$$

We estimate  $\beta$  and  $\beta_T$  using a Tobit regression censored at zero. We censored at zero since payments are always greater than or equal to zero.<sup>4</sup> The parameters  $\beta$  and  $\beta_T$  reflect the marginal impacts of each variable on the latent variable,  $P_p^*$ . Some elements of the treatment parameters,  $\beta_T$ , correspond to treating a case and ultimately having a CNC determination, and treating cases without a CNC determination. Therefore, the elements of  $\beta_T$  provide estimates of the marginal impact on payment resulting from treating the case with or without a CNC determination. The marginal impact on log of observed payments is

$$\frac{\partial \ln(P_p)}{\partial x_i} = \beta_i \Phi\left(\frac{(X_i \beta + T \beta_T)}{\sigma_p}\right)$$

where  $\Phi(\cdot)$  is the Normal distribution function and  $\sigma_p$  is the scale parameter.

Next, we model the value of taxpayers' future additional unpaid tax liabilities,  $A^f - P_f^*$  or  $U_L$ , as

$$\begin{aligned} \ln(U_L) &= X_{t+2} \alpha + T \alpha_T + \varepsilon_u && \text{if } A^f - P_f^* > 0 \text{ and} \\ \ln(U_L) &= 0 && \text{otherwise.} \end{aligned}$$

We estimate  $\alpha$  and  $\alpha_T$  using a Tobit regression censored at zero. We censored at zero since future additional unpaid tax liabilities are always greater than or equal to zero.<sup>5</sup> The elements of  $\alpha_T$  that relate to working a case and closing as CNC provide estimates to the marginal impacts of each variable on the latent variable,  $P_f^*$ . The marginal impact on log of observed additional unpaid tax liabilities is given by

$$\frac{\partial \ln(U_L)}{\partial x_j} = \alpha_j \Phi\left(\frac{(X_j \alpha + T \alpha_T)}{\sigma_u}\right)$$

where  $\Phi(\cdot)$  is the Normal distribution function and  $\sigma_u$  is the scale parameter.

<sup>3</sup> The model could be extended to include accumulated wealth in the budget constraint.

<sup>4</sup> We did not censor from above because of the potential for the taxpayer to accrue additional unpaid tax liabilities, interest and/or penalties.

<sup>5</sup> We did not censor from above because of the potential for the taxpayer to accrue additional unpaid tax liabilities, interest and/or penalties.

## Research Design

### *Available Inventory*

We identified the available inventory of taxpayers with unpaid assessments from IRS databases.<sup>6</sup> The study includes individual and business taxpayers that had at least one unpaid assessment during calendar years 2008–2010 and the taxpayer did not resolve the delinquent amounts in the IRS balance due notice process. While we included all unpaid assessments for individual accounts, we limited business accounts to sole proprietorships and corporations and their related unpaid assessments on specific tax returns: Form 941 (Employer’s Quarterly Federal Tax Return), Form 1120 (U.S. Corporation Income Tax Return), and Form 940 (Employer’s Annual Federal Unemployment (FUTA) Tax Return).<sup>7</sup>

### *Collection Treatments*

After identifying the available inventory of taxpayers with unpaid assessments, we determined if the taxpayers received various collection treatments following the notice process. The treatment categories defined for this study were based on where the case was first routed following the balance due notice process. Cases were routed to an automated collection or call site (ACS) or a field collection office (FC). Cases going to ACS could be subsequently transferred to FC as part of that treatment stream, but we did not estimate separate treatment effects for this routing. This was done to avoid the potential situation where the treatment applied to the case is endogenous to the taxpayer’s response to previous treatments. For example, the case could have been transferred from ACS to FC as a result of the taxpayer calling in response to an ACS contact. Also, a taxpayer was considered treated if it was assigned to ACS and/or FC within two years of the notice process. We chose two years because this allows a sufficient amount of time in most instances for the IRS to have selected to treat the case and make a determination such as CNC.

We divided the taxpayers into five different groups based on where the taxpayer was assigned following the notice process and if there was a subsequent CNC determination. The five treatment groups are:

1. Routed to ACS with subsequent CNC determination,
2. Routed to ACS without subsequent CNC determination,
3. Routed to FC (no ACS assignment) with subsequent CNC determination,
4. Routed to FC (no ACS assignment) without subsequent CNC determination, and
5. No collection treatment.

Taxpayers were included in the no collection treatment category if they had at least one module<sup>8</sup> in an available inventory status during the two years following notice.<sup>9</sup> Taxpayers not in available inventory were removed from the study.<sup>10</sup>

### *Dependent Variable*

We studied compliance behavior over a three-year period after the final balance due notice. We analyzed collection treatments during the first two years after the notice process. We modeled two outcomes.

1. The **total payments** made by the taxpayer in these first two years became the dependent variable for the model of payments toward delinquent assessments (unpaid assessment payments).
2. **New unpaid tax assessments** occurring in the third year after the notice process became the dependent variable for the subsequent compliance model.

Figure 2 illustrates the research design and compliance behavior studied over the three-year period.

<sup>6</sup> Data is from the Accounts Receivable Dollar Inventory database stored in the IRS Compliance Data Warehouse.

<sup>7</sup> This study related to businesses with unpaid taxes focusing on sole proprietors and corporations. This excludes businesses such as partnerships, estate and gift related taxes, government and other unpaid taxes.

<sup>8</sup> A “module” is a tax year with outstanding issues for a specific taxpayer.

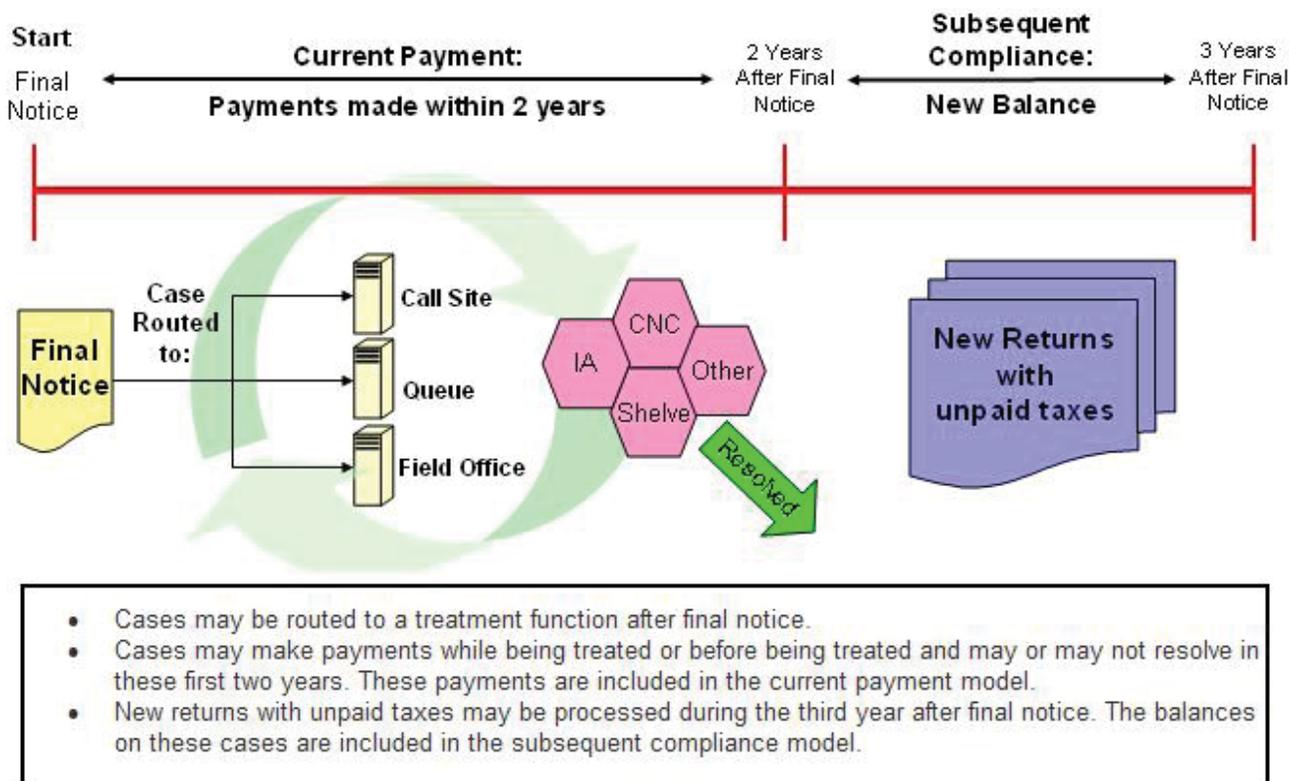
<sup>9</sup> Cases in the Field Collection Queue or in a shelved status. Cases remain in the Queue until requested by a Collection Field function. If the case meets certain guidelines, then the IRS may shelve individual and business accounts removing the case from active inventory.

<sup>10</sup> For example, some entities defined as unavailable to work for this study resolved their unpaid assessments during the notice process. Since the balance was resolved they would have never made it to the Queue, ACS and/or FC.

**Independent Variables**

Dummy variables for each treatment were included in the model allowing us to compare the impact of treating a case to not treating a case. Other explanatory variables of current payments and subsequent compliance included case characteristics such as the source of assessment (voluntarily reported balance due, examination assessment, nonfiler assessments, etc.), taxpayer type (corporation, sole proprietor, etc.), prior payments, previous treatments, age in accounts receivable, etc.. We also included the expected payments made on unpaid assessments resulting from the payment model as an independent variable for the subsequent compliance model. Appendices A and B provide a complete list of the variables.

**FIGURE 2. Summary of Research Design**



**Overview of the Collection Inventory**

**Routing Assignments**

The IRS uses several criteria to identify which cases should be worked and which treatment streams they should enter. At any point in time, there are more cases available than can actively be worked with the available ACS and FC resources. Table 1 shows where available inventory was routed by type of liability for the three calendar years in our study.

**TABLE 1. Percent of Cases in Available Inventory by Type of Liability and Treatment Type, Calendar Years 2008–2010**

Type of Liability <sup>^</sup>	Treatment Type <sup>*</sup>	Calendar Year of Final Notice		
		2008	2009	2010
Individual	ACS	84%	89%	91%
	FC (no ACS assignment)	2%	1%	1%
	No Treatment	14%	9%	8%
Business—Sole Proprietorship	ACS	56%	71%	71%
	FC (no ACS assignment)	29%	18%	17%
	None	16%	12%	12%
Business—Corporation	ACS	54%	70%	72%
	FC (no ACS assignment)	29%	18%	15%
	None	17%	13%	13%

<sup>^</sup> Individual liabilities are associated with taxpayers identified in the Individual Masterfile. Business liabilities (sole proprietorships and corporations) are associated with entities identified in the Business Masterfile.

<sup>\*</sup> Available Collection Inventory following final notice routed within two years of final notice.

NOTE: Totals may not add to 100 percent due to rounding. ACS stands for automated collection site. FC stands for field collection office. Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

The IRS tends to use ACS and FC resources to work the more difficult and complicated cases, as well as the cases that are at more of a risk for future noncompliance. Thus, simple comparisons across treatment groups do not reveal the impact of treatment on taxpayer behavior. We must therefore control for other characteristics of a case (like balance due amount or prior behavior) to accurately estimate the impact of the treatment.

During our study period there were changes to how cases were routed to the treatment stream and variations in the number of cases coming into the collection work streams. The data in Table 1 highlight the effects of these changes. Variation in the percentage and type of cases that go to each stream helps identify the impact of each treatment stream in the regressions for unpaid assessment payments and subsequent compliance.

During Calendar Years 2008–2010, we identified approximately 6.8 million individuals and 1.4 million business taxpayers (sole proprietorships and corporations) that entered the post-notice treatment stream and were available to be worked by ACS and FC. All results in this paper are based on a 5 percent random sample of these taxpayers.<sup>11</sup>

### *Unpaid Assessments Payments*

Table 2 and Table 3 provide an overview of the payments on individual and business tax liabilities during the first two years following the notice process, respectively. The percentage of payments received were higher when the IRS treated the case compared to no treatment. Cases with a CNC determination in each treatment stream have a lower average payment than those not CNC.

Of the available individual inventory, 90 percent of the cases were treated within two years of the notice process, with most taxpayers (88 percent) routed to ACS following the notice process and just 2 percent routed directly to FC. Cases treated within two years had a higher rate of payments and higher median payments compared to those not treated. Cases treated with a CNC determination consisted of 9 percent of the available individual inventory. Even with the subsequent CNC determination, 56 percent of the cases routed to ACS and 67 percent routed to FC made a payment during the first two years following final notice.

<sup>11</sup> A 5-percent sample was selected for computational ease. The sample resulted in 339,974 individuals and 70,758 businesses.

**TABLE 2. Payments on Unpaid Individual Income Tax Assessments in Available Collection Inventory, Calendar Years 2008–2010**

During First Two Years After Final Notice, Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Payments in 2 Years Following Balance Due Notice Process	Median Payments	Average Payments
ACS	Yes	8%	56%	\$243	\$1,671
ACS	No	80%	72%	\$1,223	\$4,504
FC, but no ACS	Yes	1%	67%	\$805	\$5,696
FC, but no ACS	No	1%	79%	\$3,706	\$39,123
No Treatment	No	10%	52%	\$155	\$3,427
<b>Available Individual Inventory</b>		<b>100%</b>	<b>69%</b>	<b>\$1,028</b>	<b>\$4,499</b>

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible.  
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.

Of the available business inventory, 86 percent of the cases were treated within two years of the notice process. Most of the cases treated were routed to ACS. Cases that were treated within two years had a higher rate of payments and higher median payments compared to those not treated. CNC determinations consisted of 9 percent of the available business inventory. Even with the subsequent CNC determination, 55 percent of the cases routed to either ACS or FC made a payment during the first two years following final notice. However, the average payment amount was larger with no treatment than it was for CNC dispositions.

**TABLE 3. Payments on Unpaid Business Assessments in Available Collection Inventory, Calendar Years 2008–2010**

During First Two Years After Final Notice, Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Payments in 2 Years Following Balance Due Notice Process	Median Payments	Average Payments
ACS	Yes	4%	55%	\$97	\$4,987
ACS	No	61%	78%	\$2,252	\$14,376
FC, but no ACS	Yes	5%	55%	\$105	\$7,186
FC, but no ACS	No	16%	85%	\$7,388	\$39,219
No Treatment	No	14%	44%	\$0	\$7,360
<b>Available Business Inventory</b>		<b>100%</b>	<b>72%</b>	<b>\$1,835</b>	<b>\$16,458</b>

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible.  
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014.

### Subsequent Compliance

Table 4 and Table 5 provide an overview of subsequent compliance for the individuals and businesses in our study, respectively. Taxpayers are defined as noncompliant if they accrued new modules with unpaid assessments during the third year after final notice.

Overall, 12 percent of the individual taxpayers in our study acquired an additional module with an average unpaid assessment of \$804. Cases routed to ACS with a subsequent CNC determination had the lowest percentage of subsequent modules at 8 percent.<sup>12</sup>

<sup>12</sup> We did not explicitly control for taxpayers who didn't file a tax return, but should have. Taxpayers may have had circumstances removing their filing requirement, such as going out of business or bankruptcy, or were not identified as a nonfiler.

**TABLE 4. Subsequent Compliance for Individuals' Unpaid Assessments in Available Collection Inventory, Calendar Years 2008–2010**

Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Subsequent Module in Third Year	Median Subsequent Balance	Average Subsequent Balance
ACS	Yes	8%	8%	\$0	\$226
ACS	No	80%	13%	\$0	\$814
FC, but no ACS	Yes	1%	11%	\$0	\$873
FC, but no ACS	No	1%	21%	\$0	\$7,342
No Treatment	No	10%	10%	\$0	\$572
<b>Available Inventory</b>		<b>100%</b>	<b>12%</b>	<b>\$0</b>	<b>\$804</b>

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible. Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.

In addition, 24 percent of the businesses in our study acquired an additional module with an average unpaid assessment of \$2,286. Cases treated by either ACS or FC with a subsequent CNC determination had a lower percentage of subsequent modules at 5 percent compared to cases with no treatment at 14 percent.

**TABLE 5. Subsequent Compliance for Business' Unpaid Assessments in Available Collection Inventory, Calendar Years 2008–2010**

Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Subsequent Module in Third Year	Median Subsequent Balance	Average Subsequent Balance
ACS	Yes	4%	5%	\$0	\$266
ACS	No	61%	27%	\$0	\$2,378
FC, but no ACS	Yes	5%	5%	\$0	\$318
FC, but no ACS	No	16%	32%	\$0	\$3,852
No Treatment	No	14%	14%	\$0	\$1,517
<b>Available Inventory</b>		<b>100%</b>	<b>24%</b>	<b>\$0</b>	<b>\$2,286</b>

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible. Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Business. Data extracted March 2014.

## Unpaid Assessment Payments—Model Estimates

We estimated separate Tobit models for businesses and individuals to estimate their net payments made within the first two years of the notice process.<sup>13</sup> Table 7 provides the parameter estimates for the various treatment groups for both the business and individual taxpayers. Appendices A and B provide a full set of parameter estimates.

For both businesses and individuals, we find positive and significant effects of ACS and FC treatments on payments (Table 6). Treating a case leads to higher payments towards unpaid assessments compared to cases not treated. The impact of FC was somewhat larger than the ACS impact, all else equal. This is expected, since FC employees work fewer cases but work them more intensely, and have more authority to take certain actions compared to ACS employees. When a case is routed to ACS, there is a 2.45 and 1.72 expected change in log payments for businesses and individuals, respectively. When a case is routed to FC, there is a 2.67 and 2.39 expected change in log payments for businesses and individuals, respectively.

<sup>13</sup> More specifically, we modeled the log of net payments.

**TABLE 6. ACS and FC Consolidated Treatment Effects on Payments of Unpaid Assessments, Individual and Business Collection Inventory**

Key Explanatory Variables <i>Dependent Variable: Log of Payments</i>	Business Liabilities		Individual Liabilities	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Cases Routed to ACS	2.770 (0.069)***	2.45	2.107 (0.043)***	1.72
Cases Routed to FC	3.018 (0.075)***	2.67	2.921 (0.092)***	2.39
Constant	-3.463 (0.144)***		1.777 (0.083)***	
Sigma	4.281 (0.017)***		4.759 (0.009)***	
Log-likelihood value	-114,469		-556,429	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

When we estimate separate treatment effects for CNC and non-CNC case determinations we still find a positive and significant effect on payments (see Table 7). For business taxpayers, given we treat the case and make a CNC determination, there is approximately a 0.4 marginal effect in the log of payments compared to no treatment, all else equal. For individual taxpayers with the same treatment and CNC determination, there is a 1.26 to 1.59 increase in the log payments compared to taxpayers not treated, all else equal. The results indicate that there is a larger treatment effect for the cases not identified as CNC, but the treatment effect is positive in both types of cases.

**TABLE 7. ACS and FC CNC/Non-CNC Treatment Effects on Payments of Unpaid Assessments, Individual and Business Collection Inventory**

Key Explanatory Variables <i>Dependent Variable: Log of Payments</i>	Businesses		Individuals	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Group 1: ACS with CNC	0.452 (0.120)***	0.40	1.535 (0.062)***	1.26
Group 2: ACS no CNC	2.978 (0.068)***	2.65	2.146 (0.043)***	1.76
Group 3: FC, but no ACS, with CNC	0.440 (0.107)***	0.39	1.943 (0.144)***	1.59
Group 4: FC, but no ACS, no CNC	3.792 (0.078)***	3.37	3.427 (0.111)***	2.80
Constant	-3.690 (0.142)***		1.763 (0.083)***	
Sigma	4.195 (0.017)***		4.755 (0.009)***	
Log-likelihood value	-113,648		-556,281	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

## Subsequent Compliance—Model Estimates

We estimated separate Tobit models for businesses and individuals to estimate their subsequent compliance defined as the log of the dollar amount of new unpaid tax assessments during the third year after the notice process. Table 8 provides the parameter estimates for the various treatment groups from both models. Appendices A and B provide a full set of parameter estimates.

For both businesses and individuals, we find a negative and significant effect on subsequent underpayment, given the IRS treated the case using ACS and/or FC resources. In other words, treating a case leads to lower amounts of unpaid assessments on new modules. The effect was greater for cases routed to FC compared to ACS. When a case is routed to ACS, there is a -0.2 and -0.1 marginal effect on the log of new assessments for businesses and individuals, respectively. When a case is routed to FC, there is a -0.4 and -0.3 marginal effect on the log of new assessments for businesses and individuals, respectively.

**TABLE 8. ACS and FC Consolidated Effects on Subsequent Compliance, Individual and Business Collection Inventory**

Key Explanatory Variables <i>Dependent Variable: Log of New Assessments</i>	Business Liabilities		Individual Liabilities	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Cases Routed to ACS	-1.132 (0.152)***	-0.20	-0.887 (0.159)***	-0.09
Cases Routed to FC	-2.300 (0.172)***	-0.40	-2.636 (0.327)***	-0.27
Constant	-6.055 (0.296)***		-26.961 (0.332)***	
Sigma	7.534 (0.048)***		10.918 (0.056)***	
Log-likelihood value	-75,465		-161,274	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

When the treatment groups are broken out by whether a case was identified as CNC, we still find a negative and significant effect on subsequent compliance in terms of new unpaid assessments (see Table 9). For business taxpayers, given we treat and determine the case as CNC, there is approximately a -1.1 to -1.2 marginal effect in the log of new assessments, compared to no treatment, all else equal. For individual taxpayers with the same treatment and CNC determination, there is a -0.3 to -0.4 marginal effect in the log of new assessments compared to taxpayers not treated, all else equal. Thus, the estimated subsequent compliance treatment effects for cases identified as CNC are larger than those not identified as CNC.

## Conclusions and Direction for Further Research

We find positive impacts in terms of both revenue and subsequent compliance from using ACS and FC resources to collect unpaid taxes, even if it is known, a priori, that the case will meet the guidelines for being identified as CNC.<sup>14</sup> The model estimates do suggest that the FC and ACS treatments will have a smaller impact on payments for cases with a CNC determination versus other cases. It seems fairly intuitive that working a CNC case would not produce as much additional revenue as a more collectible case. However, the estimated subsequent compliance impact of working CNC cases is relatively large compared to cases without a CNC determination. One should keep in mind, however, that the models do not explicitly control for circumstances as to why the taxpayer may have not filed or not had a filing requirement, such as a bankruptcy or going out of business.

<sup>14</sup> It is not possible to determine if a case will be identified CNC with certainty until the case is worked by an ACS or FC employee.

**TABLE 9. ACS and FC CNC/Non-CNC Treatment Effects on Subsequent Compliance, Individual and Business Collection Inventory**

Key Explanatory Variables <i>Dependent Variable: Log of New Assessments</i>	Business Liabilities		Individual Liabilities	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Group 1: ACS with CNC	-6.446 (0.338)***	-1.10	-3.191 (0.237)***	-0.33
Group 2: ACS no CNC	-0.326 (0.152)***	-0.06	-0.685 (0.237)***	-0.07
Group 3: FC, but no ACS, with CNC	-6.848 (0.315)***	-1.17	-4.291 (0.546)***	-0.44
Group 4: FC, but no ACS, no CNC	-0.947 (0.179)***	-0.16	-2.042 (0.375)***	-0.21
Constant	-6.347 (0.295)***		-27.107 (0.332)***	
Sigma	7.458 (0.047)***		10.902 (0.056)***	
Log-likelihood value	-75,052		-161,172	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

These results suggest that any optimal approach to collecting unpaid taxes that considers the treatment impacts on both enforcement revenue and ensuring future payment compliance should include cases that are CNC, even if those cases could be identified prior to treatment. Thus, it may not be appropriate to evaluate the success or failure of any treatment strategy based on a CNC determination. It is well beyond the scope of this paper to determine what the appropriate mix of cases is and how to balance the importance of revenue collection and subsequent compliance. However, it does appear that a CNC determination is not a good proxy for the productivity of a case. Rather, focusing on the treatment impact on payments and subsequent compliance is a more direct, and arguably more appropriate, strategy. However, the cost of the treatments should be taken into account; even if CNC cases tend to produce benefits, these should be compared with the associated costs to determine if CNC cases are more or less cost-effective than non-CNC cases.

This research could be extended by further exploration into the assumptions of CNC conditions being exogenous to the taxpayer's response to the treatment. If CNC conditions are endogenous to treatment then an Instrumental Variable approach may be appropriate to estimate the impacts of treating each type of case. It might also prove useful to expand the time period for studying subsequent payment compliance.

Another extension of this research could include modeling payments of current unpaid assessments and future noncompliance simultaneously. When a taxpayer is considering whether to make payments on past unpaid assessments, they are also likely considering making payments on current or future tax liabilities (e.g. withholding, estimated payments, or payments with the next tax return filed). One way to capture this decision-making process is to model both of these forms of compliance simultaneously, most likely using a method such as Seemingly Unrelated Regression (SUR) or a dynamic structure using Vector Autoregression (VAR). In our research, we did account for expected payments made on current unpaid assessments as a part of explaining future noncompliance, but we did not account for payments necessary for future compliance toward current unpaid assessments. Using SUR or VAR could help rectify this issue.

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## Appendix A Complete Model Results for Businesses

**TABLE A1. Past Assessment Payment Model for Businesses, Consolidated Treatment Effects**

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	2.770	0.069	<.0001	2.45
Cases routed to FC	3.018	0.075	<.0001	2.67
Total abatements over the one year prior to final notice as a percent of the balance due	-1.550	0.142	<.0001	-1.37
Log of the balance due at final notice.	-0.245	0.020	<.0001	-0.22
Taxpayer has a lien at final notice.	-0.542	0.084	<.0001	-0.48
Taxpayer has a balance due source of assessment.	0.689	0.047	<.0001	0.61
Taxpayer has a nonfiler source of assessment.	-0.452	0.053	<.0001	-0.40
Age of the most recent module.	-0.983	0.024	<.0001	-0.87
Taxpayer had new modules within one year prior to final notice.	0.413	0.018	<.0001	0.37
Age of the taxpayer's oldest module in accounts receivable.	0.065	0.015	<.0001	0.06
Change in payments over the year prior to final notice.	0.057	0.006	<.0001	0.05
Change in the frequency of payments two years prior compared to one year prior of final notice.	-0.113	0.011	<.0001	-0.10
Taxpayer resolved modules in the one year prior to final notice.	1.819	0.058	<.0001	1.61
Taxpayer is a corporation.	-0.440	0.050	<.0001	-0.39
Log of the taxpayer's TPI at final notice.	0.876	0.018	<.0001	0.77
Taxpayer has a module assigned to the Queue during notice process.	-0.112	0.072	0.1209	-0.10
Taxpayer has a module CNC or shelved during notice process.	-1.976	0.106	<.0001	-1.75
Taxpayer was treated and made payments during the one year prior to notice.	0.118	0.022	<.0001	0.10
Total Payments over the one year prior to final notice as a percent of the balance due	1.302	0.098	<.0001	1.15
Constant	-3.463	0.144	<.0001	
Sigma	4.281	0.017	<.0001	
Log-likelihood value	-114,469			
n	70,758			

NOTES: ACS stands for automated collection site. FC stands for field collection office.  
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014.  
Marginal Effects are calculated at the sample means.

TABLE A2. Past Assessment Payment Model for Businesses, CNC/Non-CNC Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	0.452	0.120	0.0002	0.40
Group 2: ACS no CNC	2.978	0.068	<.0001	2.65
Group 3: FC, but no ACS, with CNC	0.440	0.107	<.0001	0.39
Group 4: FC, but no ACS, no CNC	3.792	0.078	<.0001	3.37
Total abatements over the one year prior to final notice as a percent of the balance due	-1.494	0.140	<.0001	-1.33
Log of the balance due at final notice.	-0.192	0.019	<.0001	-0.17
Taxpayer has a lien at final notice.	-0.325	0.082	<.0001	-0.29
Taxpayer has a balance due source of assessment.	0.754	0.046	<.0001	0.67
Taxpayer has a nonfiler source of assessment.	-0.403	0.052	<.0001	-0.36
Age of the most recent module.	-0.958	0.023	<.0001	-0.85
Taxpayer had new modules within one year prior to final notice.	0.411	0.018	<.0001	0.37
Age of the taxpayer's oldest module in accounts receivable.	0.053	0.015	0.0003	0.05
Change in payments over the year prior to final notice.	0.063	0.006	<.0001	0.06
Change in the frequency of payments two years prior compared to one year prior of final notice.	-0.119	0.011	<.0001	-0.11
Taxpayer resolved modules in the one year prior to final notice.	1.704	0.057	<.0001	1.52
Taxpayer is a corporation.	-0.355	0.049	<.0001	-0.32
Log of the taxpayer's TPI at final notice.	0.842	0.018	<.0001	0.75
Taxpayer has a module assigned to the Queue during notice process.	-0.144	0.071	0.0423	-0.13
Taxpayer has a module CNC or shelved during notice process.	-1.862	0.104	<.0001	-1.66
Taxpayer was treated and made payments during the one year prior to notice.	0.108	0.022	<.0001	0.10
Total Payments over the one year prior to final notice as a percent of the balance due	1.247	0.096	<.0001	1.11
Constant	-3.690	0.142	<.0001	
Sigma	4.195	0.017	<.0001	
Log-likelihood value	-113,648			
n	70,758			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office. Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014. Marginal Effects are calculated at the sample means.

**TABLE A3. Subsequent Compliance Model for Businesses, Consolidated Treatment Effects**

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	-1.132	0.152	<.0001	-0.20
Cases routed to FC	-2.300	0.172	<.0001	-0.40
Taxpayer had both a TDI and TDA module active two years following notice process.	-0.746	0.116	<.0001	-0.13
Taxpayer had unpaid nonfiler source of assessments.	-2.495	0.098	<.0001	-0.44
Taxpayer had balance due unpaid source of assessments.	-0.807	0.091	<.0001	-0.14
Number of cycles since the most recent module with an unpaid assessment.	-0.082	0.002	<.0001	-0.01
Age of the newest module with an unpaid assessment	-1.524	0.047	<.0001	-0.27
Log of Taxpayer's TPI two years after final notice.	-0.027	0.030	0.364	0.00
Log of Taxpayer's balance due at two years following final notice.	0.624	0.017	<.0001	0.11
Estimate of log payments amount over 2 years after final notice.	0.929	0.024	<.0001	0.16
Constant	-6.055	0.296	<.0001	
Sigma	7.534	0.048	<.0001	
Log-likelihood Value	-75,465			
n	70,758			

NOTES: ACS stands for automated collection site. FC stands for field collection office.  
 Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014.  
 Marginal Effects are calculated at the sample means.

**TABLE A4. Subsequent Compliance Model for Businesses, CNC/Non-CNC Treatment Effects**

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	-6.446	0.338	<.0001	-1.10
Group 2: ACS no CNC	-0.326	0.152	0.0323	-0.06
Group 3: FC, but no ACS, with CNC	-6.848	0.309	<.0001	-1.17
Group 4: FC, but no ACS, no CNC	-0.947	0.179	<.0001	-0.16
Taxpayer had both a TDI and TDA module active two years following notice process.	-1.009	0.115	<.0001	-0.17
Taxpayer had unpaid nonfiler source of assessments.	-2.455	0.098	<.0001	-0.42
Taxpayer had balance due unpaid source of assessments.	-0.564	0.090	<.0001	-0.10
Number of cycles since the most recent module with an unpaid assessment.	-0.077	0.002	<.0001	-0.01
Age of the newest module with an unpaid assessment	-1.577	0.046	<.0001	-0.27
Log of Taxpayer's TPI two years after final notice.	0.082	0.029	0.0052	0.01
Log of Taxpayer's balance due at two years following final notice.	0.661	0.017	<.0001	0.11
Estimate of log payments amount over 2 years after final notice.	0.705	0.025	<.0001	0.12
Constant	-6.347	0.295	<.0001	
Sigma	7.458	0.047	<.0001	
Log-likelihood Value	-75,052			
n	70,758			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office. Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014. Marginal Effects are calculated at the sample means.

## Appendix B Complete Model Results for Individuals

**TABLE B1. Past Assessment Payment Model for Individuals, Consolidated Treatment Effects**

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	2.107	0.043	<.0001	1.723
Cases routed to FC	2.921	0.092	<.0001	2.389
CNC: unable to Contact Indicator	-3.609	0.062	<.0001	-2.951
Frequency of accruing new modules in the 2 years prior to final notice	0.291	0.014	<.0001	0.238
Age of the newest module with balance due	-0.171	0.008	<.0001	-0.140
Log of payments made in the 2 years prior to final notice	0.256	0.004	<.0001	0.210
Indicator of wages only taxpayer 2 years prior to final notice	-0.666	0.036	<.0001	-0.545
Indicator of "other" type of taxpayer at time of final notice.	-0.759	0.037	<.0001	-0.620
Log of TPI at time of final notice	0.135	0.003	<.0001	0.111
Log of payments made while in final notice status over past 2 years prior to final notice	0.261	0.006	<.0001	0.213
Time spent in Field status 1 year prior to final notice	-0.119	0.005	<.0001	-0.097
Time spent in ACS status 2 years prior to final notice	-0.086	0.004	<.0001	-0.070
Log of payments made while in queue status over past 2 years prior to final notice	0.195	0.008	<.0001	0.160
Treated by ASFR but marked as treated by field in GDW	1.830	0.071	<.0001	1.497
Time since last payment made in a "worked" status (Field or ACS).	-0.013	0.000	<.0001	-0.011
Constant	1.777	0.083	<.0001	
Sigma	4.759	0.009	<.0001	
Log-likelihood Value	-556,429			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office  
 Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.  
 Marginal Effects are calculated at the sample means.

TABLE B2. Past Assessment Payment Model for Individuals, CNC/Non-CNC Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	1.535	0.062	<.0001	1.26
Group 2: ACS no CNC	2.146	0.043	<.0001	1.76
Group 3: FC, but no ACS, with CNC	1.943	0.144	<.0001	1.59
Group 4: FC, but no ACS, no CNC	3.427	0.111	<.0001	2.80
CNC: unable to Contact Indicator	-3.079	0.075	<.0001	-2.52
Frequency of accruing new modules in the 2 years prior to final notice	0.295	0.014	<.0001	0.24
Age of the newest module with balance due	-0.168	0.008	<.0001	-0.14
Log of payments made in the 2 years prior to final notice	0.256	0.004	<.0001	0.21
Indicator of wages only taxpayer 2 years prior to final notice	-0.661	0.036	<.0001	-0.54
Indicator of "other" type of taxpayer at time of final notice.	-0.753	0.037	<.0001	-0.62
Log of TPI at time of final notice	0.134	0.003	<.0001	0.11
Log of payments made while in final notice status over past 2 years prior to final notice	0.259	0.006	<.0001	0.21
Time spent in Field status 1 year prior to final notice	-0.119	0.005	<.0001	-0.10
Time spent in ACS status 2 years prior to final notice	-0.085	0.004	<.0001	-0.07
Log of payments made while in queue status over past 2 years prior to final notice	0.195	0.008	<.0001	0.16
Treated by ASFR but marked as treated by field in CDW	1.649	0.074	<.0001	1.35
Treated by ASFR but marked as treated by field in CDW, then closed as CNC	2.776	0.154	<.0001	2.27
Time since last payment made in a "worked" status (Field or ACS).	-0.013	0.000	<.0001	-0.01
Constant	1.763	0.083	<.0001	
Sigma	4.755	0.009	<.0001	
Log-likelihood value	-556,281			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office  
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.  
Marginal Effects are calculated at the sample means.

**TABLE B3. Subsequent Compliance Model for Individuals, Consolidated Treatment Effects**

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	-0.887	0.159	<.0001	-0.09
Cases routed to FC	-2.636	0.327	<.0001	-0.27
Log of entity balance 2 years after final notice	0.492	0.022	<.0001	0.05
CNC: unable to Contact Indicator	-0.133	0.265	0.6165	-0.01
Estimate of log payments amount over 2 years after final notice.	1.370	0.039	<.0001	0.14
Indicator of Balance Due module assessed after final notice	8.871	0.086	<.0001	0.92
Indicator of module assessed 2 years prior to final notice	1.296	0.086	<.0001	0.13
Payments made over two years prior to final notice as a percent of total balance.	1.256	0.197	<.0001	0.13
Treated by ASFR but marked as treated by field in CDW	-1.627	0.266	<.0001	-0.17
W&I indicator 2 years after final notice	-2.072	0.076	<.0001	-0.21
Constant	-26.961	0.332	<.0001	
Sigma	10.918	0.056	<.0001	
Log-likelihood value	-161,274			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office  
 Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.  
 Marginal Effects are calculated at the sample means.

TABLE B4. Subsequent Compliance Model for Individuals, CNC/Non-CNC Treatment Effects Internal

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	-0.685	0.159	<.0001	-0.07
Group 2: ACS no CNC	-3.191	0.237	<.0001	-0.33
Group 3: FC, but no ACS, with CNC	-2.042	0.375	<.0001	-0.21
Group 4: FC, but no ACS, no CNC	-4.291	0.546	<.0001	-0.44
Log of entity balance 2 years after final notice	0.527	0.022	<.0001	0.05
CNC: unable to Contact Indicator	2.136	0.312	<.0001	0.22
Estimate of log payments amount over 2 years after final notice.	1.333	0.039	<.0001	0.14
Indicator of Balance Due module assessed after final notice	8.872	0.086	<.0001	0.91
Indicator of module assessed 2 years prior to final notice	1.331	0.086	<.0001	0.14
Payments made over two years prior to final notice as a percent of total balance.	1.245	0.197	<.0001	0.13
Treated by ASFR but marked as treated by field in CDW	-1.332	0.279	<.0001	-0.14
Treated by ASFR but marked as treated by field in CDW, then closed as CNC	-3.926	0.625	<.0001	-0.40
W&I indicator 2 years after final notice	-2.038	0.076	<.0001	-0.21
Constant	-27.107	0.332	<.0001	
Sigma	10.902	0.056	<.0001	
Log-likelihood value	-161,172			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office  
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.  
Marginal Effects are calculated at the sample means.

# Concentrated Enforcement in a Best-Case Tax Enforcement Regime

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## Introduction

In this paper, I set forth a theory (“concentrated enforcement”) for allocating scarce enforcement resources within a low compliance tax sector. The intuition behind concentrated enforcement is that, under a number of different circumstances, there may be increasing marginal returns to enforcement resources and psychological factors that support concentration. This paper begins by setting forth the notion of a best-case tax enforcement regime, which would allocate scarce tax enforcement resources to maximize the combination of direct revenue and voluntary compliance. The paper then examines some empirical evidence from the criminology context, which suggests that, under certain circumstances, concentration of enforcement may be critical to voluntary compliance. The bulk of the paper draws on a number of different disciplines to set forth the conditions under which concentrated enforcement may increase voluntary compliance and explore how it might work in the particularly problematic cash business tax sector. The question of when concentrated enforcement can increase compliance is not merely theoretical. As I explain in this paper, concentrated tax enforcement, in the form of project-based enforcement, already exists in practice. By exploring the conditions under which concentrated enforcement can increase compliance, this paper can help explain and improve existing practice, as well as guide future research. While ultimately determining when concentrated enforcement does increase voluntary compliance requires experimental application and evaluation, examining the conditions under which concentrated enforcement is likely to increase voluntary compliance and the evidence of such conditions is the first step toward such experimentation. This paper takes that first, necessary step toward thinking about concentrated enforcement as part of a best-case tax enforcement regime.

## Toward Best-Case Tax Enforcement

As a result of the suboptimal enforcement resources that often exist in practice, scholars in a variety of fields have examined how best to allocate scarce enforcement resources. Tax enforcement is an area in which enforcement resources are often constrained, making the question of their allocation quite important for tax enforcement agencies. It is relatively straightforward to measure the direct revenue yield from various tax enforcement strategies. However, an optimal, or “best-case” allocation of scarce tax enforcement resources would focus on maximizing not only direct revenue, or the actual revenue collected from the enforcement cases themselves. The indirect effect of enforcement, comprised of revenue voluntarily paid by taxpayers in the general population in response to enforcement, is likely to be many times the direct revenue collected directly from that enforcement (Plumley 1996). More generally, the revenue reported by taxpayers on their own, whether in indirect response to enforcement or not, far surpasses the direct revenue raised from enforcement (Internal Revenue Service 2013). As a result, a best-case allocation of tax enforcement resources should take into account not only direct revenue raised from enforcement, but also the voluntary compliance engendered by enforcement (McCubbin 2004, Plumley 2009).

The Discriminant Function (“DIF”) score is often cited and discussed as one of the key means of allocating scarce tax enforcement resources within a given taxpayer sector.<sup>2</sup> The DIF score chooses taxpayers for audit based on their “potential for [tax] change, based on past IRS experience with similar returns” (Internal Revenue Service 2006(a)).

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<sup>1</sup> This paper was prepared for and presented at the 2014 IRS-Tax Policy Center Research Conference. An accompanying article is being published in the Florida Tax Review. Thank you to participants at the 2014 IRS-Tax Policy Center Research Conference and in particular to Mark Phillips and Alan Plumley for their helpful questions and comments.

<sup>2</sup> An important question not addressed by this paper is how to allocate scarce tax enforcement resources between tax sectors. This paper assumes that the enforcement resources available to audit a particular tax sector are exogenously given and fixed. The focus of this paper is how to allocate such enforcement resources within a given sector.

As such, the DIF score can be described as a method for finding the offenders likely to be the worst, or a “worst-first” approach to tax enforcement. Evidence suggests that the DIF score is likely a reasonable means of allocating scarce tax enforcement resources so as to maximize direct revenue yield (General Accounting Office 1999, Comptroller General 1976). However, as discussed above, this conclusion does not suggest that using the DIF score alone is a comprehensive, best-case approach to allocating scarce tax enforcement resources. An important, unanswered set of questions is: (1) what is the impact on voluntary compliance of allocating enforcement resources to the returns with the highest DIF scores, and (2) whether the DIF score could be combined with other methods of allocation to maximize total revenue collected, as comprised of both the direct revenue and voluntary compliance resulting from enforcement.

The impact of DIF-based resource allocation on voluntary compliance is currently unclear. Theoretically, arguments exist that relying solely on the DIF score, or worst-first approaches generally, could maximize voluntary compliance. Worst-first approaches can maximize voluntary compliance if they encourage regulated parties to increase compliance, so as not to be considered the “worst” (Lemos and Stein 2010). However, when noncompliance is pervasive, the regulated parties may coordinate on low or no compliance and thereby undermine the power of a worst-first approach to maximize voluntary compliance. While more sophisticated empirical evaluation is needed to determine the impact of the DIF score on voluntary compliance, at least at present the DIF score seems like an effective, and crucial, tool for maximizing direct revenue, but perhaps only part of a best-case allocation of scarce tax enforcement resources.

Indeed, the IRS uses more than the DIF score to allocate scarce enforcement resources.<sup>3</sup> The IRS also uses compliance projects (and other methods, such as related examinations and a focus on large corporations and abusive tax avoidance transactions) to allocate scarce tax enforcement resources (Internal Revenue Service 2006(a)). Other countries such as the United Kingdom have even more prominently used so-called “tax campaigns” directed at certain taxpayer subsectors within particular geographic locations (HM Revenue and Customs 2013). The tax enforcement literature has yet to provide a comprehensive, theoretical explanation for the use of such enforcement projects in practice.

Some tax enforcement scholarship has suggested potential benefits of using allocation methods other than the DIF score. Most notably, James Alm and Michael McKee have suggested that exclusive use of the DIF score may allow taxpayers to coordinate on noncompliance (Alm and McKee 2004). Similarly, Norman Gemmill and Marisa Ratto have suggested that random auditing (in addition to a risk-based approach) can help prevent taxpayers from feeling safe in engaging in relatively low levels of noncompliance (Gemmill and Ratto 2012). However, existing scholarship has not suggested what allocation methods, other than random enforcement, might complement the DIF score. This paper sets forth concentrated enforcement, which, under certain circumstances, may complement the DIF score in order to create a best-case tax enforcement regime. The case for concentrated enforcement set forth in this paper also may help to explain and inform the project-based enforcement seen in actual tax practice.

## Criminology Evidence

Criminologists have offered some evidence that focusing enforcement efforts on particular groups or particular projects at a given time (rather than, or in addition to, a purely individualized, worst-first approach) can increase voluntary compliance. Most notably, criminologists have offered empirical evidence in support of a policing methodology known as “hot spots policing.” Hot spots policing arose out of empirical determinations that: (1) spreading preventative police presence across an entire population may render such resources relatively ineffective as crime deterrents; and that (2) crime often concentrates in particular geographic locations. In response to these findings, criminologists developed hot spots policing, which concentrates police resources in particular crime “hot spots.” Criminologists have shown that concentrating policing resources in hot spots can substantially reduce crime both in the hot spots and, to some extent, in surrounding areas (Braga and Weisburd 2010). This finding has been particularly encouraging, in contrast to an early policing study in Kansas City. That study found that when policing resources were applied across large patrol beats, increasing police patrol did not have a substantial, preventative effect on crime (Kelling *et al.* 1974). The bottom line from the hot spots policing research is that the concentration of policing resources can be a key factor in preventing crime.

Criminologists have also offered more anecdotal evidence of compliance benefits from project-based enforcement. Mark Kleiman has described numerous examples of project-based enforcement in which enforcement resources were

<sup>3</sup> Technically, the IRS distinguishes between resource allocation and workload selection. Resource allocation is a planning exercise in which portions of the budget are assigned to specific activities (e.g., to competing types of enforcement, and to different categories of returns within a given type of enforcement), and is typically completed well before the fiscal year begins. Workload selection refers to deciding (within the fiscal year for which the budget is appropriated) which specific taxpayers to contact within a given category and type of enforcement given the budget already allocated to that category and type of enforcement. The DIF score assigned to a return as it is processed is one of several factors used when selecting workload. However, the historical relationship between DIF score and audit yield observed in operational and random audit data has also been used as a basis for allocating the budget to audit programs and categories.

concentrated on a particular set of violators for a particular amount of time. Kleiman has described such efforts as effective means of substantially decreasing a number of otherwise rampant crime problems, such as “squeegeeing” in New York City and parole violations in Hawaii (Kleiman 2009). David Kennedy and others have similarly described how they used project-based approaches, in which specified violations were subject to enhanced enforcement efforts at specified times. Kennedy and others have described such efforts as a successful means of controlling otherwise uncontrollable crime problems such as gang violence (Kennedy 2011). While the work of Kleiman, Kennedy, and others has not been amenable to a high degree of empirical proof, it nonetheless provides real-world examples of the potential role of project-based enforcement in increasing compliance.

## Concentrated Enforcement

Building on the actual examples of (and some empirical support for) a project-based approach, I set forth concentrated enforcement as a new theory for allocating scarce tax enforcement resources. Concentrated enforcement breaks a large, low compliance sector of taxpayers into smaller subsectors and applies substantially enhanced enforcement resources in particular subsectors on a rotating basis. Subsectors subject to enhanced enforcement resources are said to be subject to “enforcement projects.” The application of enforcement projects to certain subsectors means that fewer enforcement resources are available for subsectors of the population that are not subject to enforcement projects. DIF scoring can be used as a means of identifying particularly noncompliant subsectors of taxpayers, which should be more likely to be selected for enforcement projects. Within a particular enforcement project, not necessarily every taxpayer needs to be subject to enforcement. Rather, DIF scoring may be used to select taxpayers who should be subject to particular enforcement attention within an enforcement project.

The initiation of enforcement projects would be announced directly to taxpayers subject to an enforcement project (perhaps via direct mailing or some other form of direct notification, including notification to advisors who have historically served the taxpayers in the enforcement project) prior to the initiation of enforcement projects. The initiation of enforcement projects would also be posted publicly on the IRS website, identifying which subsectors will be subject to enforcement projects and when the enforcement projects will begin. Announcement occurs because concentrated enforcement is premised on the benefits of concentrated enforcement and coordination of taxpayers’ expectations regarding concentrated enforcement and resulting compliance effects (fleshed out below). However, termination of the enforcement projects is not announced. The termination of enforcement projects is not announced so as to garner a possible (albeit likely short-lived) free-ride on the deterrence benefits of enforcement projects, even after they have terminated. Specifically, taxpayers may continue to believe they are subject to the enforcement project for some short time, even after it has terminated.

Take, for instance, the following hypothetical regarding cash business taxpayers. Imagine (for the sake of simplicity and illustration only) that there are 100,000 cash business taxpayers and 30 revenue agents available to audit cash business taxpayers. Imagine that each revenue agent can audit 100 cash business taxpayers in a given year. If the enforcement resources were applied uniformly across the population, each taxpayer would face a 3% chance of being audited per year. If the DIF score were applied to select which taxpayers to audit, particular cash business taxpayers would actually face a higher or lower than 3% chance of being audited, depending on their relative DIF score. However, whether or not they perceived themselves as having a higher or lower than 3% chance of being audited would depend on whether they perceived themselves as being more or less likely to be selected under a DIF score method (which may, but would not necessarily, correspond with their actual chance of being audited under a DIF score method). Without any reason to believe that particular taxpayers perceived they had a higher or lower individual chance of being selected for audit under a DIF score method, and that these perceptions mattered in some systematic way, it seems reasonable to assume that taxpayers believe they have an approximately 3% chance of being audited in this example, even after application of a DIF method.

Concentrated enforcement would split the population of 100,000 taxpayers into smaller subsectors and apply enforcement projects to such subsectors. Subsectors could be defined in a number of ways, but they would likely be defined by industry and location. Ideally, taxpayers within given subsectors would all be in the same group for purposes of DIF scoring. For instance, dry cleaners in Manhattan may be one subsector of the cash business tax population. Dry cleaners in Brooklyn may be another. Construction workers in San Francisco may be another subsector, and the list would go on and on. Under concentrated enforcement, a certain number of subsectors of the cash business tax population would be subject to enforcement projects at any given time. For instance, imagine that, of the 100,000 cash business taxpayers, 200 are dry cleaners in Manhattan, and that DIF scoring reveals that Manhattan dry cleaners are likely a particularly noncompliant node. An enforcement project on Manhattan dry cleaners may allocate 24% of the time of

one tax agent to audit dry cleaners in Manhattan. As a result, the dry cleaners would face a 12% chance, rather than a 3% chance, of being audited. The announcement of an enforcement project on Manhattan dry cleaners should be made directly and in advance to the Manhattan dry cleaners and their tax advisors (via direct mailing or otherwise), as well as on the IRS website. The announcement should indicate an enhanced enforcement project for the subsector, designed to ensure compliance and root out and punish noncompliance. By assumption, the limited enforcement resources available for the entire sector would mean that cash business taxpayers outside of the Manhattan dry cleaning enforcement project would face a concomitantly lower chance of being audited during the application of this enforcement project. However, cash business taxpayers outside of enforcement projects would remain subject to some chance of audit, albeit a slightly reduced chance. Other enforcement projects would be chosen based on a similar methodology, with similar effects on chance of audit of the taxpayers within and outside of the enforcement project. Enforcement projects should rotate through the population of cash business taxpayers, using DIF scoring to help choose particularly noncompliant subsectors (to the extent they can be identified).

Under certain circumstances, the application of concentrated enforcement, as described above, may increase net voluntary compliance, as measured across the entire sector of taxpayers. The underlying intuition is that, for a number of reasons, there may be increasing marginal returns to enforcement as well as psychological factors that make concentrated enforcement more effective. As an initial matter, for purely economic reasons, spreading resources uniformly (or even the perception of relatively uniform chances of being audited) may give taxpayers insufficient incentives to comply (Eeckhout *et al.* 2010, Lando and Shavell 2004, Lazear 2006). In such cases, the compliance gains in subsectors subject to enforcement projects may outweigh the losses from subsectors not subject to such projects. The point can be illustrated in a straightforward fashion by imagining a binary compliance decision, in which individuals either choose to comply or not to comply. For instance, as above, imagine that there are 100,000 cash business taxpayers and 30 tax agents available to audit cash business taxpayers, and that each tax agent can audit 100 cash business taxpayers in a given year. As illustrated previously, if the enforcement resources were spread across the population, each cash business taxpayer would face a 3% chance of getting caught for not complying with the taxpayer's tax obligations. Imagine also that each cash business taxpayer owes an unreported tax liability of \$2,000 and, if caught not complying, will have to pay the tax liability of \$2,000 plus a fine of \$1,500. Given such parameters, each taxpayer has an expected benefit of noncompliance of \$1,940 and an expected cost of noncompliance of \$45, and no taxpayer will comply. In order to comply, taxpayers would have to face a greater than 57% chance of being caught for noncompliance.<sup>4</sup> Under such circumstances, concentrated enforcement could be used to bring the chance of getting caught to 58% in the subsectors subject to enforcement projects. As a result, all taxpayers in the enforcement projects should comply. Given the limitation on enforcement resources (and assuming only for the sake of this illustration that no enforcement resources were applied outside of an enforcement project), the maximum number of cash business taxpayers in the enforcement project (or multiple enforcement projects) would be 5,172.<sup>5</sup> Under these parameters, no taxpayer outside an enforcement project will comply. However, since no taxpayers would comply at all under a uniform application of enforcement resources, total, net compliance, as measured across the entire population, would still increase under concentrated enforcement. In this situation, 5,172 more cash business taxpayers would be complying under concentrated enforcement. Indeed, as long as penalties are not treated as a source of revenue, microdeterrence in this situation not only maximizes voluntary compliance but also revenue.<sup>6</sup> While the above illustration obviously oversimplifies the compliance landscape, it nonetheless illustrates a base economic case for how concentrating enforcement resources may raise voluntary compliance.

<sup>4</sup> To determine this (rounded) percentage, solve for  $x$  in the following equation:  $1,500x > 2,000(1-x)$ .

<sup>5</sup> To determine this number solve for  $x$  in the equation  $3,000 / x \geq 58 / 100$ .

<sup>6</sup> This statement merits a bit of elaboration. Generally, this paper focuses on how, under certain conditions, concentrated enforcement can increase voluntary compliance. However, at least under the terms of this example, as long as penalties are not considered a source of revenue, maximizing voluntary compliance also maximizes revenue. The reason is as follows. Absent concentrated enforcement, no taxpayer voluntarily complies. As a result, all revenue is obtained as direct revenue from audit. Direct revenue from audit would be  $3,000 \times \$2,000 = \$6$  million. Under concentrated enforcement, 5,172 taxpayers pay a tax liability of \$2,000, which yields revenue of \$10.344 million. If penalties are considered a source of revenue, then uniform application of enforcement resources would actually maximize revenue because 3,000 audits each would produce revenue of \$3,500, which would yield total revenue of \$10.5 million. The assumption not to consider penalties a source of revenue is being made because the IRS and Treasury Department have made it clear on numerous occasions that the tax penalties should be used as a means of ensuring compliance, and that penalties should not be viewed as a direct means of raising revenue (Internal Revenue Service 1989, Department of the Treasury 1999). More generally, whether direct revenue or voluntary compliance dominates in terms of revenue depends on how high audit rates actually have to be to produce voluntary compliance. To the extent that audit rates could be lower than 58% to generate voluntary compliance, the size of the enforcement project could be larger, in which case the impact of voluntary compliance on revenue would be larger. The general importance of voluntary compliance to revenue in response to increases in low audit rates, discussed previously, suggests that, for a variety of reasons, the audit rates likely could be substantially lower than 58% and still engender voluntary compliance. For these reasons it seems reasonable to equate maximizing voluntary compliance with maximizing revenue. On the other hand, the IRS is often judged based on its direct enforcement yield per spending ratios (GAO 2012). If the IRS really were to reduce direct revenue to zero (as a result of 100% voluntary compliance) it may suffer significant criticism as a result of not being able to show direct revenue yield. In light of this practical concern, it seems fair to assume that the IRS cares about both voluntary compliance and direct revenue, but that the former may be more heavily weighted. It is worth pointing out that, in contrast to tax enforcement, criminal enforcement (discussed previously in the text) likely places a lower weight on direct return from enforcement. In other words, in the criminal context it is likely even safer to view voluntary compliance (i.e., no murders) as the goal, rather than direct return from enforcement.

Moreover, the economic point can be modeled in a more complex fashion to reflect a more realistic compliance environment (in which, for instance, not every taxpayer faces the same compliance parameters, or in which compliance is not a binary decision). Lando and Shavell have set forth a more generalized economic model, which suggests that scarce enforcement resources should always be allocated such that any portion of the population subject to enforcement receives just the optimal level of enforcement resources. The intuition behind their model is that any alternative would fail to maximize the social return per policeperson (or auditor, in this case), and therefore would fail to maximize the total, social return from policing (or auditing).<sup>7</sup> Moving beyond the Lando and Shavell model to focus on the tax context in particular, it is worthwhile to emphasize that tax compliance choices tend not to be binary (i.e., comply, don't comply), but rather a range of compliance is often possible (i.e., how much income to report). Under certain circumstances, a range of potential compliance, combined with multiple equilibria, can also create an economic case for concentration of enforcement resources. In particular, if existing levels of voluntary compliance are low, but multiple equilibria exist, concentrated enforcement may yield substantial gains from enforcement projects (by moving compliance to a higher equilibrium) and few losses from taxpayers not subject to enforcement projects (because only the low, existing voluntary compliance can be lost). While of course the opposite is possible (high losses of compliance by taxpayers not subject to enforcement projects, matched by low gains in groups subject to enforcement projects) (Alm and McKee 2006), the point here is to suggest conditions under which concentrated enforcement may increase total compliance, not prove that concentrated enforcement will always increase compliance. For the reasons suggested in the economic models sketched above, when enforcement resources are so limited as to yield inadequate incentives if spread across the whole population, there may be much to gain and little to lose by concentrating enforcement resources in the form of concentrated enforcement.

Indeed, Eeckhout *et al.* have not only made a normative, economic case for a concentration of enforcement resources (in which the threshold level of enforcement necessary to engender substantially higher compliance is applied to a subset of the population). They also have showed that their model has positive, explanatory power. Specifically, they determined that the Belgian police have monitored speeding in a manner remarkably consistent with their model. The Belgian police have engaged in a practice of rotating, announced monitoring, with a relatively fixed rate of detection (corresponding to the threshold level of enforcement) for drivers subject to announced monitoring. As enforcement resources have increased, the incidence of announced monitoring has increased, but not the rate of detection for those subject to announced monitoring. Eeckhout *et al.* estimate that this policy has resulted in an optimal use of enforcement, such that marginal benefits have almost equaled marginal costs (Eeckhout *et al.* 2010).

Moreover, when rates of enforcement are already quite low, probability neglect (or the lack of responsiveness to variations of small probabilities) may dampen the impact of the loss of enforcement in subsectors not subject to enforcement projects. For individual taxpayers, the actual rate of audit hovers around approximately 1% (Internal Revenue Service 2012). Given these parameters, it seems reasonable to imagine that taxpayers subject to an enforcement project may be more responsive to a change in their audit likelihood (for instance, an increase in audit likelihood from 1% to 12%), than taxpayers not subject to an enforcement project would be to their change in audit likelihood (for instance from a 1% chance to a slightly lower, but still very low chance of audit). As a result of probability neglect, individuals may not be particularly responsive to variations of less than 1% (Sunstein 2002, Stack and Vandenberg 2011), decreasing the potential losses of compliance from taxpayers who are not part of an enforcement project.

Other circumstances may enhance the base case for concentrated enforcement, set forth above. First, the case for concentrated enforcement may be stronger if there are feedback loops between noncompliance and enforcement. As an initial matter, feedback loops may exist when enforcement is costly and limited, and it is not possible to punish all the existing noncompliance. The underlying mechanism at work is the congestion of noncompliance, little examined in the

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Footnote 6 continued—

(i.e., catching murderers). In any event, this paper focuses on the impact of concentrated enforcement on voluntary compliance. Additionally, as will be discussed in the text later, to the extent that taxpayers are not uniform and that such nonuniformity can be detected, concentrated enforcement should focus on particular nodes of noncompliance and should allocate enforcement resources within an enforcement project toward particularly noncompliant taxpayers. This methodology should help maximize the combination of voluntary compliance and direct revenue.

<sup>7</sup> In contrast to a purely rational, economic model, this paper assumes (and discusses in text to follow) that noneconomic incentives also affect compliance. For instance, individuals may comply in response to an audit rate that is too low to economically incentivize them to comply for a variety of reasons, such as in response to norms or misperceptions of the actual audit rate. In any event, in contrast to the Lando and Shavell model, this paper suggests maintaining some chance of audit in the portion of the population that is not subject to an enforcement project at a given time. As discussed below, probability neglect may cause this portion of the population to be less responsive to the slight reduction in audit rate than purely rational economic theory would predict. As a result, maintaining some audit presence in the portion of the population not subject to an enforcement project may be able to maintain a substantial amount of compliance. This paper does adopt the suggestion from Lando and Shavell that subsectors subject to an enforcement project should be just subject to the optimal level of enforcement (however the “optimal level of enforcement” is ultimately determined, which is an important topic for future research).

tax literature (Schrag and Scotchmer 1997, Graetz *et al.* 1986). Essentially, if enforcement resources are perceived to be (relatively) fixed, increasingly high rates of noncompliance lower the perceived chance of getting caught for the same amount of noncompliance. Noncompliance therefore breeds further noncompliance. By using enforcement projects to raise rates of noncompliance within given taxpayer subsectors, concentrated enforcement may be able to reset rates of compliance to reasonably high levels, high enough to help sustain compliance as enforcement projects move to the next subsector (Kleiman 2009). Feedback loops between noncompliance and enforcement also can exist when there are commonalities in noncompliance in certain taxpayer subsectors. For instance, the difficulty in detecting tax shelters and yet the commonality of tax shelters across taxpayers makes information developed in a particular case much more valuable than simply the returns from that case. When such noncompliance commonalities exist, enforcement projects can engender enforcement expertise that produces increasing returns to scale.

Somewhat relatedly, concentrated enforcement may help create local norms of compliance to help sustain compliance. Norms and other noneconomic incentives are often thought to play a role in encouraging compliance. However, a combination of theory and some evidence suggests that norms may themselves depend on rates of compliance, such that a norm of compliance exists only once a threshold level of compliance has been reached (Cooter 1996, Lederman 2003). When enforcement resources are limited, a uniform allocation of enforcement resources may not yield sufficiently high compliance in order to create norms of compliance. However, norms can be local (Schelling 1978, Gladwell 2000), and behavior is often influenced by members of one's small group, even in cases in which such groupings are relatively arbitrary (Goette *et al.* 2006, Revesz 1997). As a result, by separating a large, highly noncompliant population into small, local subsectors and engaging in enforcement projects within subsectors, concentrated enforcement may activate local norms of compliance. These norms of compliance may help generate compliance and sustain it after the enforcement project ends.

Concentrated enforcement may also help increase voluntary compliance if taxpayers exhibit uncertainty aversion and concentrated enforcement increases the perceived uncertainty of tax enforcement. Research suggests that individuals often exhibit uncertainty aversion, or a tendency to avoid gambles when uncertainty exists regarding the likelihood of the potential outcomes (Ellsberg 1961, Lawsky 2009). Concentrated enforcement may leverage uncertainty aversion in order to increase compliance. A uniform application of enforcement resources would create a fixed probability of being audited, minimizing uncertainty. Application of a DIF score method would introduce greater uncertainty regarding the likelihood of audit. However, under a DIF score method alone, taxpayers may imagine that their own behavior affects their likelihood of audit, thereby reducing the uncertainty. Layering concentrated enforcement on top of the DIF score may preserve the uncertainty flowing from the DIF score, while also introducing the possibility of a significantly higher or lower chance of audit, which chance would depend on factors falling outside of the taxpayer's control. The increased uncertainty may decrease the likelihood of taxpayers engaging in the compliance gamble of noncompliance.<sup>8</sup>

Along similar lines, concentrated enforcement may increase voluntary compliance if taxpayers exhibit the availability bias and concentrated enforcement enhances the salience of enforcement. Research suggests that individuals tend to rely on information that is more readily available to assess the probability of events occurring (Taylor 1982, Tversky and Kahneman 1974). To the extent that concentrated enforcement makes information regarding IRS enforcement more readily available, or salient, taxpayers may perceive a greater likelihood of being audited, without requiring additional enforcement resources. The perceived higher likelihood of audit may raise voluntary compliance.

Finally, as alluded to previously, concentrated enforcement would likely work best if there are particular nodes of noncompliant taxpayers, and concentrated enforcement focuses on those nodes in particular. Concentrating enforcement efforts on nodes of noncompliance has been integral to hot spots policing, discussed previously. Such concentration can ensure that sufficient enforcement is available in the particular subsectors in which compliance is quite low. In such subsectors, there is likely to be the most to gain in terms of potential, increased compliance, and new rates and norms of compliance. The potential benefits of concentrating enforcement projects on particular nodes of noncompliant taxpayers reveals most notably how the DIF score and concentrated enforcement may work together to create a best-case enforcement regime. By using DIF scoring to identify particularly noncompliant nodes and the taxpayers who are likely to be most noncompliant within such nodes, concentrated enforcement may help ensure both a high direct yield from audit (as a result of the taxpayers being audited owing high amounts of taxes) and a high indirect yield from audit (as a result of the potential voluntary compliance benefits of concentrated enforcement, discussed above).

<sup>8</sup> While, under concentrated enforcement, taxpayers would have warning of the initiation of an enforcement project, thereby reducing uncertainty to some extent, they would not have information regarding the termination of enforcement projects, which would perpetuate uncertainty. Moreover, especially in cases of cash business underreporting, in which fraud can result in the taxpayer being subject to no statute of limitations, the possibility of being subject to an enforcement project at any point in time may be more relevant to taxpayers for the purposes of uncertainty aversion than whether or not they are subject to an enforcement project at a particular time.

Concentrated enforcement is not premised on being able to identify nodes of noncompliance or particularly non-compliant taxpayers. However, to the extent that they can be identified, the segmentation and rotation at the heart of concentrated enforcement (and the accompanying, potential voluntary compliance benefits of such segmentation and rotation) can be combined with DIF scoring as the means of choosing which segments will receive particular attention.

## Application to the Cash Business Tax Sector

While the above case for concentrated enforcement is general, this Part examines how it might apply to the cash business tax sector, a particularly problematic tax sector. This Part does so not because the cash business tax sector is the only (or best) application of concentrated enforcement, but rather because the cash business tax sector is much in need of enforcement innovation. As is widely known, significant cash business tax evasion results from the difficulty in detecting cash income and the limited enforcement resources available to detect it (Bankman 2007). The resulting net misreporting rate for nonfarm proprietor income is approximately 56% (Internal Revenue Service 2006(b)).

As an initial matter, it is worth emphasizing that these very conditions suggest reasons why exclusive use of the DIF score may not produce a best-case tax enforcement regime. The pervasive noncompliance means that cash business taxpayers, to some extent, have coordinated on widespread noncompliance, making high levels of noncompliance relatively safe. Additionally, worst-first methods work particularly well as a means of incentivizing voluntary compliance when differences from an average reflect likely noncompliance. In such cases, high levels of noncompliance can be detected relatively easily based on observable behavior, thereby providing the regulated parties a strong incentive to engage in high levels of voluntary compliance, so as not to be deemed the “worst.” However, in the case of cash business taxpayers, lower than average tax liability reporting does not necessarily reflect a high level of noncompliance. Instead, it may suggest the business is simply unsuccessful. Nor does reporting a high amount of tax liability necessarily convey that the taxpayer is highly compliant. Reporting a high amount of tax liability therefore does not necessarily inoculate the taxpayer from audit. As a result, while the DIF score may serve as a useful tool (in light of limited information) for selecting taxpayers likely to owe the most, the DIF score likely provides a relatively weak incentive for taxpayers to increase their voluntarily reported tax liability so as not to be deemed the “worst.”

A variety of conditions in the cash business tax sector suggest that concentrated enforcement, combined with the use of the DIF score (as described previously), may help maximize the combination of direct revenue and voluntary compliance. First, the widespread noncompliance in the cash business tax sector and the difficulty and expense in detecting noncompliance suggest that spreading enforcement resources across the population of cash business taxpayers on a uniform basis may yield insufficient compliance incentives. While the reporting rate for nonfarm proprietor income is approximately 44% (which is far better than nothing), this rate likely significantly overstates the truly voluntary compliance of cash business taxpayers. In particular, structural enforcement mechanisms help compel cash business taxpayers to report their credit card receipts. While so-called “cash business taxpayers” by definition receive much of their income in cash, they also receive some amount of their income in the form of credit card receipts, which are both traceable and, more recently, reported to the IRS (IRC § 6050W, Lederman 2010). Taking the reporting of such receipts into account, the reporting of actual, cash receipts likely occurs at a rate significantly lower than 44%. In other words, cash business taxpayers likely report significantly less than 44% of their cash income, or the income for which their reporting can be seen as truly voluntary. The low rate of reporting with respect to such income, the very limited enforcement resources available to audit the widespread cash business tax evasion, and the difficulty (and expense) in actually detecting cash income on audit suggest that concentration of enforcement resources may be necessary in order to give cash business taxpayers adequate incentives to report their cash income.<sup>9</sup> Moreover, because structural enforcement mechanisms (namely the traceability and reporting of credit card receipts) likely explain a significant amount of the compliance that exists in the cash business tax sector, such enforcement mechanisms may help dampen any loss of compliance by taxpayers who will not be subject to enforcement projects. Essentially, if traceability and information reporting of credit card receipts provide a substantial incentive to report credit card receipts even given a low, 1% chance of audit, they may continue to provide a substantial incentive to report such receipts for taxpayers outside of enforcement projects, for whom the audit rate will drop slightly lower as a result of concentrated enforcement. In some ways, then, the cash business tax sector may be the prototypical type of situation in which there is much compliance to gain and little compliance to lose by concentrating enforcement.

<sup>9</sup> One potential danger from auditing cash business taxpayers is that wholly ineffective audits may actually convince taxpayers of the ineffectiveness of audits, and the lack of need to comply. However, this potential danger exists whenever taxpayers are audited and is not unique to concentrated enforcement. A general assumption of this paper is that audit is effective enough (even if it is difficult and expensive to conduct well) such that increasing audit rates, all else equal, would increase compliance. If this was not the case, the IRS's best tactic might be to find a way to increase the perception of audit ability without actually increasing audits.

Additional characteristics also suggest potential benefits from concentrated enforcement. The role of the DIF score in selecting taxpayers for audit and suggestions of cash business taxpayers' resulting benchmarking behavior suggest that feedback loops exist between noncompliance and enforcement. To understand the significance of the DIF score in creating feedback loops between noncompliance and enforcement, imagine that, prior to an enforcement project, a cash business taxpayer is underreporting \$2,000 of its cash receipts. The expected benefit of underreporting would be the \$2,000 x probability of not getting caught. The expected cost of underreporting is the penalty if caught x probability of getting caught. As a result of the DIF score, if other taxpayers within the taxpayer's DIF group begin complying at a higher rate, the taxpayer would face a higher probability of getting caught for the same \$2,000 of underreporting. Increased compliance by other taxpayers would thereby decrease the expected benefit and increase the expected costs for the *same* \$2,000 of potential underreporting. This effect does not depend on the audit rate being higher. The rate of compliance of other taxpayers within the DIF group can operate as an independent factor, which affects the expected benefits and costs of underreporting the same amount. Indeed, this dynamic is consistent with early findings that audits of taxpayers tend to have the greatest impact on other taxpayers in the same class (Witte and Woodbury 1985). By substantially increasing the rate of audit, concentrated enforcement may reset the rate of compliance. As a result, to the extent that the enforcement project is comprised of taxpayers within the same DIF group, taxpayers within the enforcement project should (at least on a short term basis) still face higher costs of noncompliance, even after the enforcement project has ended. Anecdotal evidence of cash business taxpayers benchmarking their noncompliance to industry averages (Morse *et al.* 2009) suggests that increased expertise from enforcement projects may also help create increasing returns from enforcement.

The perceived importance of norms in the cash business tax sector also may help sustain compliance gains from concentrated enforcement. There appears to be a correlation between cross-country attitudes toward tax evasion and actual evasion (Slemrod 2007). Michael Wenzel has developed survey evidence suggesting interrelationships between norms of compliance and actual tax compliance (Wenzel 2005). In the cash business tax sector, taxpayers have reported, at least anecdotally, the importance of norms of compliance, or "shared wisdom" of noncompliance from family and friends who are also in the cash business tax sector (Morse *et al.* 2009, Kagan 1989). And yet, appealing to norms of compliance has not been particularly successful in affecting actual tax compliance (Blumenthal *et al.* 2001, Torgler 2004). Given the perceived importance of norms for tax compliance, an important, unanswered question is how to move the "shared wisdom" of cash business taxpayers from one of predominantly noncompliance to one of greater compliance. This task seems particularly difficult when contemplating the cash business tax sector as a whole, because existing enforcement resources have as of yet been insufficient to yield widespread compliance across the sector. However, as alluded to previously, norms and beliefs of local (even relatively arbitrary) groupings seem particularly influential. As a result, to the extent that the enforcement projects yield enhanced compliance within a particular subsector, this local compliance may help create norms of compliance and thereby sustain some amount of compliance, even after the enhanced enforcement has moved on to the next subsector.

Evidence on the reactions to uncertainty also suggests potential voluntary compliance benefits from increasing uncertainty through concentrated enforcement. Most notably, Jeff Casey and John Scholz found evidence that experimental taxpayers experienced uncertainty aversion when the probability of detection was otherwise low (Casey and Scholz 1991). These results were consistent with an earlier simulation by Nehemia Friedland regarding the impact of uncertainty of audit for low probabilities of detection (Friedland 1982). The likelihood of audit of cash business taxpayers, approximately 1%, is quite low, suggesting that uncertainty regarding this likelihood may make cash business taxpayers feel less safe in engaging in the compliance gamble of underreporting their tax liability. By layering the uncertainty of potentially being in an enforcement project onto the uncertainty of the DIF score, concentrated enforcement may inject greater uncertainty into the system and thereby increase compliance.

Additionally, media attention to tax enforcement projects suggests potential salience benefits from concentrated enforcement. The media has often publicized various tax enforcement projects, including perhaps most notably the highly covered story of a crackdown on offshore tax evasion (CNBC 2009). The media coverage of UK tax campaigns and even of a small, targeted mailing of cash business taxpayers suggest that concentrated enforcement may garner media attention as well (Caldwell 2013, McKinnon and Hughes 2013). As suggested previously, by creating more salient news stories regarding enforcement, concentrated enforcement may increase the perception of enforcement and its effectiveness.

Finally, because evidence suggests that nodes of particularly noncompliant cash business taxpayers may exist, concentrated enforcement may be able to target such nodes in particular. The Government Accountability Office cites statistics that indicate that a small portion of cash business taxpayers are responsible for the bulk of the cash business

tax noncompliance (GAO 2007). That fact, combined with information that taxpayers try to hew to industry reporting averages, implies that particular industries of cash business taxpayers may be particularly noncompliant. Recent research has used DIF scoring to identify noncompliant groups of taxpayers, based on industries and geographic location (Taxpayer Advocate Service 2012). As discussed previously, concentrated enforcement would likely be most effective if it focuses on nodes of noncompliance (as has occurred with hot spots policing).

## Potential Problems and Future Research

Of course, a number of potential problems exist with the application of concentrated enforcement to the cash business tax sector. First, the persistent noncompliance by cash business taxpayers and the extreme difficulty in detecting cash business tax evasion may suggest to some that attempts to use audit to engender substantially higher voluntary compliance by cash business taxpayers are futile. This paper does not mean to suggest that auditing is an ideal method of ensuring compliance. As suggested previously, structural enforcement mechanisms, such as credit card information reporting, can often be effective. However, in the absence of congressional adoption of some sort of structural enforcement mechanisms with respect to cash receipts (such as, perhaps, a VAT) or (the very unlikely) complete abandonment of income tax liability for cash business taxpayers, audit remains an essential means of policing the cash business tax sector. Since it appears that audits are here to stay for the foreseeable future, determining the best-case allocation of audit resources remains essential. To the extent that concentrated enforcement can improve the allocation of audits, concentrated enforcement may be an important methodology. Additionally, while this paper repeatedly mentions audits when discussing allocating enforcement resources, concentrated enforcement is a more general model that can apply to any form of enforcement resources. To the extent that other methods of enforcement (for instance, perhaps evaluations of return preparers, etc.) prove promising, concentrated enforcement could be applied to such forms of enforcement. Moreover, as suggested previously, the inadequacy of the existing enforcement resources for auditing also tends to support the concentration at the heart of concentrated enforcement.

Similarly, while some might wonder whether the cash business tax sector is the best sector for application of concentrated enforcement, this paper is not attempting to claim that concentrated enforcement would work only, or even best, in the cash business tax sector. Rather, the paper is using the cash business tax sector (a sector much in need of enforcement innovation) as just one case study of a potential application of concentrated enforcement. This paper would be consistent with additional thinking regarding other, or better, applications of concentrated enforcement. Moreover, even if other tax sectors would be better suited to concentrated enforcement, to the extent that concentrated enforcement would increase compliance of cash business taxpayers, it should be applied.

The next major issue worth addressing is the possibility of compliance decay. The concern regarding compliance decay is that compliance gains from application of an enforcement project may be temporary. After the enhanced enforcement resources move on from an enforcement project (and after the taxpayers realize that they move on), taxpayers will lose the enhanced incentives to comply. As taxpayers collectively lose such incentives, the rate of compliance may again decrease, renewing the possibility of coordinated noncompliance, and eroding any norms of compliance. However, two responses to this potential problem of compliance decay are in order. The first response is that compliance decay may not be a problem at all, in that it may not defeat the case for concentrated enforcement. The base, economic case for concentrated enforcement is that when compliance incentives are too diffuse, concentrating enforcement on one subsector of the population may raise total compliance. This can be true even if the entirety of the population not subject to an enforcement project displays significantly lower (or, in an extreme case, no) compliance as a result. As long as the compliance in the subsector(s) actually subject to an enforcement project at any given time outweighs the losses elsewhere, compliance decay would not defeat the case for concentrated enforcement. Moreover, for reasons suggested previously, various phenomena suggest reasons why compliance decay may not occur immediately, thereby increasing the benefits of concentrated enforcement above the base case scenario. Increased rates of compliance and norms of compliance may help maintain some of the benefits of an enforcement project, even after the enforcement project has terminated. Uncertainty aversion and increased salience of enforcement may help raise the compliance across the population, even in subsectors not currently subject to an enforcement project. And targeting enforcement projects to particularly noncompliant groups may help ensure that those subsectors most likely to experience compliance decay also would be most likely subject to enforcement.

The next potential concern is taxpayer entrenchment to tax evasion positions. A fundamental assumption of the concentrated enforcement model is that taxpayers would respond to enhanced enforcement by increasing their compliance. However, taxpayers could respond to enhanced enforcement by maintaining or increasing their levels of evasion. Taxpayers may maintain their levels of evasion if they fear that, by increasing their compliance, they would red flag

themselves as likely noncompliant in prior years. Taxpayers could even increase their levels of evasion if they believed that doing so would create more negotiating room with the IRS when they are actually audited. The experiment that speaks to the latter concern directly is the Minnesota experiment, in which taxpayers were told that their tax returns would be “closely examined.” The widely-cited result was that low and medium income taxpayers raised their reported tax liability, but high income taxpayers lowered their reported tax liability. The researchers suggested that the high income taxpayers may have done so as a bargaining tactic (Slemrod *et al.* 2001). However, a number of factors suggest that reduced reporting is less likely in the case of concentrated enforcement projects. First, reducing the tax reported as a bargaining position makes some sense in cases in which the tax law is unclear (as may have been the case with the high income taxpayers). In such cases, as a result of how tax penalties and statutes of limitations rules work, taking an aggressive, low reporting position is somewhat unlikely to result in a penalty or extended statute of limitations. However, in the case of cash business tax liability, underreporting involves knowingly understating tax that is clearly owed, creating the possibility of civil fraud or even criminal penalties, and an unlimited statute of limitations. Because the downside of increasing evasion in response to enhanced enforcement is great in the case of cash business tax liability, increasing underreporting as a negotiating tactic is less likely. Additionally, as the Minnesota researchers suggested, there are likely two countervailing incentives for taxpayers in deciding what to report. The first incentive is to report high tax liability, to help avoid audit. The second incentive is to report low tax liability, so as to create room to bargain in case the taxpayer is selected for audit. The Minnesota researchers hypothesized that since the taxpayers in the experiment were told that their returns would be closely examined, the taxpayers were freed of the incentive to report high tax liability to help avoid audit. As a result, at least in the case of high income taxpayers, the incentive to report low to create bargaining position on audit may have dominated. However, in the case of concentrated enforcement, not every taxpayer in an enforcement project would be promised an audit. Indeed, taxpayers would be warned that enforcement projects would be designed to root out noncompliance in particular. DIF scoring methodology could be used within an enforcement project to focus the enhanced enforcement resources. As a result, taxpayers would still have an incentive (perhaps a stronger incentive) to report high to avoid audit within an enforcement project. Perhaps even more fundamentally, the notion that enforcement can increase compliance, which has received some empirical support (Dubin 2012, Plumley 1996), motivates the IRS’s use of audit and enforcement as a general matter. As long as audit and enforcement remain an important part of the IRS’s arsenal, concentrated enforcement may help guide their allocation.

Somewhat relatedly, concentrated enforcement could potentially create compliance backlash. Unlike entrenchment, in which increased evasion could occur as a strategic taxpayer move in response to enhanced enforcement, compliance backlash may arise as a result of enforcement crowding out norms of compliance. In some ways, this concern about compliance backlash does not fit well with concentrated enforcement. Compliance backlash typically occurs when enforcement increases, and thereby crowds out norms (Gneezy and Rustichini 2000). However, concentrated enforcement is premised on the notion that enforcement resources cannot be increased substantially. As a result, concentrated enforcement seeks to change the allocation of enforcement resources, not increase the amount. Nonetheless, part of the case for concentrated enforcement is that concentrated enforcement may make enforcement seem more salient, which, for all intents and purposes, may be perceived as an increase in enforcement resources. However, at least in the cash business tax sector, it is not clear how much to make of this concern regarding compliance backlash. As discussed above, some amount of empirical evidence links increased deterrence generally with increased compliance. Leandra Lederman has persuasively explored why deterrence can be compatible with—and necessary for—compliance and norms of compliance (Lederman 2003). The likely low, existing levels of voluntary compliance among cash business taxpayers described previously suggest that, at present, norms of compliance are unlikely to be pervasive in the cash business tax sector. As a result, rather than interfering with norms of compliance, additional deterrence may foster such norms. Moreover, to the extent that concentrated enforcement focuses on particularly noncompliant nodes, it can direct enforcement toward those taxpayers for whom the lowest norms of compliance are likely to exist.

Even if compliance backlash does not occur, the concentration of resources at the heart of concentrated enforcement also presents the risk of another form of backlash, political backlash. As recent examples have poignantly indicated, taxpayers and the media alike can react swiftly and negatively to perceived instances of unfair IRS targeting. While cash business taxpayers are not associated with the type of political activity that tends to merit particularly strong concerns regarding targeting, small businesses generally tend to evoke demands for protection in the political sphere (Eyal-Cohen 2011). While mere rhetoric should not stand in the way of effective tax enforcement reform, the concerns might be more sincere. To the extent that sincere concern exists about a regime that concentrates enforcement resources, the IRS can echo some of the statements that the UK has issued in its own tax campaigns, in order to assure the public that enforcement resources are being concentrated not as a means of unfairly targeting taxpayers, but rather as a means of focusing on and eliminating noncompliance. In particular, the IRS should emphasize that enforcement

projects are necessary to root out widespread noncompliance, as well as protect the fairness of the taxpaying system for compliant taxpayers. Using DIF scoring to focus enforcement projects on particularly noncompliant nodes, and on taxpayers likely to be most noncompliant, may help assure taxpayers that enforcement is being applied in an efficient and fair fashion. To be sure, the interaction between “fair” enforcement procedures (however such procedures are defined) and ensuring compliance is a more complex subject than this paper can address in its entirety. For now it is enough to say that, to the extent that concentrated enforcement improves compliance, these concerns should be addressed so as to improve, rather than defeat, concentrated enforcement.

Perhaps most importantly, it is worth stressing that this paper has not proven, nor attempted to prove that concentrated enforcement will definitively increase voluntary compliance in the cash business tax sector, or any other taxpayer sector. Rather, the paper attempts to flesh out the conditions under which concentrated enforcement may increase voluntary compliance of taxpayers, and has engaged in a preliminary examination of how concentrated enforcement may apply to the cash business tax sector. Whether concentrated enforcement indeed increases voluntary compliance depends on whether the increases in compliance as a result of concentrated enforcement outweigh any decreases (including any decreases by taxpayers who reduce compliance as a result of not being subject to an enforcement project). This paper has fleshed out the conditions under which concentrated enforcement may increase voluntary compliance. However, ultimately determining when such conditions exist and whether, as theorized, they do, indeed, increase total voluntary compliance ultimately requires empirical data.

The fundamentally empirical questions fleshed out above underscore the benefits, rather than detriments, of applying concentrated enforcement in an experimental fashion. As Alan Plumley has explained in earlier work, tax administrators’ central goal should be to allocate resources in a manner that equalizes the marginal benefit / cost ratio across tax enforcement activities. Failure to do so would mean that greater benefit could be obtained by shifting resources to an enforcement activity that would produce higher marginal benefit (Plumley 2009). Just as important as stating this objective, however, is developing and testing innovative theories of enforcement to determine what enforcement activities produce what benefits and at what costs. To date, tax enforcement scholars have not focused sufficiently on the potential benefits of concentrated enforcement, and the possibility that such an approach may increase voluntary compliance. This paper seeks to remedy this oversight by exploring why, under certain circumstances, concentrating enforcement may increase such compliance. Putting concentrated enforcement in practice in an experimental fashion will allow tax administrators to develop data regarding the impact of concentration, which can be fine-tuned over time, as different iterations of concentration are tested. For instance, various questions include: how big can an enforcement project be, how high does the likelihood of enforcement have to be in an enforcement project in order to trigger the potential benefits fleshed out in this paper, how should publicity be tailored, how often should rotation of enforcement projects occur, how transparent should the criteria for selection of enforcement projects be, and in what taxpayer sectors might concentrated enforcement be applied? The theory of concentrated enforcement set forth in this paper provides a jumping off point for examining these questions. Enforcement projects can be put in place along the lines suggested in this paper, with data collected on the impacts of the enforcement projects on compliance both in and outside of the enforcement projects. Factors like the size of the enforcement projects, as well as the level of enforcement in the enforcement projects, can be varied over time, thereby producing more data and better estimations of the impacts of concentration. Determining what makes a best-case tax enforcement regime will require decades of data, borne out of experimentation based on theories of taxpayer responsiveness to various enforcement activities. This paper hopefully helps move tax administration toward a best-case tax enforcement regime by asking when concentrated enforcement might increase voluntary compliance and arguing that the case for concentrated enforcement in the cash business tax sector merits experimental application.

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## **Tax Uncertainty and Corporation Compliance**

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# 2010–2011 Schedule M-3 Profiles and Schedule UTP Filing Status\*

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## Part I. Schedules M-3 and UTP Background

### A. Schedule M-3 Overview

Taxpayers prepare corporate and partnership tax returns by adjusting amounts from their financial statements (FS) or books and records. The goal of the Schedule M-3 reconciliation is to increase taxpayer transparency to the IRS with respect to the adjustments (book-tax differences, or BTD) made to FS or books and records in preparing the tax return and to assist the IRS in selecting returns and issues for audit where tax compliance risk is present and in not selecting returns and issues where such risk is not present.

Schedule M-3 was first introduced in 2004 for U.S. corporations with total assets of \$10 million or more filing U.S. income tax return Form 1120. It replaced four decades of using the less structured Schedule M-1 for these corporations for the required reconciliation of FS income to tax income.<sup>2</sup>

A Treasury report in 1999 and Treasury testimony in 2000 by Assistant Secretary (Tax Policy) Jonathan Talisman viewed the 1990s widening difference between the sum of corporate FS income (book income) and federal income tax expense reported on Form 1120, Schedule M-1, lines 1 and 2, and tax income reported on Form 1120, page 1, line 28, as a possible indicator of corporate tax shelter activity, but also noted the difficulty in interpreting Schedule M-1 BTD data.<sup>3</sup>

Mills and Plesko (2003) proposed a redesign of Schedule M-1 to increase the transparency of the corporate book-to-tax reconciliation and to improve data interpretability.<sup>4</sup> The Mills and Plesko (2003) Schedule M-1 redesign recommendations are largely reflected in Schedule M-3, particularly in Part I.<sup>5</sup>

Schedule M-3, Part I, is important and unique in tax reporting in that it lists the adjustments made to worldwide consolidated income in the parent corporation's FS to determine the book income of the includible

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\* First published in *Tax Notes* 145, No. 5, (November 3, 2014). Reprinted with permission. Prepared for the 2014 IRS Research Conference.

<sup>1</sup> The opinions expressed are those of the authors and do not necessarily represent positions of the U.S. Department of the Treasury or the Internal Revenue Service.

<sup>2</sup> This paper repeats certain material from Boynton, DeFilippes, and Legel (2005, 2006a, 2006b, and 2008), Boynton, DeFilippes, Legel, and Reum (2011 and 2014), Boynton and Wilson (2006), and Boynton and Livingston (2010), used with permission. The SOI corporate data file for year  $t$  includes all tax years ending between July of calendar year  $t$  and June of calendar year  $t+1$ . Effective for tax years ending on or after December 31, 2004, Schedule M-3 replaced Schedule M-1 for corporations filing Form 1120 and reporting total assets of \$10 million or more on Form 1120, Schedule L. Effective for tax years ending on or after December 31, 2006, for corporations with total assets of \$10 million or more, Schedule M-3 applies to Form 1120S for S corporations, to Form 1120-C for cooperative associations, and to Form 1120-L for life insurance companies, and Form 1120-PC for property and casualty insurance companies. Effective for tax years ending on or after December 31, 2006, Schedule M-3 also applies to Forms 1065 and 1065-B for partnerships with total assets of \$10 million or more and to certain other partnerships. Effective for tax years ending on or after December 31, 2007, a special Schedule M-3 applies to Form 1120-F for foreign corporations with effectively connected U.S. income and total assets of \$10 million or more. Schedule M-1 continues to apply to Form 1120-RIC for regulated investment companies, to Form 1120-REIT for real estate investment trusts, and to all corporations with total assets of less than \$10 million. Effective for tax years ending December 31, 2014 and later, corporations and partnerships with \$10 million or more in assets but less than \$50 million in assets, and those partnerships with less than \$10 million in assets required to file Schedule M-3, would be permitted to file Schedule M-3, Part I, and to file Schedule M-1 in place of Schedule M-3, Parts II and III, if they so choose.

<sup>3</sup> See U.S. Department of the Treasury (1999) and Talisman (2000). See also Mills (1998) cited by U.S. Department of the Treasury (1999, page 32, note 118).

<sup>4</sup> See Mills and Plesko (2003) for the proposed redesign of Schedule M-1.

<sup>5</sup> For a discussion of the development of Schedule M-3, see Boynton and Mills (2004).

corporations in the tax return.<sup>6</sup> We also use Part I data to identify each corporation FS type as SEC 10K/Public, Audited, or Unaudited.<sup>7</sup>

Schedule M-3, Parts II and III, are a more structured listing of BTD than Schedule M-1 and specify a number of fixed categories as well as two “other with difference” categories. The fixed categories are machine readable. The book income and tax income amounts generating the BTD are listed as well as the BTD and the name for the line.

On Schedule M-3, Parts II and III, BTD are characterized as temporary or permanent. Temporary differences are items of income or expense that are recognized for both financial and tax reporting, but appear in different time periods. Permanent differences are items of income or expense that are recognized for either financial or tax reporting, but not both.<sup>8</sup>

Parts II and III contain four columns. Column (a) represents FS (book) income or expense amounts using the FS source determined in Part I. Column (d) represents amounts as shown on the tax return. The BTD between the amount shown in column (a) and the amount shown in column (d) is reported either as a temporary difference amount in column (b) or as a permanent difference amount in column (c).

*Note that on Schedule M-3, a negative total BTD adjustment occurs if tax income is below book income. Further note that in our study we conform the sign of Part III data to agree with Part II so that a negative book income or tax income item always reduces total book income or tax income and a negative BTD reduces tax income.*<sup>9</sup>

We impose certain minimum reconciliation requirements on the returns included in our study.<sup>10</sup>

This is the seventh paper in a series of articles by the authors researching the differences between FS income (often called book income) and tax income as reported on U.S. corporate income tax returns.<sup>11</sup> This seventh paper analyzes final data for the 2010–2011 corporate Form 1120, Schedule M-3, with Schedule UTP filing status.<sup>12</sup>

## **B. Schedule M-3 versus Schedule UTP**

Schedule M-3 was introduced in 2004 for corporations with assets of \$10 million or more in order to assist the IRS in reconciling FS income to tax income including identifying temporary and permanent BTD. Taxpayers

<sup>6</sup> A major problem with interpreting Schedule M-1 data in the past was the fact that the taxpayer was allowed to report a starting Schedule M-1, line 1, book income amount without reconciling the reported book income amount to financial accounting income on the taxpayer's FS. *Schedule M-3, Part I, line 11, defines the starting book income for the book-to-tax reconciliation in Parts II and III.* The May 10, 2013, IRS notice, effective December 31, 2014, permitting the use of Schedule M-1 by corporations and partnerships with \$10 million but less than \$50 million in assets in place of Schedule M-3, Parts II and III, requires Schedule M-3, Part I, and requires that Schedule M-1, line 1, book income must equal Schedule M-3, line 11.

<sup>7</sup> We define “SEC 10K/Public” to include any tax return on which: (1) Schedule M-3, Part I, line 1a, indicated that an SEC 10K was filed; or (2) Part I, line 3a, indicated that the corporation had publicly traded common stock. Some firms indicate the first without the second which may mean publicly traded debt or a reporting error. Other firms report the second without the first suggesting a reporting error. We make use of the presence of either indicator. We define “Audited” to include any tax return on which Schedule M-3, Part I, line 1b, indicates that a certified audited FS was prepared and our requirements for “SEC 10K/Public” are not met. We define “Unaudited” to include all other returns.

<sup>8</sup> Temporary differences are important in tax administration because they may identify that an item is being included in the wrong tax year. For example, deferring the recognition of \$1 billion of income for 30 years (or accelerating the recognition of \$1 billion of deductions by 30 years) involves a substantial time value of money change in the value of the tax due. In contrast to temporary differences, permanent differences are adjustments that arise as a result of fundamental permanent differences in financial and tax accounting rules. These differences result from transactions that will not reverse in subsequent periods. In FS reporting under generally accepted accounting principles (GAAP), permanent differences are not considered in the FAS No. 109 (ASC 740) computation of deferred tax assets and liabilities, but do have a direct impact on the effective tax rate. Therefore, permanent differences have the potential to substantially influence reported financial earnings per share computations, and, in the case of public companies, stock prices. Accordingly, permanent differences of a given size may represent a greater examination risk than temporary differences of the same size.

<sup>9</sup> See Part I. C, of this paper for a discussion of sign conventions.

<sup>10</sup> Some companies with assets less than \$10 million voluntarily filed Schedule M-3. We do not analyze that data. Our minimum reconciliation tests require Schedule M-3 data agreement within tolerances of 1 percent of the maximum absolute value of the amounts on Part II, line 30, for income between Part I, line 11, and Part II, line 30, column (a), and for expenses/deductions between Part III, line 38 (line 36 through 2009), and the carryover line Part II, line 27. The reconciliations of the subset of corporations meeting our minimum data and reconciliation tests for this 2010–2011 Schedule M-3 study with the full 2010 and 2011 SOI corporate files are presented in Distribution Table D3 of the full M-3 First Look data sets for 2010 and 2011 are available on request.

<sup>11</sup> See Boynton, DeFilippes, and Legel (2005, 2006a, 2006b, and 2008) and Boynton, DeFilippes, Legel, and Reum (2011 and 2014). The first two articles analyze corporate Form 1120, Schedule M-1, reporting for Tax Years 1990–2003. The third paper in this series analyzes advance file data for the 2004 corporate Form 1120, Schedule M-3. The fourth paper analyzes final data for the 2005 corporate Form 1120, Schedule M-3, and updates the prior 2004 report using final 2004 data. The fifth paper analyzes final data for the 2006 and 2007 corporate Form 1120, Schedule M-3, as well as earlier Schedule M-1 data from 1994 through 2005 and Schedule M-3 data from 2004–2005. The sixth paper analyzes final data for 2008, 2009, and 2010 corporate Form 1120, Schedule M-3, as well as earlier Schedule M-3 data for 2006 and 2007 and information on 2010 Schedule UTP filing status.

<sup>12</sup> Schedule UTP (Uncertain Tax Position Statement)

prepare corporate and partnership tax returns by adjusting amounts from their FS. The goal is to increase taxpayer transparency with respect to the adjustments made to the FS to prepare the tax return. Many, but not all, of the items that must be listed on Schedule UTP generate or impact BTD that must be included on Schedule M-3. Schedule M-3 reports dollar amounts; Schedule UTP does not.

Schedule UTP was introduced in 2010 for corporations with assets of \$100 million or more with audited FS reporting uncertain tax positions in the income tax footnote and for certain related corporations.<sup>13</sup> The purpose was to share with the IRS some of the taxpayer information calculated as part of preparing the FS income tax footnote.<sup>14</sup> The goal was to increase taxpayer transparency with respect to items giving rise to federal income tax uncertain tax positions in the taxpayer's FS.

Schedule UTP asks for relevant code sections and a concise description of issues, *without dollar amounts*, for the uncertain tax positions that affect the FS reported U.S. federal income tax liabilities of certain corporations that issue or are included in audited FS. The corporate asset reporting threshold is assets of \$100 million or more in Tax Years 2010 and 2011, \$50 million or more in Tax Years 2012 and 2013, and \$10 million or more in tax years ending December 31, 2014 or later.<sup>15</sup>

Items listed on the Schedule UTP relate to amounts and/or positions reported on other forms or schedules of the current tax return or a prior tax return. Many of the Schedule UTP items relate to the temporary or permanent BTD reported on Parts II and III of the Schedule M-3. (Note that adjustments can be made during an examination for amounts reported on Part I of the Schedule M-3 due to errors in the calculations of the income/(loss) of the includible and excludable entities. However, it is unlikely taxpayers would report a Schedule UTP item that would relate to whether an entity should be included or excluded from the consolidated tax return.) Other Schedule UTP items may relate to tax credit amounts or international issues that are not reported on the Schedule M-3 but are instead reported on the forms and schedules specific to those items (i.e., Form 6765, *Credit for Increasing Research Activities*, or Form 5471, *Information Return of U.S. Persons with Respect to Certain Foreign Corporations*).<sup>16</sup>

In summary:

- Schedule M-3:
  - This IRS form is a crosswalk from the taxpayer's FS to their tax return.
  - Part I removes the income (loss) of all entities included in the FS but not included in the consolidated tax return and adds the income (loss) of all entities not included in the FS but included in the consolidated tax return.
  - Parts II and III require taxpayers to report the dollar amounts of the temporary and permanent adjustments they make to create their tax return from their FS as well as the initial book income and final tax income amounts for each scheduled item.
- Schedule UTP:
  - This IRS form reports the federal income tax uncertain tax positions reserved on the taxpayer's FS with respect to items on the tax return the taxpayer acknowledges the IRS may challenge.

<sup>13</sup> For a discussion of the uncertain tax positions reported on Schedule UTP and an analysis of how Schedule UTP reporting requirements affect corporate tax and financial reporting behavior, see Towery (2013).

<sup>14</sup> Footnote reporting of uncertain tax positions is required by U.S. GAAP under FAS No. 109 (ASC 740) and FIN 48 (ASC 740-10).

<sup>15</sup> Schedule UTP requires the reporting of each U.S. federal income tax position taken by an applicable corporation on its U.S. federal income tax return for which two conditions are satisfied: (1) The corporation has taken a tax position on its U.S. federal income tax return for the current tax year or for a prior tax year; and (2) Either the corporation or a related party has recorded a reserve with respect to that tax position for U.S. federal income tax in audited FS, or the corporation or related party did not record a reserve for that tax position because the corporation expects to litigate the position. A tax position for which a reserve was recorded (or for which no reserve was recorded because of an expectation to litigate) must be reported regardless of whether the audited FS are prepared based on U.S. GAAP, International Financial Reporting Standards (IFRS), or other country-specific accounting standards, including a modified version of any of the above (for example, modified GAAP).

<sup>16</sup> Although Schedule M-3 does not deal with credits, a direct correlation may exist between an item on Schedule M-3 and a credit. For example, there is a direct correlation between Schedule M-3 R&D costs on Part III, line 36, column (d), and credit eligible expenses on Form 6765, and therefore with the R&D credit. The most frequent code section cited is IRS section 482 relating to transfer pricing. IRC section 41 relating to the R&D credit is the second most frequent code section cited in 2010 and 2011 on Schedule UTP, Part I.

- Schedule UTP discloses relevant code sections and provides a concise description of the uncertain tax positions *without reporting the dollar amounts*.
- Items listed on Schedule UTP may relate to the amounts reported on Schedule M-3.
- Some items reported on Schedule UTP may relate to items not reported on Schedule M-3 (i.e., tax credit items).<sup>17</sup>

*Schedule M-3 and Schedule UTP are complementary sources of taxpayer transparency that do not overlap and do not contain duplicative information.* Sections A to D of Part IV of this report investigate some of the Schedule M-3 characteristics of Schedule UTP filers and nonfilers. Tables 1, 2, 4, 5, and 6 present additional data on Schedule UTP filers and nonfilers.

### C. Book-to-Tax Differences (BTD) and Signs

Book income is the FS income of the entity filing a corporation or partnership income tax return. For consolidated corporations filing U.S. Form 1120, book income is the consolidated FS income of the includible corporations joining in the consolidated tax return and will often differ from the worldwide consolidated income reported by the parent corporation's worldwide consolidated FS. Schedule M-3, Part I, reconciles worldwide consolidated FS income to book income.

We compare pretax book income (book income measured before federal income tax expense) with tax income and calculate BTD as pretax differences, consistent with the BTD literature since Talisman (2000).<sup>18</sup>

The BTD literature prior to the introduction of Schedule M-3 defined the sign of the difference between pretax book income and tax income as “book minus tax” resulting in a *positive* difference if the book amount is *higher* than the tax amount. Schedule M-3 reverses this prior convention to “tax minus book” by its reconciliation rules.

For Schedule M-3, the temporary and permanent adjustment amounts reported in columns (b) and (c) of Parts II and III are the amounts that are *added* to column (a) book income to determine column (d) tax income. A *positive* total BTD in columns (b) and (c) of Schedule M-3, Parts II and III, means that the tax amount is *higher* than the book amount. A *negative* total BTD in columns (b) and (c) of Schedule M-3, Parts II and III, means that the tax amount is *lower* than the book amount.

In this paper, the sign of Schedule M-3, Part III, expense/deduction data including BTD has been changed to agree with the effect of such expense/deduction items and BTD on net income reported on Part II, line 30. If a Part III expense/deduction item or BTD reduces Part II, line 30, net income, we show it as a negative amount.<sup>19</sup>

### D. Source of Schedule M-3 Data and UTP Status

A weighted statistical sample of tax return data is electronically encoded annually by the IRS Statistics of Income Division (SOI), for use by the U.S. Department of the Treasury Office of Tax Analysis (OTA), and the congressional Joint Committee on Taxation (JCT).<sup>20</sup> The Office of Planning, Analysis, Inventory, and Research (PAIR) within the IRS Large Business & International Division (LB&I) also receives a copy of the file.<sup>21</sup> The

<sup>17</sup> See prior footnote on R&D credits and Schedule M-3.

<sup>18</sup> We calculate total pretax book income and total pretax temporary and permanent BTD by adding back federal income tax expense and differences reported on Schedule M-3, Part III, lines 1 and 2, columns (a), (b), and (c), to book income and differences reported on Schedule M-3, Part II, line 30, columns (a), (b), and (c), column by column. Total BTD is the sum of total temporary and permanent BTD.

<sup>19</sup> Schedule M-3 instructions require that column (a) book expense and column (d) tax deduction amounts that reduce net book income and reduce net tax income be shown on Part III as positive amounts. However, some taxpayers fail to follow the instructions. For a discussion of the problem and how we deal with it, see Boynton, DeFilippes, and Legel (2006b and 2008) and Boynton, DeFilippes, Legel, and Reum (2011).

<sup>20</sup> The SOI corporate file is a statistical sample. The record for a smaller tax return (usually measured by total assets) may be weighted to represent more than one tax return. Generally tax returns for corporations with \$50 million or more in assets have a weight of one, that is, the record represents only itself. The record for a smaller tax return generally has a weight greater than one (for example five), that is, the record represents several similar tax returns (for example, five tax returns).

<sup>21</sup> Use of the SOI file by PAIR and LB&I is limited under a formal Memorandum of Understanding between SOI and LB&I to research studies. SOI file data are not used for IRS audit case building.

SOI corporate file includes Schedule M-1 data and, beginning with the 2004 file, Schedule M-3 data. Starting with 2010, the SOI corporate file reports if the taxpayer indicates on Form 1120, Schedule K that Schedule UTP is required, if a Schedule UTP, Part I, identifying an uncertain tax position is attached to the return with any data, and the number of lines on Schedule UTP, Part I, with any data on the line.<sup>22</sup> The 2011 SOI corporate file was issued to OTA, JCT, and LB&I in October 2013.<sup>23</sup>

Beginning May 2011, researchers using SOI data must report tax data as an aggregate for a minimum of five taxpayers to protect taxpayer confidentiality.<sup>24</sup> For statistical reasons, SOI prefers that reported aggregate data are for 10 or more taxpayers when possible.<sup>25</sup>

### ***E. Limits of Schedule M-3 Data***

With the exception of Schedule M-3, Part I, amounts reported on the Form 1120 tax return and the Schedule M-3, Parts II and III:

- are limited to the tax information and pretax book income information of the includible corporations in the tax consolidated return; and
- do not include the tax information or pretax book income information of the nonincludible corporations and partnerships (both foreign and domestic) that are included in the worldwide consolidated after-tax income reported on Schedule M-3, Part I, line 4 (the worldwide book income reported in the FS for consolidated book purposes).

The after-tax income of the nonincludible corporations and partnerships are removed, in gross after-tax amounts, on Schedule M-3, Part I, lines 5 and 6, as one step in determining the book income of the includible corporations reported on Schedule M-3, Part I, line 11.

Form 1120 tax return and Schedule M-3 data do not yield generalizations about the FS pretax consolidated worldwide income. In particular, amounts reported on the Form 1120 and the Schedule M-3 do not provide the data needed to calculate the pretax worldwide effective tax rate for the entities included in the worldwide FS.

### ***F. Reconciling Counts of Schedule UTP***

Table 1 shows a total of 2,074 Form 1120 2011 Schedule UTP filers compared to 2,190 reported by the PAIR LB&I UTP Registry for the 2011 form year. The difference is a result of:

- (1) including different corporate income tax return forms (PAIR counts include Form 1120-F and Form 1120 filed by parents of insurance companies and our tables include neither);

<sup>22</sup> The regular 2010 and 2011 SOI corporate files do not tabulate what is reported on Schedule UTP, Part I, and do not report if an attached Schedule UTP, Part I, contains relevant data. A special SOI supplement to each of the regular 2010 and 2011 SOI corporate files tabulates the limited information reported on Schedule UTP, Part I, lines 1 through 10, for current-year uncertain tax positions such as Internal Revenue Code (IRC) sections cited, temporary and permanent effect, whether the position is a major position, and relative rank of the position. Part II relating to prior year uncertain tax positions, and Part III relating to the concise descriptions for the positions listed in Parts I and II, are not tabulated by SOI.

<sup>23</sup> The final SOI corporate file may contain placeholder records representing returns for some reason not available at the time the SOI file is issued but desired by SOI for statistical purposes. Placeholder data are commonly the edited return data from the prior tax year, but may also be current-year data from the IRS Business Master File (limited return data tabulated by the IRS when the return is first received and processed) or data from the IRS Employee User Portal. Placeholder returns are not included in the Schedule M-3 First Look data files.

<sup>24</sup> Prior to May 2011, the minimum aggregation requirement for SOI and for other government agencies was data aggregation for three or more taxpayers or individuals. SOI has increased the required minimum for the use of SOI data to five or more. The change for SOI data applies to Tax Year 2008 and to new studies of data from earlier tax years. A data count of zero is permitted. Tests must be performed to assure that data cannot be generated by subtraction that would violate the minimum aggregations requirement. For a discussion of the older requirement of three or more taxpayers or individuals for aggregate data, see U.S. Office of Management and Budget Working Paper 22 (2005) and IRS Publication 1075 (Rev. 2007).

<sup>25</sup> Our tax return table values may not add and may differ from official 2010 and 2011 SOI values due to rounding. SOI publications do not include Schedules M-1 or M-3 data. Prior to the publication of Boynton, DeFilippes, and Legel (2005 and 2006a), only Plesko (2002) (for 1996–1998) and Plesko-Shumofsky (2005) (for 1995–2001) presented public Schedule M-1 data for the SOI corporate file population. The year-by-year reconciliations of the subset of corporations meeting our minimum data and reconciliation tests for this 2010–2011 Schedule M-3 study with the full 2010–2011 SOI corporate files are presented in Distribution Table D3 of the full M-3 First Look data set for each year, 2010–2011, are available on request. Our minimum data and reconciliation tests require that Part I, line 11 and Part II, line 30 column (a) agree and that Part III, line 38 and Part II, line 27 agree within 1 percent of the maximum absolute value of the amounts on Part II, line 30.

- (2) using different tax year beginning months and ending months for 2011 (July 2011 to June 2012 for SOI data versus December 2011 to November 2012 for PAIR);
- (3) using different standards as to whether Schedule UTP is filed (SOI reports the indication on Form 1120, Schedule K that Schedule UTP is required; in addition SOI counts Schedule UTP as present if any Schedule UTP, Part I Current Year line, has any data; PAIR requires both Schedule UTP, Parts I Current Year or II Prior Year, and also Part III Concise Descriptions);<sup>26</sup> and
- (4) different minimum asset recognition thresholds (PAIR includes voluntary filing by a corporation with assets below \$100 million and this report does not).

In particular: (1) 2011 SOI Schedule UTP data are for Form 1120 tax returns with year ends of July 2011 through June 2012; (2) we recognize a corporation as a Schedule UTP filer if SOI recognizes the indication on Form 1120, Schedule K, that Schedule UTP is required and/or SOI recognizes the presence of a Schedule UTP, Part I, with any data on any line; (3) we exclude Form 1120 returns if SOI indicates that it is the parent of an insurance company and should be classified as either 1120-L or 1120-PC under the SOI test of 50 percent or more of the total receipts are from life insurance or property and casualty insurance; and (4) we exclude voluntary 2011 Schedule UTP filed by corporations with total Schedule L assets of less than \$100 million.

### Reconciliation of the Number of 1120 Returns for July 2011–June 2012

UTP registry for Dec 2011–Nov 2012	2,190
Remove 1120-F returns	- 22
<b>Subtotal</b> 1120, 1120-L, 1120-PC for Dec 2011–Nov 2012	<b>2,168</b>
Remove 1120 for July 2012–Nov 2012	- 217
<b>Subtotal</b> 1120, 1120-L, 1120-PC for Dec 2011–June 2012	<b>1,951</b>
Add 1120 for July 2011–Nov 2011	+ 245
<b>Subtotal</b> 1120, 1120-L, 1120-PC for July 2011–June 2012	<b>2,196</b>
Add 1120 identified by SOI UTP Flag NOT in UTP Registry	+ 75
<b>Subtotal</b> 1120+1120-L+1120-PC UTP identified by SOI UTP flag for July 2011–July 2012	<b>2,271</b>
Remove returns deemed 1120-L and 1120-PC identified by SOI	- 111
<b>Subtotal</b> 1120 UTP identified by SOI UTP flag for July 2011–June 2012	<b>2,160</b>
Remove 1120 for July 2011–June 2012 with assets below \$100 million	- 86
<b>Total</b> 1120 for July 2011–June 2012 identified by SOI UTP flag with assets of \$100 million or more	<b>2,074</b>

## Part II. 2011 Worldwide Income to Tax Less Credits

### A. By Asset Size, FS Type, and UTP Status

Table 1 presents 2011 Schedule M-3, Part I, data and other tax return data for the 41,636 corporations meeting our study requirements filing the Form 1120 broken down by asset size, UTP filing status, and for three FS types (SEC 10K/Public, Audited, and Unaudited).<sup>27</sup> The columns are key tax return and Schedule M-3 variables: number of returns, Schedule L total assets, worldwide income, nonincludible foreign income, pretax book income, tax net income, pretax temporary BTD, pretax permanent BTD, tax net income positive, taxable income, foreign tax credit, and U.S. corporate income tax less credits.<sup>28</sup>

<sup>26</sup> The regular 2010 and 2011 SOI corporate files do not tabulate what is reported on Schedule UTP, Part I, and do not report if an attached Schedule UTP, Part I, contains relevant data. A special SOI supplement to each of the regular 2010 and 2011 SOI corporate files tabulates the limited information reported on Schedule UTP, Part I, lines 1 through 10, for current year uncertain tax positions such as IRC sections cited, temporary and permanent effect, whether the position is a major position, and relative rank of the position. Part II relating to prior-year uncertain tax positions, and Part III relating to the concise descriptions for the positions listed in Parts I and II, are not tabulated by SOI.

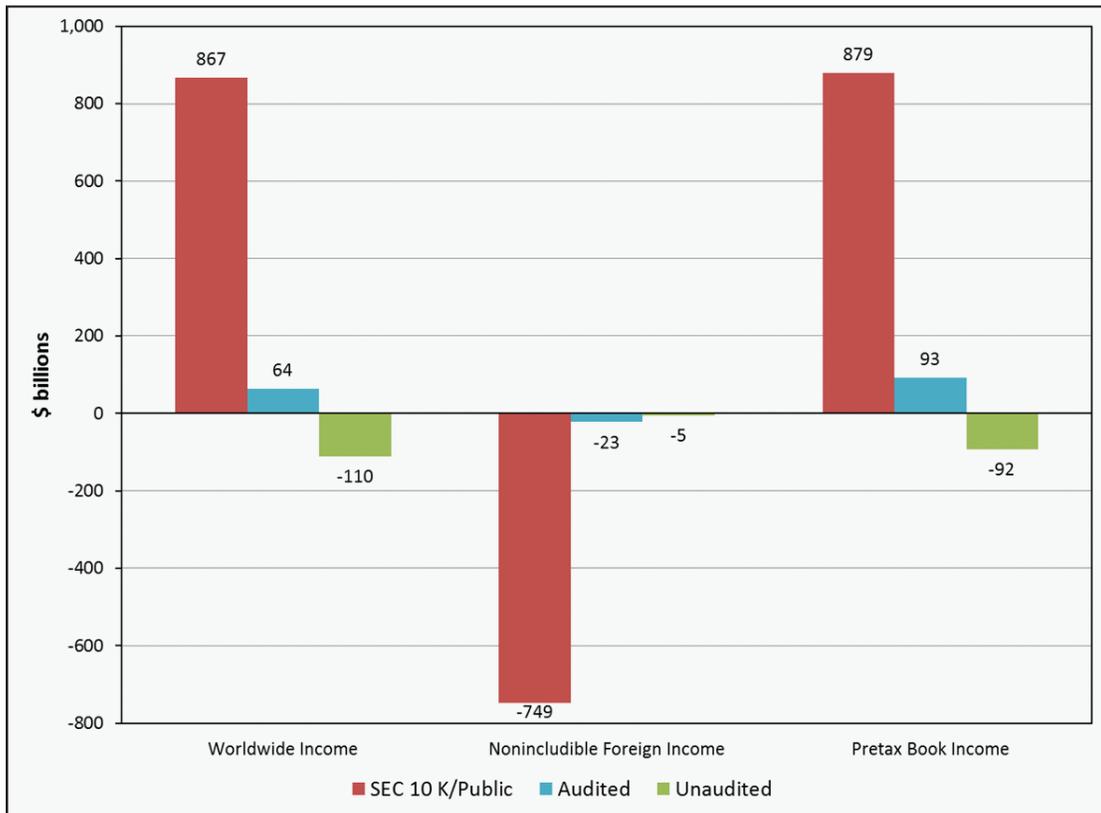
<sup>27</sup> Some companies with assets less than \$10 million voluntarily filed Schedule M-3. We do not analyze that data. Our minimum reconciliation tests require Schedule M-3 data agreement within tolerances of 1 percent of the maximum absolute value of the amounts on Part II, line 30, for income between Part I, line 11, and Part II, line 30, column (a), and for expenses/deductions between Part III, line 38, and the carryover line Part II, line 27. The year-by-year reconciliations of the subset of corporations meeting our minimum data and reconciliation tests for this 2010–2011 Schedule M-3 study with the full 2010–2011 SOI corporate files are presented in Distribution Table D3 of the full M-3 First Look data set for each year, 2010–2011, available on request.

<sup>28</sup> Nonincludible foreign income is shown as negative in Table 1 because it is the foreign income that must be removed from worldwide income in determining book income for the U.S. tax consolidated group. FTC is shown as negative in Table 1 because it reduces the U.S. income tax that is owed.

Table 1 has two columns of percentages following each amount giving, first, the percentage of the total for all 41,636 corporations represented by that row amount, and, second, the percentage of the total for the subgroup of rows in which the row is included represented by that row amount.

Figures 1A-1C highlight the relative magnitude of several 2011 Schedule M-3 and Form 1120 tax return income and adjustment amounts involved in moving from worldwide consolidated FS income to tax less credits. Data are presented for three FS types: SEC 10K/Public, Audited, and Unaudited.<sup>29</sup>

**FIGURE 1A. 2011: U.S. Corporation M-3: Worldwide Income to Pretax Book Income**



In Figure 1A, for 2011, total worldwide consolidated FS income (reported on Schedule M-3, Part I, line 4) is \$867,248 million for SEC 10K/Public; \$63,688 million for Audited; and -\$110,295 million for Unaudited.

Next shown in Figure 1A is the adjustment to remove nonincludible foreign net income (reported on Schedule M-3, Part I, line 5). The 2011 adjustment is -\$748,596 million for SEC 10K/Public; -\$22,616 million for Audited; and -\$5,223 million for Unaudited.<sup>30</sup>

<sup>29</sup> We define "SEC 10K/Public" to include any tax return on which (1) Schedule M-3, Part I, line 1a, indicated an SEC 10K was filed or (2) Part I, line 3a, indicated the corporation had publicly traded common stock. Some firms indicate the first without the second which may mean publicly traded debt or a reporting error. Other firms report the second without the first suggesting a reporting error. We make use of the presence of either indicator. We define "Audited" to include any tax return on which Schedule M-3, Part I, line 1b, indicates a certified audited FS was prepared and our requirements for "SEC 10K/Public" are not met. We define "Unaudited" to include all other returns.

<sup>30</sup> The adjustment to remove positive nonincludible foreign net income from worldwide FS income is shown as a *negative* amount on Schedule M-3, Part I, in the calculation of the book income of includible corporations. The income must be removed from worldwide FS income in the calculation of the book income of includible corporations because foreign subsidiaries owned more than 50 percent and certain foreign partnerships are includible in worldwide consolidated FS but only U.S. corporations owned more than 80 percent are includible in the U.S. tax consolidated group tax return.

**TABLE 1. 2011 U.S. Corporations Form 1120 Schedule M-3: Financial Statement Type by Asset Size by UTP Filing Status (\$ millions)**

Asset Size (A)	UTP Filing Status and Financial Statement Type	Number of Returns				Schedule L Total Assets				Worldwide Income (Part I Ln 4)				Noncludible Foreign Income				Pretax Book Income				Tax Net Income			
		Sum		%2		Sum		%2		Sum		%2		Sum		%2		Sum		%2		Sum		%2	
		%1	%2	%1	%2	%1	%2	%1	%2	%1	%2	%1	%2	%1	%2	%1	%2	%1	%2	%1	%2	%1	%2		
All	All	41,636	100	100	51,095,020	100	100	820,641	100	100	-776,435	100	100	879,279	100	100	715,873	100	100						
	a SEC 10 K/Public	4,488	11	11	37,697,048	74	74	867,248	106	106	-748,596	96	96	878,771	100	100	637,691	89	89						
	b Audited	17,298	42	42	6,354,953	12	12	63,688	8	8	-22,616	3	3	92,621	11	11	45,882	6	6						
All	c Unaudited	19,850	48	48	7,043,018	14	14	-110,295	-13	-13	-5,223	1	1	-92,114	-10	-10	32,300	5	5						
	a 1120 Consolidated	19,485	47	47	20,243,234	40	40	556,127	68	68	-334,930	43	43	613,912	70	70	242,821	34	34						
	b 1120 Mixed Group	420	1	1	23,273,632	46	46	265,442	32	32	-427,122	55	55	269,238	31	31	233,126	33	33						
\$10M ≤ A < \$50M	c 1120 Unconsolidated	21,732	52	52	7,578,153	15	15	-928	0	0	-14,383	2	2	-3,872	0	0	37,306	5	5						
	All	24,012	58	58	524,047	1	1	-2,304	0	0	-7,086	1	1	-5,077	-1	-1	-5,918	-1	-1						
	All	5,317	13	13	377,215	1	1	1,845	0	0	-1,271	0	0	2,323	0	0	68	0	0						
A ≥ \$100M	All	12,307	30	30	50,193,759	98	98	821,100	100	100	-768,079	99	99	882,032	100	100	721,722	101	101						
	with UTP	2,074	5	17	35,883,467	70	71	770,004	94	94	-695,826	90	91	803,216	91	91	611,598	85	85						
	a SEC 10 K/Public	1,227	3	10	31,349,918	61	62	732,811	89	89	-682,842	88	89	740,593	84	84	558,750	78	77						
	b Audited	535	1	4	2,561,995	5	5	27,278	3	3	-11,768	2	2	44,613	5	5	22,246	3	3						
	c Unaudited	311	1	3	1,971,553	4	4	9,915	1	1	-1,216	0	0	18,011	2	2	30,603	4	4						
	without UTP	10,233	25	83	14,310,292	28	29	51,096	6	6	-72,253	9	9	78,816	9	9	110,124	15	15						
	a SEC 10 K/Public	2,143	5	17	6,300,624	12	13	138,890	17	17	-63,497	8	8	143,609	16	16	82,959	12	11						
	b Audited	4,861	12	39	3,387,115	7	7	34,550	4	4	-9,136	1	1	46,867	5	5	24,116	3	3						
	c Unaudited	3,229	8	26	4,622,553	9	9	-122,344	-15	-15	381	0	0	-111,659	-13	-13	3,049	0	0						
	All	2,751	7	100	47,199,385	92	100	782,195	95	100	-753,264	97	100	833,436	95	100	687,664	96	100						
	with UTP	1,072	3	39	35,488,064	69	75	757,394	92	97	-689,080	89	91	791,482	90	95	599,656	84	87						
	a SEC 10 K/Public	748	2	27	31,148,090	61	66	723,340	88	92	-677,128	87	90	732,578	83	88	551,856	77	80						
b Audited	159	0	6	2,428,108	5	5	24,473	3	3	-10,914	1	1	41,776	5	5	18,277	3	3							
c Unaudited	165	0	6	1,911,866	4	4	9,581	1	1	-1,038	0	0	17,128	2	2	29,524	4	4							
without UTP	1,679	4	61	11,711,321	23	25	24,801	3	3	-64,184	8	9	41,954	5	5	88,008	12	13							
a SEC 10 K/Public	803	2	29	5,761,870	11	12	128,041	16	16	-57,578	7	8	134,187	15	16	78,049	11	11							
b Audited	486	1	18	2,119,574	4	4	23,912	3	3	-7,671	1	1	29,668	3	4	12,925	2	2							
c Unaudited	390	1	14	3,829,877	7	8	-127,153	-15	-16	1,064	0	0	-121,901	-14	-15	-2,967	0	0							
All	9,556	23	100	2,994,374	6	100	38,905	5	100	-14,815	2	100	48,598	6	100	34,058	5	100							
with UTP	1,002	2	10	395,403	1	13	12,610	2	32	-6,746	1	46	11,735	1	24	11,942	2	35							
a SEC 10 K/Public	479	1	5	201,828	0	7	9,471	1	24	-5,714	1	39	8,015	1	16	6,894	1	20							
b Audited	376	1	4	133,887	0	4	2,805	0	7	-853	0	6	2,837	0	6	3,969	1	12							
c Unaudited	146	0	2	59,687	0	2	333	0	1	-179	0	1	883	0	2	1,079	0	3							
without UTP	8,554	21	90	2,598,971	5	87	26,295	3	68	-8,069	1	54	36,863	4	76	22,116	3	65							
a SEC 10 K/Public	1,340	3	14	538,754	1	18	10,849	1	28	-5,919	1	40	9,422	1	19	4,910	1	14							
b Audited	4,375	11	46	1,267,540	2	42	10,637	1	27	-1,466	0	10	17,199	2	35	11,190	2	33							
c Unaudited	2,839	7	30	792,677	2	26	4,808	1	12	-683	0	5	10,241	1	21	6,016	1	18							

%1 = the percentage of the total for all 41,636 corporations represented by that row amount; %2 = the percentage of the total for the subgroup of rows in which the row is included represented by that row amount. Totals may not equal the sum of the components due to rounding.

**TABLE 1. 2011 U.S. Corporations Form 1120 Schedule M-3: Financial Statement Type by UTP Filing Status (\$ millions)**  
(Continued)

Asset Size (A)	UTP Filing Status and Financial Statement Type	Pretax Temporary Book-Tax Difference		Pretax Permanent Book-Tax Difference		Positive Tax Net Income		Taxable Income		Foreign Tax Credit		Total Tax Less Credits		
		Sum	%1	%2	Sum	%1	%2	Sum	%1	%2	Sum	%1	%2	
All	All	-150,437	100	100	36,807	100	1,007,640	100	894,552	100	-104,882	100	190,756	100
	a SEC 10 K/Public	-202,588	135	135	-5,315	-14	776,399	77	700,876	78	-94,412	90	137,090	72
	b Audited	-54,477	36	36	9,707	26	117,093	12	101,086	11	-5,769	6	27,160	14
All	c Unaudited	106,629	-71	-71	32,416	88	114,147	11	92,590	10	-4,701	4	26,506	14
	a 1120 Consolidated	-181,226	120	120	65,336	178	625,863	62	572,099	64	-74,762	71	118,008	62
	b 1120 Mixed Group	45,302	-30	-30	-30,037	-82	326,410	32	276,774	31	-29,042	28	58,436	31
\$10M ≤ A < \$50M	c 1120 Unconsolidated	-14,513	10	10	1,508	4	55,367	5	45,679	5	-1,077	1	14,312	8
	All	-2,976	2	2	2,193	6	24,808	2	19,311	2	-181	0	6,246	3
	All	-3,812	3	3	1,571	4	14,900	1	11,617	1	-212	0	3,719	2
\$50M ≤ A < \$100M	All	-143,648	95	95	33,043	90	967,931	96	863,623	97	-104,489	100	180,791	95
	with UTP	-162,003	108	113	4,532	12	716,857	71	647,420	72	-88,912	85	125,224	66
	a SEC 10 K/Public	-132,785	88	92	-18,395	-50	641,765	64	580,837	65	-83,242	79	108,995	57
A ≥ \$100M	b Audited	-22,318	15	16	1,409	4	36,892	4	33,344	4	-4,125	4	6,914	4
	c Unaudited	-6,900	5	5	21,518	58	38,200	4	33,239	4	-1,545	1	9,314	5
	without UTP	18,355	-12	-13	28,511	77	251,074	25	216,203	24	-15,577	15	55,567	29
A ≥ \$1B	a SEC 10 K/Public	-70,126	47	49	11,984	33	132,598	13	118,866	13	-11,151	11	27,715	15
	b Audited	-29,565	20	21	7,275	20	61,420	6	52,610	6	-1,431	1	15,407	8
	c Unaudited	118,045	-78	-82	9,253	25	57,056	6	44,727	5	-2,994	3	12,446	7
A ≥ \$1B	All	-122,932	82	100	25,746	70	874,480	87	785,617	88	-101,499	97	157,549	83
	with UTP	-161,719	107	132	3,873	11	695,357	69	629,191	70	-87,966	84	120,283	63
	a SEC 10 K/Public	-131,758	88	107	-18,340	-50	629,053	62	570,242	64	-82,680	79	106,198	56
A ≥ \$1B	b Audited	-22,631	15	18	585	2	30,702	3	27,839	3	-3,864	4	5,363	3
	c Unaudited	-7,330	5	6	21,627	59	35,602	4	31,109	3	-1,422	1	8,722	5
	without UTP	38,787	-26	-32	21,873	59	179,123	18	156,426	17	-13,533	13	37,266	20
A ≥ \$1B	a SEC 10 K/Public	-64,688	43	53	10,745	29	114,920	11	104,321	12	-10,570	10	23,384	12
	b Audited	-21,117	14	17	4,612	13	30,698	3	26,278	3	-677	1	7,240	4
	c Unaudited	124,592	-83	-83	6,516	18	33,505	3	25,829	3	-2,286	2	6,643	3
\$100M ≤ A < \$1B	All	-20,718	14	100	7,297	20	93,452	9	78,007	9	-2,990	3	23,241	12
	with UTP	-285	0	1	659	2	21,500	2	18,230	2	-946	1	4,940	3
	a SEC 10 K/Public	-1,026	1	5	-56	0	12,712	1	10,594	1	-563	1	2,797	1
\$100M ≤ A < \$1B	b Audited	312	0	-2	824	2	6,191	1	5,506	1	-260	0	1,550	1
	c Unaudited	430	0	-2	-110	0	2,598	0	2,129	0	-123	0	592	0
	without UTP	-20,433	14	99	6,638	18	71,952	7	59,777	7	-2,044	2	18,301	10
\$100M ≤ A < \$1B	a SEC 10 K/Public	-5,438	4	26	1,238	3	17,677	2	14,545	2	-580	1	4,331	2
	b Audited	-8,447	6	41	2,662	7	30,722	3	26,332	3	-755	1	8,167	4
	c Unaudited	-6,547	4	32	2,738	7	23,551	2	18,899	2	-709	1	5,803	3

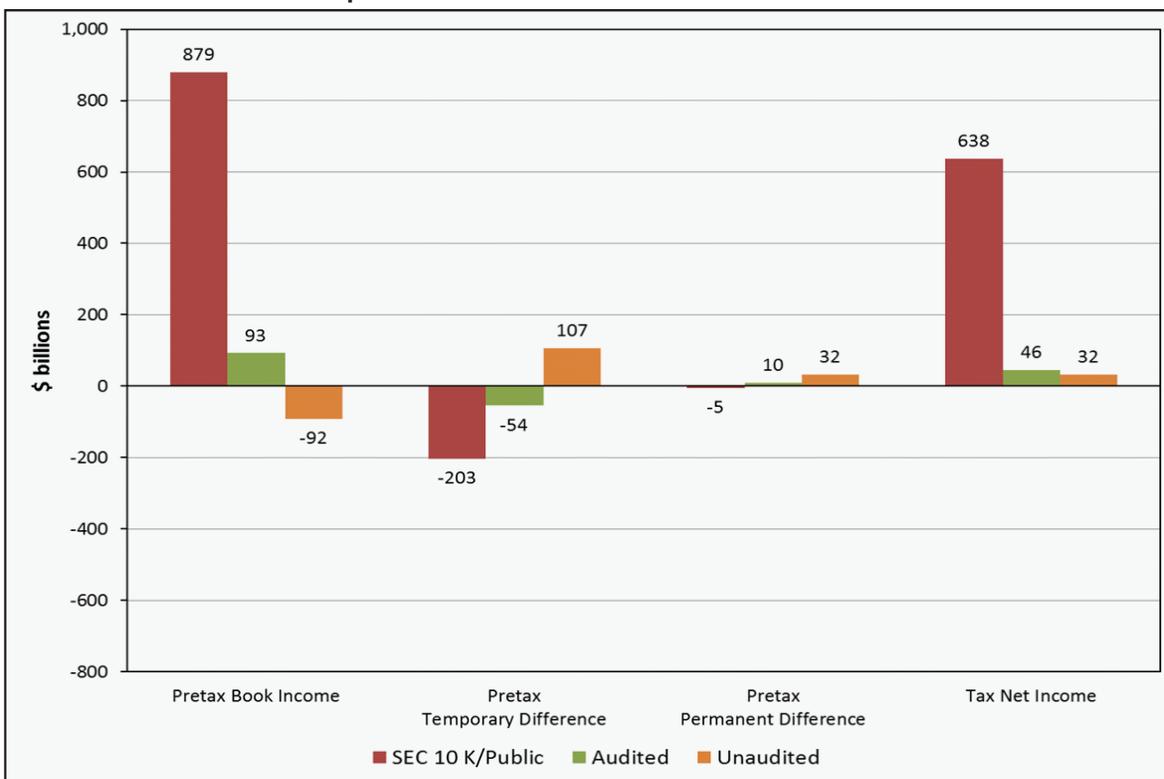
%1 = the percentage of the total for all 41,636 corporations represented by that row amount; %2 = the percentage of the total for the subgroup of rows in which the row is included represented by that row amount. Totals may not equal the sum of the components due to rounding.

Data for the following 2011 Schedule M-3, Part I, adjustments are not shown in Figure 1A and are not included in Table 1:<sup>31</sup>

- The adjustment to remove nonincludible U.S. net income (reported on Schedule M-3, Part I, line 6);<sup>32</sup>
- The adjustment to include the net income of other includible entities (reported on Schedule M-3, Part I, line 7);<sup>33</sup>
- The adjustment to FS consolidation eliminations (reported on Schedule M-3, Part I, line 8) because of the removal of the net income of foreign and U.S. nonincludible corporations and partnerships and the inclusion of the net income of other includible entities;<sup>34</sup>
- The adjustment to income because of differences in FS year and tax year (reported on Schedule M-3, Part I, line 9);
- Other adjustments (reported on Schedule M-3, Part I, line 10) required to determine the net income of includible corporations (“book income”);<sup>35</sup> and
- The net income of includible corporations (“book income”) (reported on Schedule M-3, Part I, line 11).<sup>36</sup>

Shown last in Figure 1A is pretax book income. Pretax book income is \$878,771 million for SEC 10K/Public, \$92,621 million for Audited, and - \$92,114 million for Unaudited.<sup>37</sup>

**FIGURE 1B. 2011: U.S. Corporation M-3: Pretax Book Income to Tax Net Income**



<sup>31</sup> Data for 2006-2010 for all of the items are reported in Tables 1A-1D of Boynton, DeFilippes, Legel, and Reum (2014).

<sup>32</sup> The adjustment to remove positive nonincludible U.S. net income from worldwide FS income would be shown as a *negative* amount. U.S. subsidiaries owned more than 50 percent and certain U.S. partnerships are includible in worldwide consolidated FS but only U.S. corporations owned 80 percent or more are includible in the U.S. tax consolidated tax return.

<sup>33</sup> Other includible entities are U.S. subsidiaries owned 80 percent or more and certain disregarded entities (if owned by any of the includible corporations) for some reason not included in the worldwide consolidated FS and therefore not included on Schedule M-3, Part I, Line 4.

<sup>34</sup> Such adjustments include the restoration of certain dividends, minority interests, and equity method income eliminated in the consolidation for worldwide consolidated FS income.

<sup>35</sup> These adjustments include adjustments required between GAAP and statutory accounting when subsidiaries are insurance companies.

<sup>36</sup> Book income on Schedule M-3, Part I, line 11, is the book anchor for the Schedule M-3 book-to-tax reconciliation in Parts II and III. Tax net income on Form 1120, page 1, line 28, is the tax anchor.

<sup>37</sup> For our analysis, consistent with the BTM literature since Talisman (2000), we adjust book income to pretax book income by reversing the recognition of federal income tax expense (reported on Schedule M-3, Part III, lines 1, and 2) and calculate BTM as pretax differences. The adjustment of book income to pretax book income permits a consistent comparison with tax return income. See our discussion of pretax income, BTM, and signs in Part I. C of this paper.

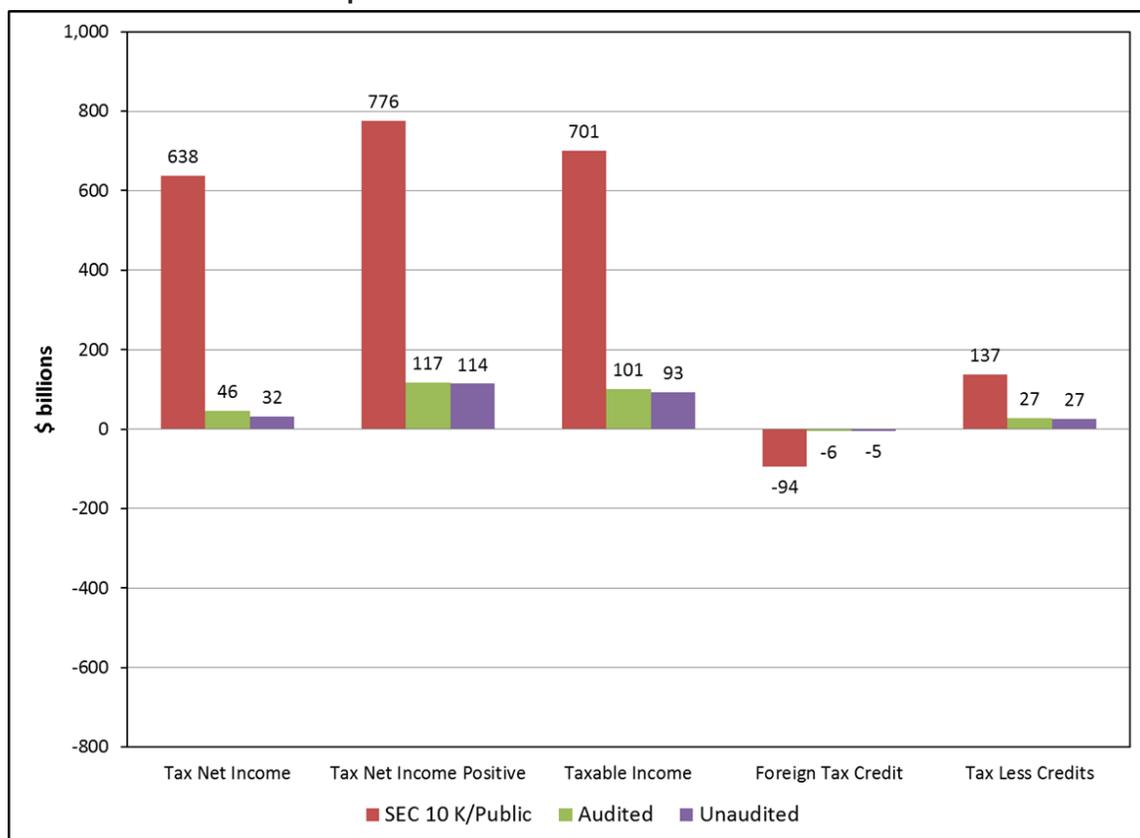
The first item in Figure 1B is pretax book income repeating the last item in Figure 1A.

Next shown in Figure 1B is the adjustment for net temporary BTD followed by the adjustment for net permanent BTD. Net total BTD is the sum of net temporary BTD and net permanent BTD. A negative BTD reduces tax net income compared to pretax book income. A positive BTD increases tax net income compared to pretax book income.

The net temporary BTD is -\$202,588 million for SEC 10K/Public, -\$54,477 million for Audited, and \$106,629 million for Unaudited. The net permanent BTD is -\$5,315 million for SEC 10K/Public, \$9,707 million for Audited, and \$32,416 million for Unaudited.

Not shown are the adjustments to Form 1120, page 1, line 4, dividend income and line 28 tax net income made by SOI to remove intercompany dividends (ICD) and the adjustment to correct other Form 1120, page 1, reporting errors impacting line 28 tax net income.<sup>38</sup>

**FIGURE 1C. 2011: U.S. Corporation M-3: Tax Net Income to Tax Less Credits**



Tax net income is the last item in Figure 1B and the first item in Figure 1C. It is \$637,691 million for SEC 10K/Public, \$45,882 million for Audited, and \$32,300 million for Unaudited.

The next item shown in Figure 1C is total positive tax net income, that is, the total tax net income of corporations not reporting a loss on Form 1120, page 1, line 28. Loss corporations are not subject to the regular

<sup>38</sup> Data for 2006-2010 are reported in Tables 1A-1D of Boynton, DeFilippes, Legel, and Reum (2014). Some taxpayers improperly include ICD in tax net income on Form 1120, page 1, line 28, the reconciliation target for Schedule M-3. The taxpayer then removes the same ICD amount as a 100-percent dividends-received deduction on line 29b so that it does not increase final income subject to tax on line 30. On the SOI corporate file, SOI removes all ICD that it identifies from Form 1120 data including from page 1, line 28, whether or not the tax consolidation group contains an insurance company subsidiary. See the discussion of the history of ICD editing by SOI for 1990-2003 tax years in Boynton, DeFilippes, and Legel (2005 and 2006a) and Boynton, DeFilippes, Legel, and Reum (2011 and 2014). Note that changes on the SOI corporate file do not change the amounts on the tax return and do not impact IRS audits (or lack of audits) for corporate tax returns.

corporate income tax. Positive tax net income is \$776,399 million for SEC 10K/Public, \$117,093 million for Audited and \$114,147 million for Unaudited.

Not shown in Figure 1C are:<sup>39</sup>

- The Form 1120, page 1, line 29a, net operating loss (NOL) deduction utilizing prior-year losses to reduce current taxable income;<sup>40</sup> and
- The adjustment for special deductions (dividend received deductions), on Form 1120, page 1, line 29b. The adjustment for special deductions reduces taxable income.

The next item shown is Form 1120, page 1, line 30, taxable income: \$700,876 million for SEC 10K/Public, \$101,086 million for Audited, and \$92,590 million for Unaudited.

Not shown is U.S. federal corporate income tax before credits.<sup>41</sup>

The next to last item shown is foreign tax credits (FTC) of -\$104,882 for all corporations, -\$94,412 million for SEC 10K/Public, -\$5,769 million for Audited, and -\$4,701 million for Unaudited.<sup>42</sup>

Missing from Figure 1C are adjustments for the general business credit and other credits reducing taxes due.<sup>43</sup>

In Figure 1C, the last item is tax less credits of \$137,090 million for SEC 10K/Public, \$27,160 million for Audited, and \$26,506 million for Unaudited.

Figure 2 expands on the 2011 analysis of pretax book income to tax net income first shown in Figure 1B and focuses on the corporations with \$100 million or more in assets—that is, the study population potentially subject to filing Schedule UTP for 2011. Figure 2 and Table 1 present data for Schedule UTP filers and nonfilers by FS type.

Table 1 data highlight the relative importance to the U.S. corporate tax system of very large corporations and of corporations that are publicly held and file with the SEC as well as the importance of “mixed groups” (tax consolidated groups with a noninsurance parent and one or more insurance subsidiaries). The study data for 2011 include 41,636 corporations that file Schedule M-3 including 12,307 corporations (30 percent) with total assets of \$100 million or more that are potentially subject to filing Schedule UTP.

The 2,751 corporations (7 percent) with \$1 billion or more in assets report 92 percent of the assets, 95 percent of the worldwide income, 97 percent of the nonincludible foreign income, 95 percent of pretax book income, 82 percent of the net negative (tax income reducing) temporary BTD, 70 percent of the net positive permanent BTD, and 83 percent of the tax less credits for the 41,636 corporations. The 4,488 corporations (11 percent) with SEC 10K/Public FS report 74 percent of the assets, 106 percent of the worldwide income, 96 percent of the nonincludible foreign income, 100 percent of pretax income, 135 percent of the net negative temporary BTD, and net negative permanent BTD equal to -14 percent of the aggregate net positive permanent BTD, and 72 percent of the tax less credits. The 420 corporations (1 percent) that are mixed groups report 46 percent of the assets, 32 percent of the worldwide income, 55 percent of the nonincludible foreign income, 31 percent of pretax book income, net positive temporary BTD equal to -30 percent of the aggregate net negative temporary BTD, net negative permanent BTD equal to -82 percent of the aggregate net positive permanent BTD, and 31 percent of the tax less credits.

In contrast with the above, the 24,012 corporations (58 percent) with assets of \$10 million or more but less than \$50 million report only 1 percent of total assets, an aggregate FS net loss representing less than 1 percent

<sup>39</sup> Data for 2006-2010 for all of the items are reported in Tables 1A-1D of Boynton, DeFilippes, Legel, and Reum (2014).

<sup>40</sup> The adjustment for the NOL deduction would be shown as negative because the adjustment reduces taxable income.

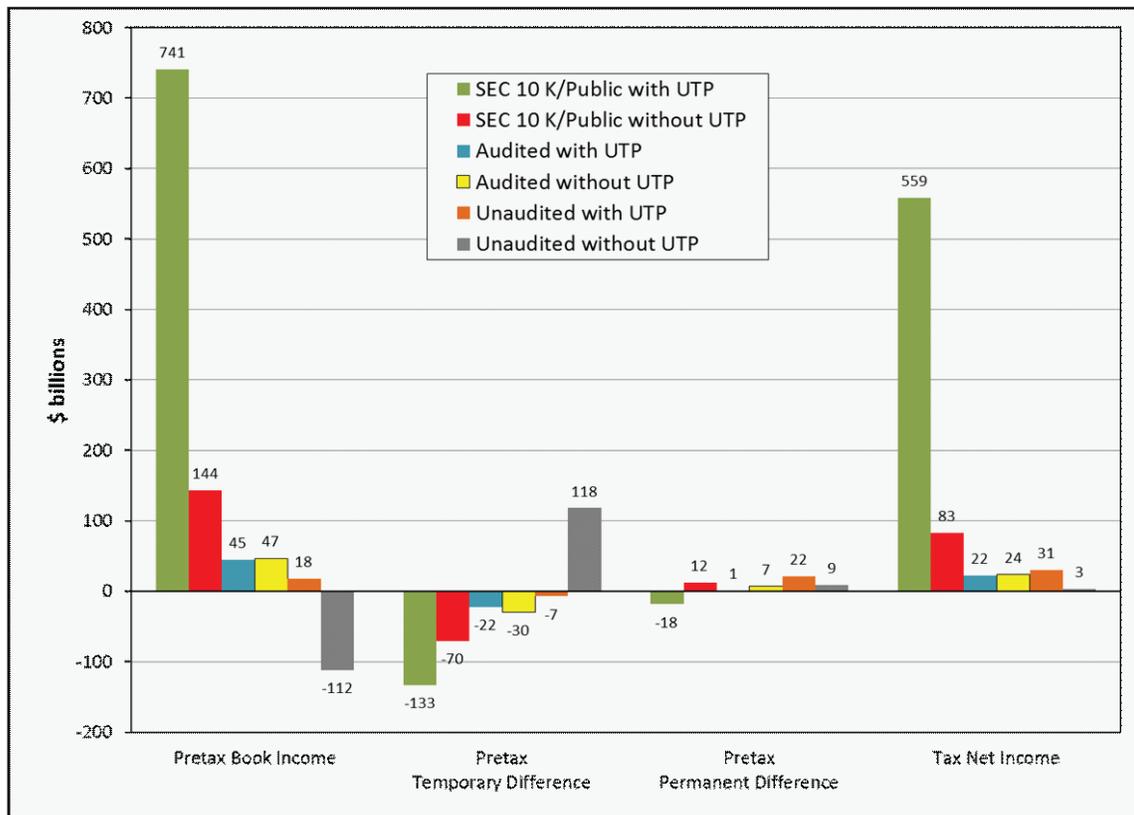
<sup>41</sup> Data for 2006-2010 are reported in Tables 1A-1D of Boynton, DeFilippes, Legel, and Reum (2014).

<sup>42</sup> The adjustment for FTC is shown as negative because the adjustment reduces the U.S. income tax that is owed. FTC reduces U.S. income taxes, within limits, for income taxes paid to foreign countries on income earned outside the U.S. but included in U.S. taxable income.

<sup>43</sup> Data for 2006-2010 are reported in Tables 1A-1D of Boynton, DeFilippes, Legel, and Reum (2014).

of worldwide income, and 3 percent of tax less credits.<sup>44</sup> The 5,317 corporations (13 percent) with assets of \$50 million or more but less than \$100 million report only 1 percent of total assets, an aggregate FS net profit representing less than 1 percent of worldwide income, and 2 percent of tax less credits. Corporations with assets of \$50 million or more but less than \$100 million are potentially subject to filing Schedule UTP starting in 2012. Corporations with assets of \$10 million or more but less than \$50 million are potentially subject to filing Schedule UTP starting in 2014.

**FIGURE 2. 2011: U.S. Corporation M-3: Pretax Book Income to Tax Net Income, All FS by UTP Status**



The 12,307 corporations (30 percent) with assets of \$100 million or more in 2011 are potentially required to file Schedule UTP. They report 98 percent of assets, approximately 100 percent of net aggregate worldwide income, 99 percent of the nonincludible foreign income, approximately 100 percent of net aggregate pretax book income, 95 percent of the net negative temporary BTD, 90 percent of the net positive permanent BTD, and 95 percent of tax less credits for the 41,636 corporations.

The 2,074 corporations (5 percent) with assets of \$100 million or more that in fact filed Schedule UTP report 70 percent of assets, 94 percent of worldwide income, 90 percent of the nonincludible foreign income, 91 percent of pretax book income, 108 percent of the net negative (tax-income-decreasing) temporary BTD, 12 percent of the net positive (tax-income-increasing) permanent BTD, and 66 percent of tax less credits for the 41,636 corporations.

<sup>44</sup> Effective for tax years ending December 31, 2014, and later, corporations and partnerships with \$10 million or more in assets but less than \$50 million in assets and those partnerships with less than \$10 million in assets required to file Schedule M-3 would be permitted to file Schedule M-3, Part I, and to file Schedule M-1 in place of Schedule M-3, Parts II and III, if they so choose.

In contrast, the 10,233 corporations (25 percent) with assets of \$100 million or more that did not file Schedule UTP (were not required to file or failed to file) report 28 percent of assets, 6 percent of worldwide income, 9 percent of nonincludible foreign income, 9 percent of the pretax book income, net positive temporary BTD equal to -12 percent of the net negative temporary BTD, 77 percent of the net positive permanent BTD, and 29 percent of tax less credits for the 41,636 corporations.

### ***B. By Industry and UTP Status***

Table 2 presents distribution table data for 2011 with rows for 19 key industries and Schedule UTP filing status for 12,307 corporations with \$100 million or more in assets.<sup>45</sup> The columns are key tax return and Schedule M-3 variables: number of returns, Schedule L total assets, worldwide income, nonincludible foreign income, pretax book income, pretax temporary BTD, pretax permanent BTD, and U.S. corporate income tax less credits.<sup>46</sup> Subtotals are presented for: manufacturing, finance/holding, and other.

Table 2 has two columns of percentages following each row amount giving, first, the percentage of the total for all 12,307 corporations represented by that row amount, and, second, the percentage of the total for the industry within which the row is included represented by that row amount.

The rate of filing Schedule UTP by the 12,307 corporations with assets of \$100 million or more differs greatly by industry. In manufacturing, 908 (34 percent) file Schedule UTP and 1,802 (66 percent) do not. In finance/holding, 189 (4 percent) file and 4,678 (96 percent) do not. In other, 976 (21 percent) file and 3,753 (79 percent) do not.

The 908 manufacturing corporations filing Schedule UTP report 18 percent of assets for the 12,307 corporations with \$100 million or more in assets, 54 percent of the worldwide income, 69 percent of nonincludible foreign income, 44 percent of pretax book income, 28 percent of the net negative temporary BTD, 44 percent of the net positive permanent BTD, and 28 percent of the tax less credits. In contrast, the 1,802 manufacturing corporations that do not file Schedule UTP report 9 percent of the worldwide income of the 12,307 corporations, 6 percent of the foreign nonincludible income, and 13 percent of the net negative permanent BTD.

The 189 finance/holding corporations filing Schedule UTP report a disproportionate 41 percent of assets for the 12,307 corporations with assets of \$100 million or more but only 12 percent of tax less credits, 10 percent of worldwide income, 5 percent of nonincludible foreign income, 16 percent of pretax book income, 6 percent of net negative (tax income reducing) temporary BTD, and -87 percent of net negative permanent BTD.

The 976 other nonmanufacturing, nonfinancial corporations filing Schedule UTP report 8 percent of the assets for the 12,307 corporations, 13 percent of worldwide income, 29 percent of nonincludible foreign income, 30 percent of pretax book income, 30 percent of tax less credits, 78 percent of net negative temporary BTD, and net positive (tax income increasing) permanent BTD equal to 56 percent of the net positive permanent BTD of the 12,307 corporations.

<sup>45</sup> The industries listed in Table 2 are listed in SOI publications in the following industries, major codes and sector codes: Petroleum Refineries: Ind. 324110; Pharmaceuticals: Ind. 325410; Computers/Electronics: Major code 334; Electrical Equipment: Major code 335; Transportation Equipment: Major code 336; Fabricated Metal and Machinery: Major codes 332 and 333; Food/Beverage Mfg: Major codes 311 and 312; Other Manufacturing: Major codes 313, 315, 316, 321, 322, 323, 325, 326, 327, 331, 337, 339, and Ind. 325125; Non-Bank Holding Company: Ind. 551112; Bank & Bank Holding Company: Ind. 551111, and Major code 521; Securities/Commodities: Major code 523; Other Financial: Major codes 522, 524, 525, and Sector code 53; Trade: Sector code 41; (N) Information: Sector code 51; Utilities: Sector code 22; Transport/Warehousing: Sector code 48; Mining: Sector code 21; Construction: Sector code 23; and Service/Agriculture/Other: the remainder of the industries not listed above.

<sup>46</sup> Nonincludible foreign income is shown as *negative* in Table 2 because it is the foreign income that must be *removed* from worldwide income in determining book income for the U.S. tax consolidated group.

**Table 2. 2011 U.S. Corporations Form 1120 Schedule M-3: 19 Industries, Assets of \$100 Million or More, by UTP Filing Status**

Industry	UTP Filing Status	Number of Returns			Schedule L Total Assets			Worldwide Income (Part I Line 4)			Nonincludible Foreign Income		
		Sum	%1	%2	Sum	%1	%2	Sum	%1	%2	Sum	%1	%2
All	All	12,307	100	100	50,193,759	100	100	821,100	100	100	-768,079	100	100
i. SUBTOTAL Manufacturing	No	1,802	15	66	1,785,153	4	17	76,523	9	15	-45,477	6	8
	Yes	908	7	34	8,937,084	18	83	445,044	54	85	-533,494	69	92
n. SUBTOTAL Financial	No	4,678	38	96	8,675,006	17	30	-106,974	-13	478	-1,310	0	3
	Yes	189	2	4	20,433,731	41	70	84,601	10	-378	-41,964	5	97
y. SUBTOTAL Other	No	3,753	30	79	3,850,133	8	37	81,547	10	25	-25,466	3	17
	Yes	976	8	21	6,512,652	13	63	240,359	29	75	-120,368	16	83
a. Petroleum Refineries	No	28	0	74	216,424	0	9	14,670	2	14	-5,276	1	7
	Yes	10	0	26	2,128,289	4	91	93,198	11	86	-71,301	9	93
b. Pharmaceuticals	No	58	0	49	27,936	0	3	569	0	1	5	0	0
	Yes	60	0	51	1,002,631	2	97	52,041	6	99	-173,851	23	100
c. Computers/Electronics	No	139	1	39	143,452	0	13	2,973	0	3	-2,157	0	2
	Yes	216	2	61	953,745	2	87	95,375	12	97	-131,237	17	98
d. Electrical Equipment	No	80	1	71	53,096	0	5	1,174	0	5	-1,751	0	6
	Yes	32	0	29	947,861	2	95	20,725	3	95	-29,488	4	94
e. Transportation Equipment	No	207	2	67	128,784	0	11	4,284	1	6	-2,734	0	13
	Yes	100	1	33	1,079,082	2	89	64,991	8	94	-18,194	2	87
f. Fabrication Metal/Machinery	No	318	3	71	218,902	0	23	11,984	1	29	-8,881	1	28
	Yes	128	1	29	715,079	1	77	29,159	4	71	-23,350	3	72
g. Food / Beverage Manufacturing	No	204	2	78	329,153	1	30	23,279	3	47	-13,613	2	32
	Yes	57	0	22	760,280	2	70	26,637	3	53	-28,541	4	68
h. Other Manufacturing	No	767	6	72	667,407	1	33	17,590	2	22	-11,070	1	16
	Yes	305	2	28	1,350,116	3	67	62,918	8	78	-57,532	7	84
j. Non-Bank Holding Company	No	367	3	96	274,992	1	66	974	0	9	-1,482	0	12
	Yes	17	0	4	140,437	0	34	9,739	1	91	-10,427	1	88
k. Bank (& Bank Holding Company)	No	3,288	27	98	4,907,807	10	32	22,754	3	29	-194	0	1
	Yes	55	0	2	10,272,572	20	68	55,146	7	71	-16,088	2	99
l. Securities/Commodities	No	241	2	84	2,651,577	5	42	-146,364	-18	118	5,297	-1	-172
	Yes	47	0	16	3,628,474	7	58	22,321	3	-18	-8,374	1	272
m. Other Financial	No	782	6	92	840,631	2	12	15,662	2	120	-4,932	1	41
	Yes	70	1	8	6,392,248	13	88	-2,605	0	-20	-7,075	1	59
o. Trade	No	1,185	10	81	993,513	2	32	37,241	5	30	-8,586	1	15
	Yes	283	2	19	2,083,899	4	68	85,452	10	70	-48,941	6	85
p. Information	No	435	4	71	645,107	1	27	2,496	0	4	1,882	0	-5
	Yes	174	1	29	1,720,048	3	73	65,298	8	96	-36,984	5	105
q. Utilities	No	161	1	73	438,640	1	27	7,299	1	21	-13	0	1
	Yes	59	0	27	1,172,245	2	73	27,427	3	79	-2,492	0	99
r. Transportation/Warehousing	No	246	2	87	347,366	1	59	234	0	2	480	0	-48
	Yes	36	0	13	242,174	0	41	14,470	2	98	-1,490	0	148
s. Mining	No	329	3	90	584,648	1	61	25,048	3	48	-16,577	2	59
	Yes	35	0	10	370,655	1	39	27,291	3	52	-11,431	1	41
t. Construction	No	182	1	89	112,250	0	70	-1,032	0	-251	-34	0	6
	Yes	22	0	11	48,957	0	30	1,443	0	351	-546	0	94
x. Services/Agriculture/ Other	No	1,214	10	77	728,608	1	45	10,262	1	35	-2,617	0	12
	Yes	367	3	23	874,674	2	55	18,979	2	65	-18,484	2	88

%1 = the percentage of the total for all 12,307 corporations represented by that row amount; %2 = the percentage of the total for the subgroup of rows in which the row is included represented by that row amount.

Totals may not equal the sum of the components due to rounding.

**TABLE 2. 2011 U.S. Corporations Form 1120 Schedule M-3: 19 Industries, Assets of \$100 Million or More, by UTP Filing Status (Continued)**

Industry	UTP Filing Status	Pretax Book Income			Pretax Temporary Difference			Pretax Permanent Difference			Tax Less Credits		
		Sum	%1	%2	Sum	%1	%2	Sum	%1	%2	Sum	%1	%2
All	All	882,032	100	100	-143,648	100	100	33,043	100	100	180,791	100	100
i. SUBTOTAL Manufacturing	No	63,405	7	14	-19,334	13	32	2,475	7	14	13,878	8	22
	Yes	391,897	44	86	-40,367	28	68	14,658	44	86	50,125	28	78
n. SUBTOTAL Financial	No	-91,156	-10	-176	103,238	-72	110	4,089	12	-17	15,033	8	41
	Yes	142,824	16	276	-9,183	6	-10	-28,590	-87	117	21,202	12	59
y. SUBTOTAL Other	No	106,567	12	28	-65,550	46	37	21,948	66	54	26,656	15	33
	Yes	268,496	30	72	-112,453	78	63	18,463	56	46	53,896	30	67
a. Petroleum Refineries	No	14,723	2	12	-5,276	4	50	-580	-2	-4	1,488	1	21
	Yes	112,004	13	88	-5,197	4	50	16,779	51	104	5,759	3	79
b. Pharmaceuticals	No	671	0	3	496	0	7	-52	0	0	383	0	5
	Yes	23,681	3	97	6,230	-4	93	14,943	45	100	7,748	4	95
c. Computers/Electronics	No	2,396	0	4	-2,501	2	18	1,248	4	-42	577	0	6
	Yes	63,091	7	96	-11,480	8	82	-4,218	-13	142	9,510	5	94
d. Electrical Equipment	No	356	0	1	-752	1	20	550	2	-13	323	0	27
	Yes	26,965	3	99	-2,920	2	80	-4,694	-14	113	884	0	73
e. Transportation Equipment	No	2,250	0	4	-1,968	1	9	439	1	-5	368	0	6
	Yes	58,572	7	96	-19,724	14	91	-8,586	-26	105	5,310	3	94
f. Fabrication Metal/Machinery	No	8,452	1	25	-1,220	1	40	1,410	4	47	2,366	1	32
	Yes	24,756	3	75	-1,829	1	60	1,577	5	53	4,955	3	68
g. Food / Beverage Manufacturing	No	19,653	2	45	-1,158	1	77	-2,521	-8	59	3,944	2	41
	Yes	23,634	3	55	-352	0	23	-1,724	-5	41	5,566	3	59
h. Other Manufacturing	No	14,904	2	20	-6,955	5	58	1,981	6	77	4,428	2	30
	Yes	59,194	7	80	-5,096	4	42	581	2	23	10,393	6	70
j. Non-Bank Holding Company	No	2,327	0	20	-3,503	2	46	5,244	16	32	2,195	1	54
	Yes	9,468	1	80	-4,038	3	54	11,051	33	68	1,895	1	46
k. Bank (& Bank Holding Company)	No	31,696	4	22	-10,897	8	158	-1,532	-5	3	7,453	4	47
	Yes	112,284	13	78	3,997	-3	-58	-44,778	-136	97	8,358	5	53
l. Securities/Commodities	No	-141,181	-16	115	131,491	-92	103	1,512	5	36	2,117	1	30
	Yes	18,829	2	-15	-3,597	3	-3	2,729	8	64	5,056	3	70
m. Other Financial	No	16,002	2	88	-13,853	10	71	-1,135	-3	-89	3,267	2	36
	Yes	2,242	0	12	-5,544	4	29	2,409	7	189	5,893	3	64
o. Trade	No	49,379	6	32	-15,913	11	59	2,817	9	33	13,052	7	31
	Yes	105,265	12	68	-10,909	8	41	5,655	17	67	28,614	16	69
p. Information	No	6,048	1	9	6,930	-5	-47	2,416	7	25	2,758	2	18
	Yes	62,704	7	91	-21,627	15	147	7,130	22	75	12,208	7	82
q. Utilities	No	8,058	1	16	-15,636	11	23	-1,818	-6	19	330	0	34
	Yes	41,766	5	84	-53,348	37	77	-7,996	-24	81	652	0	66
r. Transportation/Warehousing	No	2,075	0	9	-7,308	5	37	1,940	6	104	954	1	25
	Yes	20,337	2	91	-12,415	9	63	-83	0	-4	2,871	2	75
s. Mining	No	28,581	3	54	-28,992	20	69	11,025	33	108	2,758	2	51
	Yes	24,749	3	46	-12,764	9	31	-818	-2	-8	2,630	1	49
t. Construction	No	-833	0	-386	-1,561	1	98	176	1	29	464	0	52
	Yes	1,049	0	486	-29	0	2	423	1	71	427	0	48
x. Services/Agriculture/ Other	No	13,259	2	51	-3,069	2	69	5,391	16	28	6,339	4	49
	Yes	12,625	1	49	-1,360	1	31	14,152	43	72	6,494	4	51

%1 = the percentage of the total for all 12,307 corporations represented by that row amount; %2 = the percentage of the total for the subgroup of rows in which the row is included represented by that row amount.

Totals may not equal the sum of the components due to rounding.

## Part III. 2010 and 2011 Adjusted Mini M-3

### A. Mini M-3: Specified vs Other Lines

The “other-with-difference” lines on Schedule M-3 with BTD are Part II, line 25, and Part III, line 37. The “other-with-no-difference” line is Part II, line 28. In two prior studies in this series we noted both the large dollar magnitude of the book income, tax income, and BTD amounts reported on the “other-with-difference” lines and the documentation problems found on the lines.<sup>47</sup>

We use a “Mini M-3” format to compare the aggregate amounts reported on the Schedule M-3, Parts II and III, “other-with-difference” or “other-with-no-difference” lines with the aggregate amounts reported on the Schedule M-3, Parts II and III, “specified” lines, that is, the lines with specific captions.<sup>48</sup>

A Schedule M-3 COGS adjustment discussed in the next section is used to remove the cost of securities, commodity contracts, and other financial products reported in COGS by some corporations and to reconcile to the COGS amount reported by the IRS SOI corporate data file. The Mini M-3 format also makes related special adjustments to other-income-with-difference and other-items-with-no-difference lines and decomposes the adjusted other-items-with-no-difference line into other-income-with-no-difference and other-expense/deduction-with-no-difference lines.

After making the data adjustments, the Mini M-3 format has 10 categories of specified lines, other-with-difference or no-difference lines, and subtotals or totals:<sup>49</sup>

- Other income with no difference (Part II, line 28 adjusted) (gross receipts)
- COGS (Part II, line 17 adjusted)
- Adjusted gross profit
- Specified income (Part II, lines 1-16, 18-24, and 29a-29c)
- Other income with difference (Part II, line 25 adjusted)
- Adjusted total income
- Specified expense/deduction (Part III, lines 3-36)<sup>50</sup>
- Other expense/deduction with difference (Part III, line 37)
- Other expense/deduction with no difference (an adjustment to Part II, line 28)
- Pretax book income

We used the adjusted-total-income book amount as a common-size scaling factor and compare percentages of adjusted-total-income book to remove or minimize the impact of differences in the size of corporations from our analysis. In addition, for the purposes of comparing the Schedule M-3 characteristics of Schedule UTP filers and nonfilers for the three FS types, total pretax income BTD is expressed as a percentage of total pretax book income.

### B. COGS and Other Adjustments

We make a Schedule M-3 COGS adjustment for the Mini M-3. The adjustment reconciles the Schedule M-3 COGS tax income amount with Form 1120, page 1, line 2, COGS reported by SOI for the corporations in our study. SOI removes the cost of securities, commodity contracts, and other financial products reported in Form

<sup>47</sup> For discussions of the other-with-difference documentation by large taxpayers in 2005 and 2007, see Boynton, DeFilippes, and Legel (2008) and Boynton, DeFilippes, Legel, and Reum (2011).

<sup>48</sup> Amounts reported on the other-with-difference lines require attached documentation. The documentation must separately state and adequately disclose the BTD for the line. The other-items-with-no-difference line has no documentation. Reporting on the other-with-difference lines is similar to but more detailed than reporting on Schedule M-1. Both allow descriptions determined by the taxpayer. Schedule M-1 requires only a description and a BTD. Schedule M-3 requires a description, a book income amount, a temporary BTD amount, a permanent BTD amount, and a tax income amount.

<sup>49</sup> In Tables 4, 5, and 6, we omit the data for adjusted other income with no difference and adjusted COGS and start the table data with adjusted gross profit to save space. All BTD in adjusted gross profit are from adjusted COGS. The adjustments we make to COGS are made equally to the unadjusted book amount and tax amount, and have no effect on the BTD.

<sup>50</sup> We exclude federal income tax expense reported on Schedule M-3, Part III, lines 1 and 2, from our pretax analysis. See our discussion of pretax income and BTD in Part I. C, of this paper.

1120, page 1, line 2, COGS.<sup>51</sup> We make the equal adjustments to Part II, line 17, COGS book income and tax income with the result that COGS BTD are not changed. SOI also makes adjustments to Form 1120, page 1, line 1, gross receipts to match the amounts SOI removes from COGS. We match our COGS adjustments with adjustments to other-income-with-difference and to other-items-with-no-difference. We also decompose the adjusted other-items-with-no-difference into other-income-with-no difference and other-expense/deduction-with-no difference.<sup>52</sup>

SOI has adjusted Form 1120, page 1, line 1, gross receipts, and line 2, COGS, Schedule A COGS, and Schedule L inventory amounts since the 1980s to remove the cost of securities and commodities transactions. SOI adjusted COGS, gross receipts, and inventory amounts are used by the Bureau of Economic Analysis (BEA) for national income accounts. At the request of the Office of Tax Analysis (OTA), SOI has not adjusted the data for Schedule M-3 since its introduction in 2004.

We wish to develop a consistent Schedule M-3 measure of total book income before expenses to scale or common size the book income and tax income components, as well as the book expense and tax deduction components for different size corporations. Adopting the SOI adjustments to COGS and gross receipts facilitates the development of a consistent measure of total income applicable to different size corporations.<sup>53</sup>

As shown in Table 3, we adjust 2011 Schedule M-3 COGS by approximately \$41 trillion to agree with the SOI Form 1120, page 1, line 2, COGS. In doing so, we need to determine where on Schedule M-3 to make the matching gross receipts adjustment. Using 2010 data, we developed a rule to allocate the matching gross receipts reduction between Schedule M-3, Part II, line 25, other income with difference, and line 28, other items without difference. We verified our rule on the 2010 data using the top 25 returns which, for 2010, accounted for 99 percent of the aggregate adjustment of approximately \$32 trillion.<sup>54</sup> In addition, for 2011 we compare the Form 1120, page 1, line 27, total deduction amount with the total Part III deduction amount carried over to Part II as reported on Part II, line 27, column (d), to determine the total deductions-with-no-difference amount currently included in Part II, line 28, other items with no difference. The amounts of the four adjustments are shown in Table 3.<sup>55</sup>

Of the 41,636 Schedule M-3 returns in our study for 2011, some 25,078 reported COGS on Part II, line 17. The total COGS adjustment for 2011 is \$41,308,853 million. The details of the adjustment are shown in Table 3 and Figure 3. The adjustments do not affect pretax net income and do not affect BTD. BTD are not affected by the COGS and other adjustments described in this Part III, B., because equal adjustments are made to book income and tax income amounts.

Table 3 shows the aggregate amounts of the three COGS adjustments and the one other-expense/deduction-with-no-difference adjustment for all corporations in our study and by FS type. The adjustments are largely to SEC 10K/Public. The adjustments do not affect pretax net income and do not affect BTD.

<sup>51</sup> Note that changes on the SOI corporate file do not change the amounts on the tax return and do not impact IRS audits (or lack of audits) for corporate tax returns.

<sup>52</sup> We have introduced adjustment lines into our 2010 M-3 First Look FORM tables to show the frequency of adjustment and the amounts needed to reconcile Schedule M-3, Part II, line 17, COGS to the SOI amount reported for Form 1120, page 1, line 2.

<sup>53</sup> Aggregate unadjusted book income and tax income reported on Schedule M-3, Part II, line 26, for all corporations are both *negative* because the large absolute amount of COGS for all corporations on Part II, line 17, exceeds the income reported on the specified income lines and the other-income-with-difference line combined. A majority of gross receipts are reported on Part II, line 28, other items with no difference.

<sup>54</sup> See Boynton, DeFilippes, Legel, and Reum (2014).

<sup>55</sup> Our allocation rule:

**ADJ COGS1 and ADJ COGS2:** If the absolute value of P2L17 column D COGS is greater than Form 1120, page 1, line 2, COGS, then the excess difference is the COGS adjustment and the matching gross receipts adjustment. The adjustments reduce the absolute magnitude of P2L17, P2L25, and P2L28.

**ADJ COGS1:** The gross receipts adjustment is applied to P2L25 other income with difference if P2L25D other income with difference is greater than P2L28D other income without difference AND P2L25D is greater than 80 percent of the gross receipts adjustment **ELSE** use ADJ COGS2.

**ADJ COGS2:** The gross receipts adjustment goes to P2L28 other income without difference.

**ADJ COGS3:** If the absolute value of P2L17 column (d) COGS is less than 1120, page 1, line 2, COGS, the adjustment is an increase to P2L17 and P2L28 in absolute magnitude.

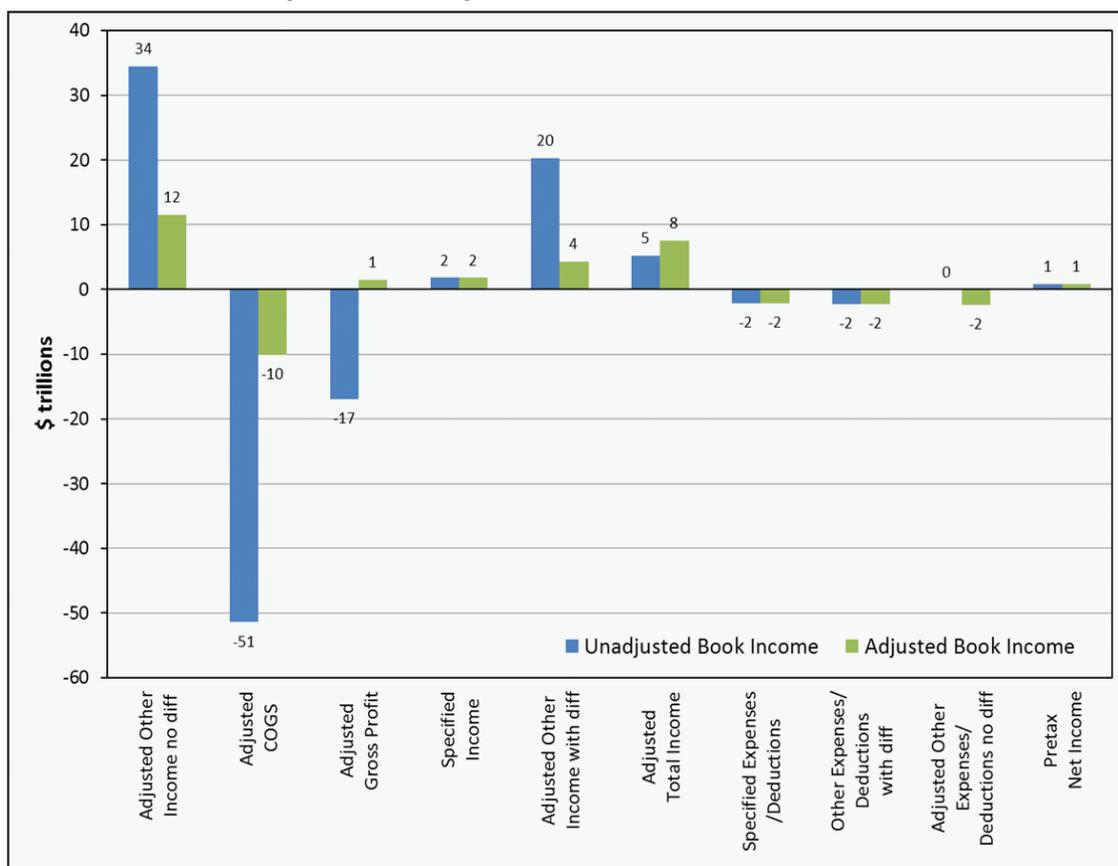
**ADJ EXPDED:** We estimate expenses/deduction without differences as the amount if any by which Form 1120, page 1, line 27, total deductions exceed the absolute value of P2L27 column (d). We show it as an additional expense/deduction line and as an increase to P2L28. The adjusted P2L28 amount changes from "other items without difference" to "other income without difference."

**TABLE 3. 2011 U.S. Corporation Form 1120 Schedule M-3: Cost of Goods Sold (COGS) Related Adjustments (\$ Millions)**

	Unadjusted Book Income	Adjustments					Adjusted Book Income
		ADJ COGS1	ADJ COGS2	ADJ COGS3	ADJ Expenses/Deductions	Total ADJ	
<b>All</b>							
Other income no diff	34,488,365		-25,733,871	446,385	2,387,246	-22,900,240	11,588,124
COGS	-51,429,810	16,021,367	25,733,871	-446,385		41,308,853	-10,120,956
<b>Gross Profit</b>	<b>-16,941,445</b>	<b>16,021,367</b>	<b>0</b>	<b>0</b>	<b>2,387,246</b>	<b>18,408,613</b>	<b>1,467,168</b>
Specified income	1,804,671					0	1,804,671
Other income with diff	20,340,377	-16,021,367				-16,021,367	4,319,010
<b>Total Income</b>	<b>5,203,603</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,387,246</b>	<b>2,387,246</b>	<b>7,590,849</b>
Specified expense/dedn	-2,098,946					0	-2,098,946
Other exp/dedn with diff	-2,225,382					0	-2,225,382
Other exp/dedn no diff	0				-2,387,246	-2,387,246	-2,387,246
<b>Pretax Net Income</b>	<b>879,279</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>879,279</b>
<b>SEC 10K/Public</b>							
Other income no diff	29,167,653		-24,324,224	352,206	1,451,683	-22,520,335	6,647,319
COGS	-45,958,356	15,993,158	24,324,224	-352,206		39,965,176	-5,993,181
<b>Gross Profit</b>	<b>-16,790,703</b>	<b>15,993,158</b>	<b>0</b>	<b>0</b>	<b>1,451,683</b>	<b>17,444,841</b>	<b>654,138</b>
Specified income	1,470,206					0	1,470,206
Other income with diff	19,240,058	-15,993,158				-15,993,158	3,246,900
<b>Total Income</b>	<b>3,919,561</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,451,683</b>	<b>1,451,683</b>	<b>5,371,244</b>
Specified expense/dedn	-1,564,368					0	-1,564,368
Other exp/dedn with diff	-1,476,426					0	-1,476,426
Other exp/dedn no diff	0				-1,451,683	-1,451,683	-1,451,683
<b>Pretax Net Income</b>	<b>878,771</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>878,771</b>
<b>Audited</b>							
Other income no diff	2,823,328		-357,790	44,962	522,623	209,795	3,033,123
COGS	-2,999,792	10,505	357,790	-44,962		323,333	-2,676,459
<b>Gross Profit</b>	<b>-176,464</b>	<b>10,505</b>	<b>0</b>	<b>0</b>	<b>522,623</b>	<b>533,128</b>	<b>356,664</b>
Specified income	185,016					0	185,016
Other income with diff	706,232	-10,505				-10,505	695,727
<b>Total Income</b>	<b>714,784</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>522,623</b>	<b>522,623</b>	<b>1,237,408</b>
Specified expense/dedn	-286,067					0	-286,067
Other exp/dedn with diff	-336,096					0	-336,096
Other exp/dedn no diff	0				-522,623	-522,623	-522,623
<b>Pretax Net Income</b>	<b>92,621</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>92,621</b>
<b>Unaudited</b>							
Other income no diff	2,497,383		-1,051,857	49,216	412,940	-589,701	1,907,682
COGS	-2,471,661	17,704	1,051,857	-49,216		1,020,345	-1,451,317
<b>Gross Profit</b>	<b>25,722</b>	<b>17,704</b>	<b>0</b>	<b>0</b>	<b>412,940</b>	<b>430,644</b>	<b>456,365</b>
Specified income	149,449					0	149,449
Other income with diff	394,086	-17,704				-17,704	376,383
<b>Total Income</b>	<b>569,257</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>412,940</b>	<b>412,940</b>	<b>982,197</b>
Specified expense/dedn	-248,510					0	-248,510
Other exp/dedn with diff	-412,860					0	-412,860
Other exp/dedn no diff	0				-412,940	-412,940	-412,940
<b>Pretax Net Income</b>	<b>-92,114</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-92,114</b>

Totals may not equal the sum of the components due to rounding.

We will use the adjusted book income and tax income amounts in our Mini M-3 analysis in Part IV and will scale by adjusted total income, the sum of the adjusted other-income-with-no-difference, adjusted COGS, specified-income, and adjusted other-income-with-difference amounts.

**FIGURE 3. 2011: Unadjusted and Adjusted Book Income Amounts**

## Part IV. Analysis of Mini M-3: FS by UTP

### A. Mini M-3 by FS by UTP

Part IV, Tables 4, 5, and 6, and Figures 4, 5, and 6 present adjusted 2010 and 2011 data for adjusted gross profit, specified income, adjusted income with difference, adjusted total income, specified expense/deduction, other expense/deduction with difference, other expense deduction with no difference, and pretax book income for book income, tax income, and temporary and permanent BTM amounts by FS type (SEC 10K/Public, Audited, and Unaudited) further partitioned by the presence or absence of Schedule UTP.<sup>56</sup> The Mini M-3 formats in Tables 4-6 do not show the adjusted-income-with-no-difference line and the adjusted-COGS line but do show the adjusted-gross-profit line resulting from the two omitted lines.<sup>57</sup> All BTM reported on the adjusted-gross-profit line are from the adjusted-COGS line and, when relevant, are discussed as COGS BTM.

<sup>56</sup> The SAS computer code we use for indicating the presence or absence of UTP filing is as follows:

```
/*Flag any indication of UTP*/
HAS_UTP = 0;
IF (SCHUTP_REQ_IND = 1) OR (SCHUTP_CD = 1) OR (NUM_SCHUTP > 0) THEN HAS_UTP=1;
HAS_UTP3 = HAS_UTP;
IF TOT_ASSTS < 100000 THEN HAS_UTP3=0; /* if assets under 100m */
```

We are using UTP3, which does not recognize volunteer filings by corporations with total assets of less than \$100 million.

<sup>57</sup> The data for the omitted adjusted-income-with-no-difference and adjusted-COGS lines in Tables 4, 5, and 6 are available on request.

**TABLE 4. 2010-2011: U.S. Corporation Form 1120 Schedule M-3: Mini M-3 by UTP Status: SEC 10K/Public FS: Assets ≥ \$100 Million**

	\$ Millions										Percent of Adjusted Total Income Book				Percent of Pretax Book		
	Column A Book	Column B Temporary	Column C Permanent	Column D Tax	Total Diff.	Book	Temp	Perm	Tax	Total Diff.	Temp	Perm	Total Diff.				
<b>2010 with UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	1,287,530	-24,531	3,891	1,266,891	-20,640	33.51	-0.64	0.10	32.98	-0.54	-3.6	0.6	-0.54	-3.0			
Specified Income	1,289,815	-114,719	-13,349	1,161,754	-128,067	33.57	-2.99	-0.35	30.24	-3.33	-16.7	-1.9	-3.33	-18.6			
Adjusted Other Income with difference	1,264,432	3,583	-58,287	1,209,747	-54,704	32.91	0.09	-1.52	31.49	-1.42	0.5	-8.5	-1.42	-8.0			
<b>Adjusted Total Income</b>	<b>3,841,778</b>	<b>-135,667</b>	<b>-67,745</b>	<b>3,638,392</b>	<b>-203,412</b>	<b>100.00</b>	<b>-3.53</b>	<b>-1.76</b>	<b>94.71</b>	<b>-5.29</b>	<b>-19.8</b>	<b>-9.9</b>	<b>-5.29</b>	<b>-29.6</b>			
Specified Expense/Deduction	-1,230,384	28,994	22,723	-1,178,676	51,718	-32.03	0.75	0.59	-30.68	1.35	4.2	3.3	1.35	7.5			
Other Exp/Ded with difference	-978,950	-34,794	-4,483	-1,018,242	-39,276	-25.48	-0.91	-0.12	-26.50	-1.02	-5.1	-0.7	-1.02	-5.7			
Adj Other Exp/Ded no difference	-945,641	0	0	-945,641	0	-24.61	0.00	0.00	-24.61	0.00	0.0	0.0	0.00	0.0			
<b>Pretax Net Income</b>	<b>686,803</b>	<b>-141,466</b>	<b>-49,504</b>	<b>495,833</b>	<b>-190,970</b>	<b>17.88</b>	<b>-3.68</b>	<b>-1.29</b>	<b>12.91</b>	<b>-4.97</b>	<b>-20.6</b>	<b>-7.2</b>	<b>-4.97</b>	<b>-27.8</b>			
<b>2010 without UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	624,083	25,810	-140	649,762	25,669	45.99	1.90	-0.01	47.88	1.89	11.4	-0.1	1.89	11.3			
Specified Income	147,010	15,562	-47,012	115,566	-31,450	10.83	1.15	-3.46	8.52	-2.32	6.8	-20.7	-2.32	-13.8			
Adjusted Other Income with difference	586,029	-39,252	-17,031	529,745	-56,283	43.18	-2.89	-1.25	39.03	4.15	-17.3	-7.5	4.15	-24.8			
<b>Adjusted Total Income</b>	<b>1,357,122</b>	<b>2,120</b>	<b>-64,184</b>	<b>1,295,074</b>	<b>-62,065</b>	<b>100.00</b>	<b>0.16</b>	<b>-4.73</b>	<b>95.43</b>	<b>-4.57</b>	<b>0.9</b>	<b>-28.2</b>	<b>-4.57</b>	<b>-27.3</b>			
Specified Expense/Deduction	-338,353	-26,289	-140	-364,799	-26,429	-24.93	-1.94	-0.01	-26.88	-1.95	-11.6	-0.1	-1.95	-11.6			
Other Exp/Ded with difference	-377,011	-13,388	17,336	-373,063	3,948	-27.78	-0.99	1.28	-27.49	0.29	-5.9	7.6	0.29	1.7			
Adj Other Exp/Ded no difference	-414,425	0	0	-414,425	0	-30.54	0.00	0.00	-30.54	0.00	0.0	0.0	0.00	0.0			
<b>Pretax Net Income</b>	<b>227,332</b>	<b>-37,557</b>	<b>-46,989</b>	<b>142,786</b>	<b>-84,546</b>	<b>16.75</b>	<b>-2.77</b>	<b>-3.46</b>	<b>10.52</b>	<b>-6.23</b>	<b>-16.5</b>	<b>-20.7</b>	<b>-6.23</b>	<b>-37.2</b>			
<b>2011 with UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	245,221	13,563	-2,748	256,037	10,816	5.90	0.33	-0.07	6.16	0.26	1.8	-0.4	0.26	1.5			
Specified Income	1,252,745	-83,872	-15,125	1,153,790	-98,996	30.14	-2.02	-0.36	27.76	-2.38	-11.3	-2.0	-2.38	-13.4			
Adjusted Other Income with difference	2,658,720	-7,895	-33,595	2,617,230	-41,490	63.96	-0.19	-0.81	62.96	-1.00	-1.1	-4.5	-1.00	-5.6			
<b>Adjusted Total Income</b>	<b>4,156,686</b>	<b>-78,204</b>	<b>-51,467</b>	<b>4,027,056</b>	<b>-129,671</b>	<b>100.00</b>	<b>-1.88</b>	<b>-1.24</b>	<b>96.88</b>	<b>-3.12</b>	<b>-10.6</b>	<b>-6.9</b>	<b>-3.12</b>	<b>-17.5</b>			
Specified Expense/Deduction	-1,280,402	-19,186	29,058	-1,270,570	9,872	-30.80	-0.46	0.70	-30.57	0.24	-2.6	3.9	0.24	1.3			
Other Exp/Ded with difference	-1,090,956	-35,395	4,019	-1,122,333	-31,377	-26.25	-0.85	0.10	-27.00	-0.75	-4.8	0.5	-0.75	-4.2			
Adj Other Exp/Ded no difference	-1,044,741	0	0	-1,044,741	0	-25.13	0.00	0.00	-25.13	0.00	0.0	0.0	0.00	0.0			
<b>Pretax Net Income</b>	<b>740,593</b>	<b>-132,785</b>	<b>-18,395</b>	<b>589,413</b>	<b>-151,180</b>	<b>17.82</b>	<b>-3.19</b>	<b>-0.44</b>	<b>14.18</b>	<b>-3.64</b>	<b>-17.9</b>	<b>-2.5</b>	<b>-3.64</b>	<b>-20.4</b>			
<b>2011 without UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	397,317	-18,377	1,744	380,669	-16,634	33.31	-1.54	0.15	31.92	-1.39	-12.8	1.2	-1.39	-11.6			
Specified Income	214,691	2,827	12,700	230,274	15,526	18.00	0.24	1.06	19.31	1.30	2.0	8.8	1.30	10.8			
Adjusted Other Income with difference	580,656	2,216	-3,628	579,244	-1,412	48.69	0.19	-0.30	48.57	-0.12	1.5	-2.5	-0.12	-1.0			
<b>Adjusted Total Income</b>	<b>1,192,664</b>	<b>-13,334</b>	<b>10,816</b>	<b>1,190,188</b>	<b>-2,519</b>	<b>100.00</b>	<b>-1.12</b>	<b>0.91</b>	<b>99.79</b>	<b>-0.21</b>	<b>-9.3</b>	<b>7.5</b>	<b>-0.21</b>	<b>-1.8</b>			
Specified Expense/Deduction	-278,518	-44,642	178	-323,024	-44,464	-23.35	-3.74	0.01	-27.08	-3.73	-31.1	0.1	-3.73	-31.0			
Other Exp/Ded with difference	-377,189	-12,150	990	-388,349	-11,160	-31.63	-1.02	0.08	-32.56	-0.94	-8.5	0.7	-0.94	-7.8			
Adj Other Exp/Ded no difference	-393,348	0	0	-393,348	0	-32.98	0.00	0.00	-32.98	0.00	0.0	0.0	0.00	0.0			
<b>Pretax Net Income</b>	<b>143,609</b>	<b>-70,126</b>	<b>11,984</b>	<b>85,466</b>	<b>-58,142</b>	<b>12.04</b>	<b>-5.88</b>	<b>1.00</b>	<b>7.17</b>	<b>-4.87</b>	<b>-48.8</b>	<b>8.3</b>	<b>-4.87</b>	<b>-40.5</b>			

Totals may not equal the sum of the components due to rounding.

The analysis of Schedule UTP filing status is limited to corporations in the study reporting total assets of \$100 million or more, the total asset threshold in 2011 for Schedule UTP to potentially apply. Schedule UTP asks for relevant code sections and a concise description of issues, *without dollar amounts*, for the uncertain tax positions that affect the FS reported U.S. federal income tax liabilities of certain corporations that issue or are included in audited FS.<sup>58</sup>

The first five data columns in Tables 4-6 are book income, temporary difference, permanent difference, tax income, and total difference in millions of dollars. The next five columns express the first five columns as percentages of the book amount of adjusted total income, our primary scaling factor to correct for the difference in size of the three FS types.<sup>59</sup> The final three columns express temporary difference, permanent difference, and total difference as percentages of pretax book income.

Tables 4-6 present the 2010-2011 Mini M-3 data for Schedule UTP filers and nonfilers for the three FS types: Table 4 for SEC 10K/Public, Table 5 for Audited, and Table 6 for Unaudited.

Figures 4, 5, and 6 compare the 2010-2011 temporary BTM, permanent BTM, and total BTM as a percentage of pretax book income for Schedule UTP filers and nonfilers: Figure 4 for SEC 10K/Public, Figure 5 for Audited, and Figure 6 for Unaudited filers.

## **B. SEC 10K/Public FS Mini M-3**

### **2010**

See the first panel of Table 4. Schedule UTP filers report, in aggregate, a relatively large negative temporary component for specified-income BTM (-2.99 percent) and a relatively large negative permanent component for other-income-with-difference BTM (-1.52 percent) contributing to a relatively large total pretax income negative BTM (-4.97 percent) reducing tax income from pretax income book (pretax income book 17.88 percent to tax income 12.91 percent), a reduction of 27.8 percent.

See the second panel of Table 4. Schedule UTP nonfilers report, in aggregate, a relatively large positive temporary component for COGS (1.90 percent), a relatively large negative permanent component for specified-income BTM (-3.46 percent), a relatively large negative temporary component for other-income-with-difference BTM (-2.89 percent), and a relatively large negative temporary component for specified-expense/deduction BTM (-1.94 percent) contributing to a relatively large total pretax income negative BTM (-6.23 percent) reducing tax income from pretax income book (pretax income book 16.75 percent to tax income 10.52 percent), a reduction of 37.2 percent.

See the last row of the first and second panels of Table 4 and see Figure 4. Although the pretax income negative BTM of the UTP filers is larger in dollar magnitude than the pretax income negative BTM of the nonfilers (UTP filers -\$190,970 million versus UTP nonfilers -\$84,546 million), the nonfiler negative BTM as a percentage of pretax income book represents a greater tax income reduction (UTP filers 27.8 percent versus UTP nonfilers 37.2 percent).

### **2011**

See the third panel of Table 4. Schedule UTP filers report, in aggregate, a relatively large negative temporary component for specified-income BTM (-2.02 percent) contributing to a relatively large total pretax income negative BTM (-3.64 percent) reducing tax income from pretax income book (pretax income book 17.82 percent to tax income 14.18 percent), a reduction of 20.4 percent.

<sup>58</sup> See Part I. B. of this study for a discussion of Schedule UTP requirements. See Part I. F. for a reconciliation of the 2011 Schedule UTP count we present with the PAIR LB&I UTP Registry count.

<sup>59</sup> As discussed in Part III, we wish to develop a consistent Schedule M-3 measure of total book income before expenses to scale or common size book income and tax income components and book expense and tax deduction components for different size corporations. Adopting the SOI adjustments to COGS and gross receipts facilitates development of a consistent measure of total income applicable to different size corporations.

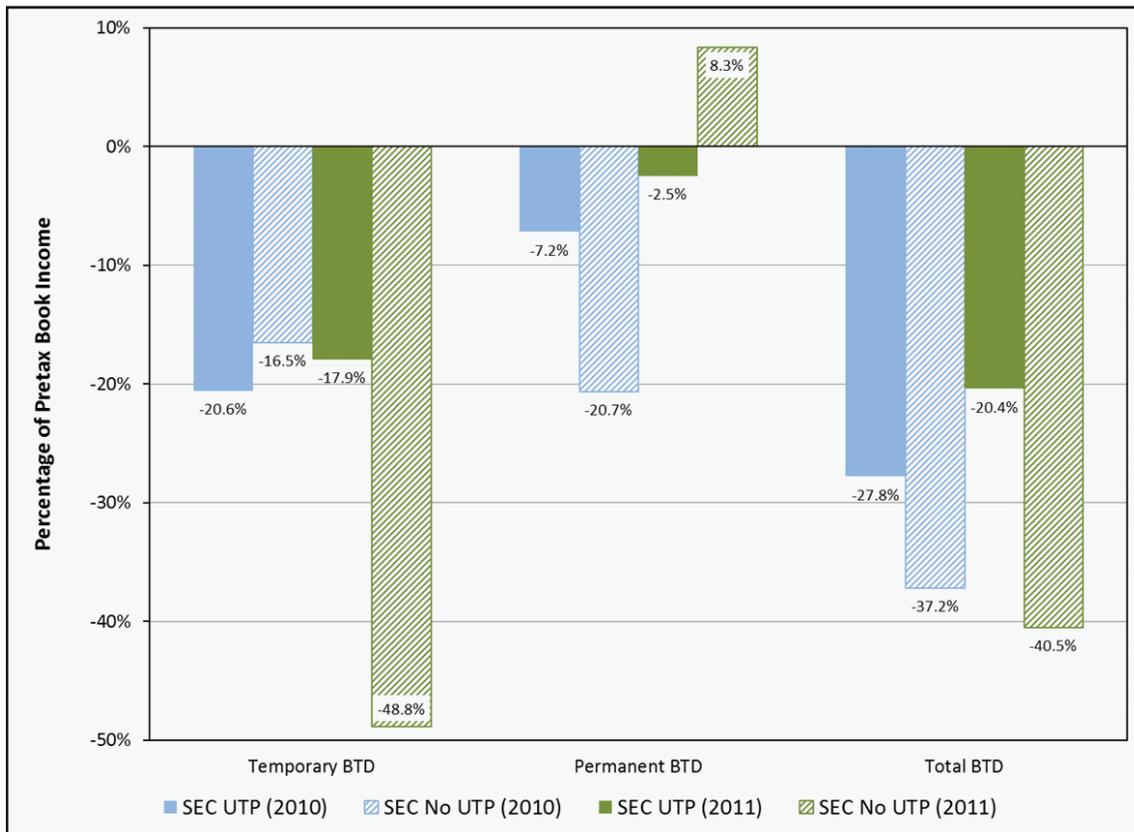
**TABLE 5. 2010-2011: U.S. Corporation Form 1120 Schedule M-3: Mini M-3 by UTP Status: Audited FS: Assets \$100 Million or More**

	\$ Millions										Percent of Adjusted Total Income Book				Percent of Pretax Book		
	Column A Book		Column B Temporary	Column C Permanent	Column D Tax	Total Diff.	Book	Temp	Perm	Tax	Total Diff.	Temp	Perm	Total Diff.	Temp	Perm	Total Diff.
	16,809	8,599	-44	25,372	8,555	4.24	2.17	-0.01	6.39	2.16	38.8	-0.2	38.6				
<b>2010 with UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	16,809	8,599	-44	25,372	8,555	4.24	2.17	-0.01	6.39	2.16	38.8	-0.2	38.6				
Specified Income	53,526	6,630	-7,756	52,399	-1,125	13.49	1.67	-1.95	13.20	-0.28	29.9	-35.0	-5.1				
Adjusted Other Income with difference	326,536	-10,781	-1,716	314,039	-5,067	82.28	-2.72	-0.43	79.13	-3.15	-48.7	-7.8	-56.4				
<b>Adjusted Total Income</b>	<b>396,871</b>	<b>4,449</b>	<b>-9,516</b>	<b>391,810</b>	<b>-5,067</b>	<b>100.00</b>	<b>1.12</b>	<b>-2.40</b>	<b>98.72</b>	<b>-1.28</b>	<b>20.1</b>	<b>-43.0</b>	<b>-22.9</b>				
Specified Expense/Deduction	-115,032	-818	6,103	-109,754	5,285	-28.98	-0.21	1.54	-27.65	1.33	-3.7	27.6	23.9				
Other Exp/Ded with difference	-143,167	13,925	257	-128,985	14,182	-36.07	3.51	0.06	-32.50	3.57	62.9	1.2	64.1				
Adj Other Exp/Ded no difference	-116,531	0	0	-116,531	0	-29.36	0.00	0.00	-29.36	0.00	0.0	0.0	0.0				
<b>Pretax Net Income</b>	<b>22,139</b>	<b>17,561</b>	<b>-3,155</b>	<b>36,545</b>	<b>14,406</b>	<b>5.58</b>	<b>4.42</b>	<b>-0.79</b>	<b>9.21</b>	<b>3.63</b>	<b>79.3</b>	<b>-14.3</b>	<b>65.1</b>				
<b>2010 without UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	210,209	-4,403	353	206,199	-4,051	34.65	-0.73	0.06	33.99	-0.67	-10.4	0.8	-9.6				
Specified Income	114,477	-1,266	2,870	116,061	1,603	18.87	-0.21	0.47	19.13	0.26	-3.0	6.8	3.8				
Adjusted Other Income with difference	281,990	-341	-6,459	275,191	-6,800	46.48	-0.06	-1.06	45.36	-1.12	-0.8	-15.2	-16.1				
<b>Adjusted Total Income</b>	<b>606,676</b>	<b>-6,011</b>	<b>-3,237</b>	<b>597,452</b>	<b>-9,248</b>	<b>100.00</b>	<b>-0.99</b>	<b>-0.53</b>	<b>98.48</b>	<b>-1.52</b>	<b>-14.2</b>	<b>-7.6</b>	<b>-21.8</b>				
Specified Expense/Deduction	-146,571	-9,770	5,911	-150,453	-3,859	-24.16	-1.61	0.97	-24.80	-0.64	-23.1	14.0	-9.1				
Other Exp/Ded with difference	-159,195	108	377	-158,710	485	-26.24	0.02	0.06	-26.16	0.08	0.3	0.9	1.1				
Adj Other Exp/Ded no difference	-258,551	0	0	-258,551	0	-42.62	0.00	0.00	-42.62	0.00	0.0	0.0	0.0				
<b>Pretax Net Income</b>	<b>42,359</b>	<b>-15,672</b>	<b>3,051</b>	<b>29,738</b>	<b>0</b>	<b>6.98</b>	<b>-2.58</b>	<b>0.50</b>	<b>4.90</b>	<b>-2.08</b>	<b>-37.0</b>	<b>7.2</b>	<b>-29.8</b>				
<b>2011 with UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	-1,516	8,837	62	7,383	8,899	-0.36	2.12	0.01	1.77	2.14	19.8	0.1	19.9				
Specified Income	52,223	6,549	-9,591	49,183	-3,042	12.55	1.57	-2.31	11.82	-0.73	14.7	-21.5	-6.8				
Adjusted Other Income with difference	365,275	-9,796	-505	354,974	87.81	87.81	-2.35	-0.12	85.33	-2.48	-22.0	-1.1	-23.1				
<b>Adjusted Total Income</b>	<b>415,982</b>	<b>5,590</b>	<b>-10,034</b>	<b>411,539</b>	<b>-4,444</b>	<b>100.00</b>	<b>1.34</b>	<b>-2.41</b>	<b>98.93</b>	<b>-1.07</b>	<b>12.5</b>	<b>-22.5</b>	<b>-10.0</b>				
Specified Expense/Deduction	-113,737	-24,735	9,572	-128,900	-27.34	-27.34	-5.95	2.30	-30.99	-3.65	-55.4	21.5	-34.0				
Other Exp/Ded with difference	-122,802	-3,174	1,871	-124,104	-1,303	-29.52	-0.76	0.45	-29.83	-0.31	-7.1	4.2	-2.9				
Adj Other Exp/Ded no difference	-134,830	0	0	-134,830	0	-32.41	0.00	0.00	-32.41	0.00	0.0	0.0	0.0				
<b>Pretax Net Income</b>	<b>44,613</b>	<b>-22,318</b>	<b>1,409</b>	<b>23,704</b>	<b>0</b>	<b>10.72</b>	<b>-5.37</b>	<b>0.34</b>	<b>5.70</b>	<b>-5.03</b>	<b>-50.0</b>	<b>3.2</b>	<b>-46.9</b>				
<b>2011 without UTP Filing</b>																	
<b>Adjusted Gross Profit</b>	215,912	-6,756	490	214,503	-6,266	35.60	-1.11	0.08	35.36	-1.03	-14.4	1.0	-13.4				
Specified Income	114,346	-7,134	1	102,304	-7,132	18.85	-1.18	0.00	16.87	-1.18	-15.2	0.0	-15.2				
Adjusted Other Income with difference	276,287	-1,302	-772	274,321	-2,075	45.55	-0.21	-0.13	45.23	-0.34	-2.8	-1.6	-4.4				
<b>Adjusted Total Income</b>	<b>606,546</b>	<b>-15,192</b>	<b>-281</b>	<b>591,128</b>	<b>-7,895</b>	<b>100.00</b>	<b>-2.50</b>	<b>-0.05</b>	<b>97.46</b>	<b>-2.55</b>	<b>-32.4</b>	<b>-0.6</b>	<b>-33.0</b>				
Specified Expense/Deduction	-141,545	-14,229	6,334	-149,491	7,895	-23.34	-2.35	1.04	-24.65	-1.30	-30.4	13.5	-16.8				
Other Exp/Ded with difference	-158,200	-145	1,222	-157,126	1,077	-26.08	-0.02	0.20	-25.91	0.18	-0.3	2.6	2.3				
Adj Other Exp/Ded no difference	-259,935	0	0	-259,935	0	-42.85	0.00	0.00	-42.85	0.00	0.0	0.0	0.0				
<b>Pretax Net Income</b>	<b>46,867</b>	<b>-29,565</b>	<b>7,275</b>	<b>24,577</b>	<b>0</b>	<b>7.73</b>	<b>-4.87</b>	<b>1.20</b>	<b>4.05</b>	<b>-3.67</b>	<b>-63.1</b>	<b>15.5</b>	<b>-47.6</b>				

Totals may not equal the sum of the components due to rounding.

See the fourth panel of Table 4. Schedule UTP nonfilers report, in aggregate, a relatively large negative temporary component for COGS (-1.54 percent), and a relatively large negative temporary component for specified-expense/deduction BTD (-3.74 percent) contributing to a relatively large total pretax income negative BTD (-4.87 percent) reducing tax income from pretax income book (pretax income book 12.04 percent to tax income 7.17 percent), a reduction of 40.5 percent.

**FIGURE 4: 2010–2011 U.S. Corporation M-3: Book-to-Tax Difference as Percentage of Pretax Book for SEC 10K/Public FS by UTP Filing Status**



See the last row of the third and fourth panels of Table 4 and see Figure 4. Although the pretax income negative BTB of the UTP filers is larger in dollar magnitude than the pretax income negative BTB of the nonfilers (UTP filers -\$151,180 million versus UTP nonfilers -\$58,142 million), the nonfiler negative BTB as a percentage of pretax income book represents a greater tax income reduction (UTP filers 20.4 percent versus UTP nonfilers 40.5 percent).

### Conclusions: SEC 10K/Public

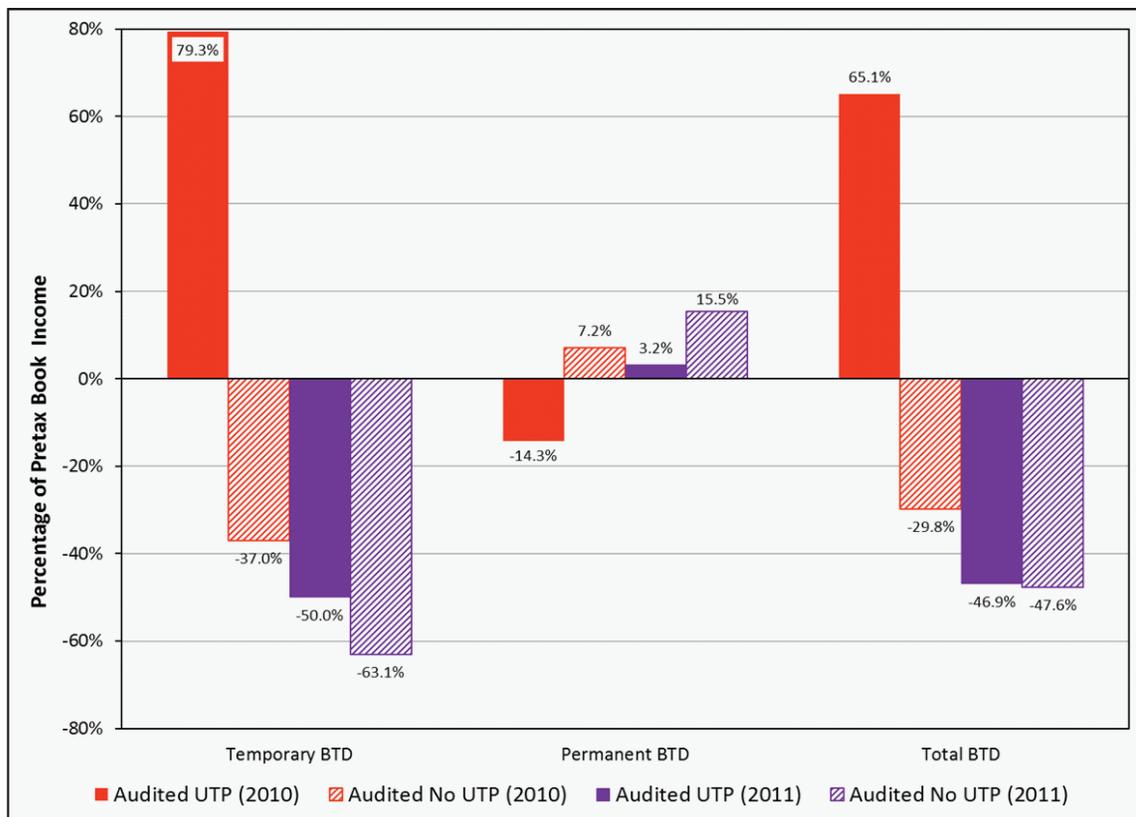
The requirements to file Schedule UTP in 2010–2011 do identify a *minority* group of corporations with SEC 10K/Public FS with \$100 million or more in assets that has both uncertain tax positions and that, in aggregate, reduces tax income with BTB reported on Schedule M-3 (a 27.8-percent reduction in pretax book income for 2010 and a 20.4-percent reduction in 2011), but similar corporations in FS type and asset size not required to file Schedule UTP (or failing to file) reduce tax income with BTB to a relatively greater extent (a 37.2-percent reduction in pretax income for 2010 and a 40.5-percent reduction in 2011). For 2010 and 2011, some 31.7 percent and 36.4 percent (respectively) of the SEC 10K/Public firms filed Schedule UTP while 68.3 percent and 63.6 percent (respectively) did not file a Schedule UTP. *The conclusion for corporations with SEC 10K/Public FS with \$100 million or more in assets is that filing Schedule UTP does not identify the same tax compliance risks as reporting Schedule M-3 tax-income-decreasing BTB. The further conclusion is that Schedule UTP supplements—but does not replace—Schedule M-3 for transparency and return selection for the minority of large corporations with SEC 10K/Public FS that file Schedule UTP.*

### C. Audited FS Mini M-3

2010

See the first panel of Table 5. Schedule UTP filers, in aggregate, report a relatively large positive temporary component for COGS BTD (2.17 percent) reflected in the gross profit subtotal line, both a relatively large positive temporary component and a relatively large negative permanent component for specified-income BTD (temporary 1.67 percent and permanent -1.95 percent), a relatively large negative temporary component for other-income-with-difference BTD (-2.72 percent), a relatively large positive permanent component for specified-expense/deduction BTD (1.54 percent), and a relatively large positive temporary component for other-expense/deduction-with-difference BTD (3.51 percent) contributing to a relatively large total pretax income positive BTD (3.63 percent) increasing tax income from pretax income book (pretax income book 5.58 percent to tax income 9.21 percent), an increase of 65.1 percent.

**FIGURE 5: 2010–2011 U.S. Corporation M-3: Book-to-Tax Difference as Percentage of Pretax Book for Audited FS by UTP Filing Status**



See the second panel of Table 5. Schedule UTP nonfilers, in aggregate, report a relatively large negative temporary component for specified-expense/deduction BTD (-1.61 percent) contributing to a relatively large total pretax income negative BTD (-2.08 percent) reducing tax income from pretax income book (pretax income book 6.98 percent to tax income 4.90 percent), a reduction of 29.8 percent.

See the last row of the first and second panels of Table 5 and see Figure 5. The pretax income positive BTD of the UTP filers is larger in dollar magnitude than the pretax income negative BTD of the nonfilers (UTP filers \$14,406 million versus UTP nonfilers -\$12,621 million). The filer positive BTD as a percentage of pretax income book represents a tax income increase of 65.1 percent while the nonfiler negative BTD represents a tax income decrease of 29.8 percent.

## 2011

See the third panel of Table 5. Schedule UTP filers, in aggregate, report a relatively large positive temporary component for COGS BTD (2.12 percent) reflected in the gross profit line, both a relatively large positive temporary component and a relatively large negative permanent component for specified-income BTD (temporary 1.57 percent and permanent -2.31 percent), a relatively large negative temporary component for other-income-with-difference BTD (-2.35 percent), and both a relatively large negative temporary component and a relatively large positive permanent component for specified-expense/deduction BTD (temporary -5.95 percent and permanent 2.30 percent) contributing to a relatively large total pretax income negative BTD (-5.03 percent) decreasing tax income from pretax income book (pretax income book 10.72 percent to tax income 5.70 percent), a decrease of 46.9 percent.

See the fourth panel of Table 5. Schedule UTP nonfilers, in aggregate, report a relatively large negative temporary component for specified-expense/deduction BTD (-2.35 percent) contributing to a relatively large total pretax income negative BTD (-3.67 percent) reducing tax income from pretax income book (pretax income book 7.73 percent to tax income 4.05 percent), a reduction of 47.6 percent.

See the last row of the third and fourth panels of Table 5 and see Figure 5. The pretax income negative BTD of the UTP filers is smaller in dollar magnitude than the pretax income negative BTD of the nonfilers (UTP filers -\$20,909 million versus UTP nonfilers -\$22,290 million). The filer negative BTD as a percentage of pretax income book represents a tax income decrease of 46.9 percent while the nonfiler negative BTD represents a slightly larger tax income decrease of 47.6 percent.

### Conclusions: Audited

The requirements to file Schedule UTP in 2010 identify a *minority* group of corporations with Audited FS with total assets of \$100 million or more that has uncertain tax positions and that, in aggregate, increases tax income with BTD reported on Schedule M-3 (this group of taxpayers had a 65.1-percent increase to pretax book income). For 2011, the requirements to file Schedule UTP identify a *minority* group of corporations with Audited FS with total assets of \$100 million or more that has uncertain tax positions and that, in aggregate, reduces tax income with BTD reported on Schedule M-3 (a 46.9-percent reduction in pretax book income). Similar corporations in FS type and asset size not required to file Schedule UTP (or failing to file) do reduce tax income with BTD for both 2010 and 2011 (respectively) to a relatively greater or same extent (a 29.8-percent reduction in pretax book income for 2010 and a 47.6-percent reduction in 2011). For 2010 and 2011, 9.4 percent and 9.9 percent (respectively) of the Audited firms filed Schedule UTP while 90.6 percent and 90.1 percent (respectively) did not file a Schedule UTP. *The conclusion for corporations with Audited FS with \$100 million or more in assets is that filing Schedule UTP does not identify the same tax compliance risks as reporting Schedule M-3 tax-income-decreasing BTD. The further conclusion is that Schedule UTP supplements—but does not replace—Schedule M-3 for transparency and return selection for the minority of large corporations with Audited FS that file Schedule UTP.*

### D. Unaudited FS Mini M-3

#### 2010

See the first panel of Table 6. Schedule UTP filers, in aggregate, report both a relatively large positive temporary component and a relatively large positive permanent component for specified-income BTD (temporary 1.85 percent and permanent 3.66 percent) and a relatively large positive permanent component for specified-expense/deduction BTD (1.70 percent) contributing to a relatively large total pretax income positive BTD (5.98 percent) increasing tax income from pretax income book (pretax income book 4.84 percent to tax income 10.81 percent), an increase of 123.6 percent.

See the second panel of Table 6. Schedule UTP nonfilers, in aggregate, report a relatively large negative permanent component for specified-income BTD (-3.74 percent) and a relatively large negative temporary component for specified-expense/deduction BTD (-1.86 percent) contributing to a relatively large total pretax income negative BTD (-8.72 percent) reducing tax income from pretax income book (pretax income book 13.53 percent to tax income 4.81 percent), a reduction of 64.5 percent.

**TABLE 6. 2010–2011: U.S. Corporation Form 1120 Schedule M-3: Mini M-3 by UTP Status: Unaudited FS: Assets \$100 Million or More**

	\$ Millions					Percent of Adjusted Total Income Book					Percent of Pretax Book		
	Column A Book	Column B Temporary	Column C Permanent	Column D Tax	Total Diff.	Book	Temp	Perm	Tax	Total Diff.	Temp	Perm	Total Diff.
<b>2010 with UTP Filing</b>													
<b>Adjusted Gross Profit</b>	29,257	484	127	29,868	611	9.75	0.16	0.04	9.95	0.20	3.3	0.9	4.2
Specified Income	44,925	5,540	10,995	61,412	16,534	14.97	1.85	3.66	20.46	5.51	38.2	75.8	113.9
Adjusted Other Income with difference	225,919	-3,963	-2,650	219,306	-6,613	75.28	-1.32	-0.88	73.08	-2.20	-27.3	-18.3	-45.6
<b>Adjusted Total Income</b>	<b>300,101</b>	<b>2,060</b>	<b>8,472</b>	<b>310,586</b>	<b>10,532</b>	<b>100.00</b>	<b>0.69</b>	<b>2.82</b>	<b>103.49</b>	<b>3.51</b>	<b>14.2</b>	<b>58.4</b>	<b>72.6</b>
Specified Expense/Deduction	-95,618	-1,549	5,108	-92,012	3,558	-31.86	-0.52	1.70	-30.66	1.19	-10.7	35.2	24.5
Other Exp/Ded with difference	-103,545	2,778	1,070	-99,697	3,849	-34.50	0.93	0.36	-33.22	1.28	19.1	7.4	26.5
Adj Other Exp/Ded no difference	-86,425	0	0	-86,425	0	-28.80	0.00	0.00	-28.80	0.00	0.0	0.0	0.0
<b>Pretax Net Income</b>	<b>14,514</b>	<b>3,289</b>	<b>14,650</b>	<b>32,453</b>	<b>17,939</b>	<b>4.84</b>	<b>1.10</b>	<b>4.88</b>	<b>10.81</b>	<b>5.98</b>	<b>22.7</b>	<b>100.9</b>	<b>123.6</b>
<b>2010 without UTP Filing</b>													
<b>Adjusted Gross Profit</b>	203,190	-2,239	87	201,037	-2,153	40.23	-0.44	0.02	39.81	-0.43	-3.3	0.1	-3.2
Specified Income	121,951	-2,129	-18,910	100,896	-21,039	24.15	-0.42	-3.74	19.98	-4.17	-3.1	-27.7	-30.8
Adjusted Other Income with difference	179,907	-5,082	1,295	176,127	-3,787	35.62	-1.01	0.26	34.87	-0.75	-7.4	1.9	-5.5
<b>Adjusted Total Income</b>	<b>505,049</b>	<b>-9,450</b>	<b>-17,529</b>	<b>478,060</b>	<b>-26,979</b>	<b>100.00</b>	<b>-1.87</b>	<b>-3.47</b>	<b>94.66</b>	<b>-5.34</b>	<b>-13.8</b>	<b>-25.7</b>	<b>-39.5</b>
Specified Expense/Deduction	-135,631	-9,390	-2,939	-147,955	-12,329	-28.86	-1.86	-0.58	-29.30	-2.44	-13.7	-4.3	-18.0
Other Exp/Ded with difference	-127,336	-2,225	-2,522	-132,084	-4,747	-26.21	-0.44	-0.50	-26.15	-0.94	-3.3	-3.7	-6.9
Adj Other Exp/Ded no difference	-173,753	0	0	-173,753	0	-34.40	0.00	0.00	-34.40	0.00	0.0	0.0	0.0
<b>Pretax Net Income</b>	<b>68,328</b>	<b>-21,065</b>	<b>-22,990</b>	<b>24,274</b>	<b>-44,055</b>	<b>13.53</b>	<b>-4.17</b>	<b>-4.55</b>	<b>4.81</b>	<b>-8.72</b>	<b>-30.8</b>	<b>-33.6</b>	<b>-64.5</b>
<b>2011 with UTP Filing</b>													
<b>Adjusted Gross Profit</b>	105,497	2,609	342	108,449	2,952	32.95	0.81	0.11	33.88	0.92	14.5	1.9	16.4
Specified Income	48,833	278	13,225	62,332	13,502	15.25	0.09	4.13	19.47	4.22	1.5	73.4	75.0
Adjusted Other Income with difference	165,800	517	-827	165,489	-311	51.79	0.16	-0.26	51.69	-0.10	2.9	-4.6	-1.7
<b>Adjusted Total Income</b>	<b>320,130</b>	<b>3,403</b>	<b>12,740</b>	<b>336,270</b>	<b>16,143</b>	<b>100.00</b>	<b>1.06</b>	<b>3.98</b>	<b>105.04</b>	<b>5.04</b>	<b>18.9</b>	<b>70.7</b>	<b>89.6</b>
Specified Expense/Deduction	-90,564	-7,682	3,704	-94,538	-3,978	-28.29	-2.40	1.16	-29.53	-1.24	-42.7	20.6	-22.1
Other Exp/Ded with difference	-115,525	-2,622	5,074	-113,073	2,452	-36.09	-0.82	1.58	-35.32	0.77	-14.6	28.2	13.6
Adj Other Exp/Ded no difference	-96,030	0	0	-96,030	0	-30.00	0.00	0.00	-30.00	0.00	0.0	0.0	0.0
<b>Pretax Net Income</b>	<b>18,011</b>	<b>-6,900</b>	<b>21,518</b>	<b>32,628</b>	<b>14,618</b>	<b>5.63</b>	<b>-2.16</b>	<b>6.72</b>	<b>10.19</b>	<b>4.57</b>	<b>-38.3</b>	<b>119.5</b>	<b>81.2</b>
<b>2011 without UTP Filing</b>													
<b>Adjusted Gross Profit</b>	218,469	-2,970	1	215,464	-2,969	45.18	-0.61	0.00	44.56	-0.61	-2.7	0.0	-2.7
Specified Income	85,079	6,692	4,367	96,140	11,059	17.60	1.38	0.90	19.88	2.29	6.0	3.9	9.9
Adjusted Other Income with difference	179,951	70	1,513	181,535	1,584	37.22	0.01	0.31	37.55	0.33	0.1	1.4	1.4
<b>Adjusted Total Income</b>	<b>483,499</b>	<b>3,792</b>	<b>5,882</b>	<b>493,139</b>	<b>9,674</b>	<b>100.00</b>	<b>0.78</b>	<b>1.22</b>	<b>101.99</b>	<b>2.00</b>	<b>3.4</b>	<b>5.3</b>	<b>8.7</b>
Specified Expense/Deduction	-134,130	-13,877	94	-147,883	-13,783	-27.74	-2.87	0.02	-30.59	-2.85	-12.4	0.1	-12.3
Other Exp/Ded with difference	-263,145	128,131	3,277	-131,734	131,407	-54.43	26.50	0.68	-27.25	27.18	114.8	2.9	117.7
Adj Other Exp/Ded no difference	-197,883	0	0	-197,883	0	-40.93	0.00	0.00	-40.93	0.00	0.0	0.0	0.0
<b>Pretax Net Income</b>	<b>-111,659</b>	<b>118,045</b>	<b>9,253</b>	<b>15,639</b>	<b>127,298</b>	<b>-23.09</b>	<b>24.41</b>	<b>1.91</b>	<b>3.23</b>	<b>26.33</b>	<b>105.7</b>	<b>8.3</b>	<b>114.0</b>

Totals may not equal the sum of the components due to rounding.

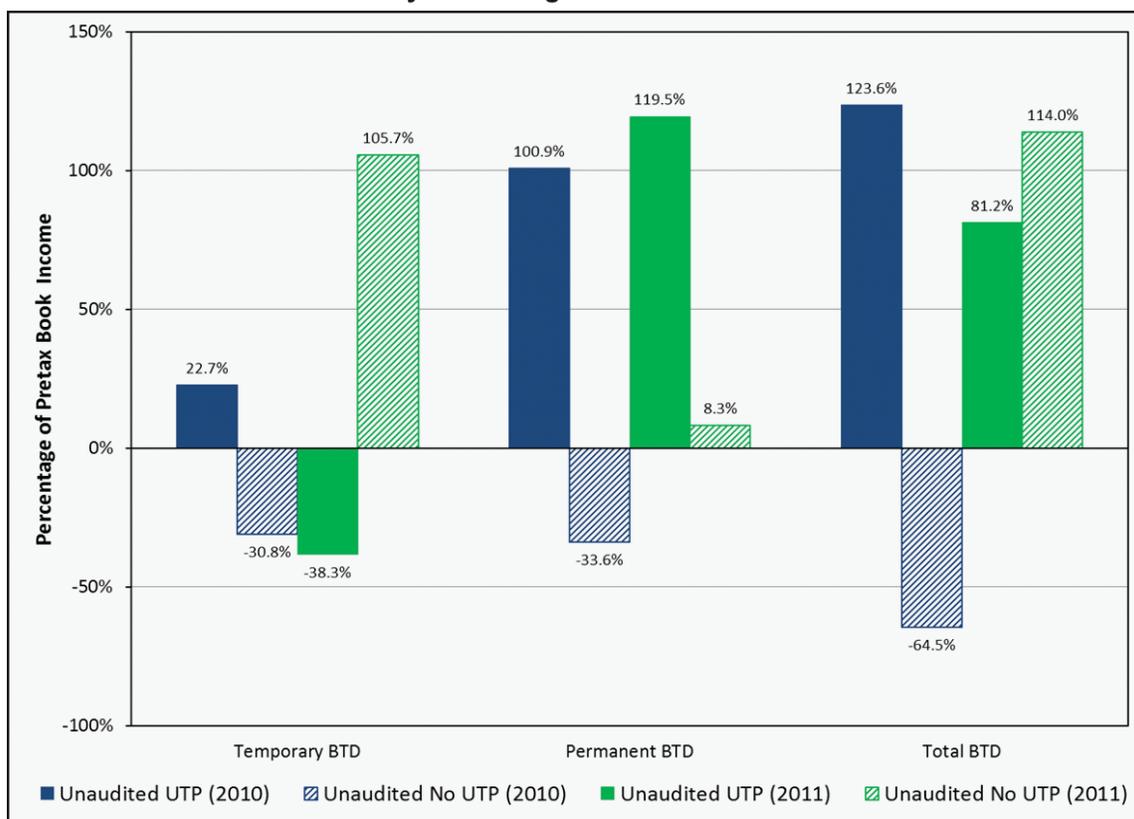
See the last row of the first and second panels of Table 6 and see Figure 6. The pretax income positive BTB of the UTP filers is smaller in dollar magnitude than the pretax income negative BTB of the nonfilers (UTP filers \$17,939 million versus UTP nonfilers -\$44,055 million). The filer positive BTB as a percentage of pretax income book represents a tax income increase of 123.6 percent while the nonfiler negative BTB represents a tax income decrease of 64.5 percent.

2011

See the third panel of Table 6. Schedule UTP filers, in aggregate, report a relatively large positive permanent component for specified-income BTB (4.13 percent), a relatively large negative temporary component for specified-expense/deduction BTB (-2.40 percent), and a relatively large positive permanent component for other-expense/deduction-with-difference BTB (1.58 percent) contributing to a relatively large total pretax income positive BTB (4.57 percent) increasing tax income from pretax income book (pretax income book 5.63 percent to tax income 10.19 percent), an increase of 81.2 percent.

See the fourth panel of Table 6. Schedule UTP nonfilers, in aggregate, report a relatively large negative temporary component for specified-expense/deduction BTB (-2.87 percent) and a relatively large positive temporary component for other-expense/deduction-with-difference BTB (26.50 percent) contributing to a relatively large total pretax income positive BTB (26.33 percent) increasing tax income from pretax income book (pretax income book -23.09 percent to tax income 3.23 percent), an increase of 114.0 percent of the absolute value of the loss.

**FIGURE 6: 2010–2011 U.S. Corporation M-3: Book-to-Tax Difference as Percentage of Pretax Book for Unaudited FS by UTP Filing Status**



See the last row of the third and fourth panels of Table 6 and see Figure 6. The pretax income positive BTD of the UTP filers is smaller in dollar magnitude than the pretax income positive BTD of the nonfilers (UTP filers \$14,618 million versus UTP nonfilers \$127,298 million). The filer positive BTD as a percentage of pretax income book represents a tax income increase of 81.2 percent while the nonfiler positive BTD represents a tax income increase of 114.0 percent.

### **Conclusions: Unaudited**

The requirements to file Schedule UTP in 2010 and 2011 identify a *minority* group of corporations with Unaudited FS with total assets of \$100 million or more that has uncertain tax positions and that, in aggregate, increase tax income with BTD reported on Schedule M-3 (this group of taxpayers had an increase in pretax book income of 123.6 percent for 2010 and 81.2 percent for 2011). Similar corporations in FS type and asset size not required to file Schedule UTP (or failing to file) do reduce tax income with BTD in 2010 to a relatively greater extent but not in 2011 (a reduction of pretax income of 64.5 percent for 2010 and an increase of 114.0 percent for 2011). For 2010 and 2011, some 8.0 percent and 8.8 percent (respectively) of the Unaudited firms filed Schedule UTP while 92.0 percent and 91.2 percent (respectively) did not file a Schedule UTP. *The conclusion for corporations with Unaudited FS with \$100 million or more in assets is that filing Schedule UTP does not identify the same tax compliance risks as reporting Schedule M-3 tax-income-decreasing BTD. The further conclusion is that Schedule UTP supplements—but does not replace—Schedule M-3 for transparency and return selection for the minority of large corporations with Unaudited FS that file Schedule UTP.*

## **Part V. General Conclusions**

This paper presents and compares 2010-2011 Schedule M-3 and Form 1120 tax return data profiles for Schedule UTP filers and nonfilers with \$100 million or more in assets. It includes 12,044 corporations in 2010 and 12,307 corporations in 2011. In 2010 Schedule UTP filers decrease tax income using Schedule M-3 BTD *less*—as a percentage of total pretax book income—than Schedule UTP nonfilers for all FS types (SEC 10K/Public, Audited, and Unaudited). In 2011 Schedule UTP filers decrease tax income using BTD *less* than Schedule UTP nonfilers for SEC 10K/Public FS and decrease tax income *no more* than nonfilers for Audited FS. We conclude that filing Schedule UTP does not identify the same tax compliance risks as reporting Schedule M-3 tax-income-decreasing BTD. We also conclude that Schedules UTP and M-3 are complementary and not duplicative for tax compliance risk analysis. We observe that for all FS-types only a *minority* of large corporations file Schedule UTP while all file Schedule M-3.

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# Unintended Consequences of Linking Tax Return Disclosures of Tax Uncertainty to Financial Reporting for Tax Uncertainty

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Firms face increasing pressure to disclose information about their uncertain tax positions.<sup>2</sup> Beginning in 2007, U.S. financial reporting rules require firms to disclose reserves for uncertain tax positions in their public financial statements (Financial Accounting Standards Board (2006)/ASC 740-10). Although the FASB issued that Financial Interpretation No. 48 (FIN 48) to make tax contingencies more transparent to investors, tax authorities can use the reserves to identify and assess tax uncertainty. However, a tax authority cannot observe whether the reserves relate to positions claimed in its jurisdiction because firms aggregate the reserves across jurisdictions. As a result, a growing number of tax authorities now require firms to disclose detailed information about the tax positions underlying financial statement reserves, essentially linking tax return disclosures of tax uncertainty with financial reporting for tax uncertainty. Understanding how firms respond to such tax disclosure requirements is important because the requirements can affect firms' tax and financial reporting decisions. The IRS created Schedule UTP (*Uncertain Tax Position Statement*) in 2010, which requires a firm to list and describe to the IRS Federal income tax positions for which the firm has recorded a reserve in its audited financial statements.<sup>3</sup> Using confidential corporate tax return data and public financial statement data, I use the implementation of Schedule UTP to examine how linking tax return disclosures of tax uncertainty to financial reporting for tax uncertainty affects firms' reporting decisions.

Theoretical models of tax compliance predict that Schedule UTP disclosures will affect a firm's decision of whether to claim an uncertain tax position. In the most basic model, a firm's decision to claim an uncertain position entails a tradeoff between: (i) the benefit of lower tax liability if undetected by the tax authority; and (ii) the costs, such as penalties and interest, if detected by the tax authority (Allingham and Sandmo (1972)). If disclosing such a position on Schedule UTP increases the probability that the IRS will audit the position, a firm should become less willing to claim the position. Indeed, game-theoretic models of tax compliance predict that increasing audit probability decreases firms' willingness to claim uncertain tax positions (e.g., Graetz, Reinganum, and Wilde (1986)), and recent empirical evidence supports this prediction (Hoopes, Mescall, and Pittman (2012); DeBacker, Heim, Tran, and Yuskavage (2013)). Further, former IRS Commissioner Doug Shulman acknowledged in remarks to the American Bar Association in September of 2012 that one purpose of the Schedule UTP was to deter firms from "pushing the envelope too far."

However, if the IRS is already aware that a firm is claiming an uncertain tax position via other tax return disclosures or prior audits, disclosing the existence of the position on Schedule UTP should be costless to the firm. Even if the IRS is not aware of a position, the net present value of the position could still be positive after taking into account a higher likelihood of audit. In these cases, Schedule UTP would not affect firms' willingness to claim an uncertain tax position. Alternatively, because Schedule UTP requires a firm to disclose only positions underlying financial statement reserves, the firm could find ways to avoid reserving for an uncertain tax position provided management can provide the external auditor with sufficient evidence for why the position does not warrant a reserve (Harvey (2010, 2013); Sheppard (2013)).

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<sup>1</sup> I am grateful to the Internal Revenue Service LB&I Division for supporting this research by providing access to confidential corporate tax return data. All opinions are my own and do not reflect the positions of the IRS. Special thanks to Ben Ayers, Charles Boynton, Jenny Brown, Charles Christian, Lisa De Simone, Jay Hartzell, Ross Jennings, Ellen Legel, Petro Lisowsky, John Miller, Lillian Mills, Ed Outslay, John Robinson, Leslie Robinson, Lisa Rupert, Jeri Seidman, David Stanley, Bridget Stomberg, and David Wagner for their thoughtful comments and suggestions.

<sup>2</sup> I refer to uncertain tax positions as those that might not be sustained if challenged by a tax authority.

<sup>3</sup> A firm must also disclose any position that the firm expects to litigate even if the firm has not recorded a reserve. Thus, even if a firm does not record a reserve for uncertain tax positions in its financial statements, the firm could still report a position on Schedule UTP.

In sum, the effect of Schedule UTP on firms' tax and financial reporting decisions is an empirical question. Abernathy, Davenport, and Rapley (2013) and Ferraro (2012) both document a post-Schedule UTP decrease in financial statement reserves for uncertain tax positions. However, because firm-level Federal tax payments are not publicly available, the studies cannot determine whether the decrease in reserves results from: (i) an actual reduction in Federal tax uncertainty due to changes in underlying tax positions; or (ii) a change in financial reporting for tax uncertainty with no change in underlying tax uncertainty. Understanding which of these explanations drives the decrease in reserves is crucial to assessing the effect of the standard on tax and financial reporting. This study disentangles the two explanations by combining confidential Federal tax return data with public financial statement data.

I construct a sample of firm-year observations over the period 2007 to 2011 at the intersection of three data sources: (i) the IRS corporate tax return dataset; (ii) the Compustat Fundamentals Annual dataset; and (iii) the IRS Large Business & International (LB&I) Division's FIN 48 registry. I measure claims for uncertain tax positions using Federal tax payments reported on the corporate tax return and I measure financial reporting for tax uncertainty using reserves for uncertain tax positions. Schedule UTP became effective for firms with at least \$100 million in total assets in 2010 and for smaller firms starting in 2012. The phase-in enables me to compare behavior both across time and in the cross-section to test the effect of Schedule UTP on Federal tax payments and financial reporting reserves for uncertain tax positions.

I find that although firms report lower reserves in their publicly-available financial statements, they do not claim fewer benefits on their Federal income tax returns. These results imply that firms modified their financial reporting for tax uncertainty to avoid disclosing positions to the IRS on Schedule UTP. Thus, the post-Schedule UTP decrease in reserves represents a change in financial reporting with no change in underlying claims for uncertain tax positions. To further investigate the change in behavior post-Schedule UTP, I test whether the results are stronger for firms under continual audit by the IRS. Because of limited resources, the IRS cannot audit every taxpayer who reports a position on Schedule UTP. Therefore, firms under continual IRS audit face the greatest risk of Schedule UTP positions being audited because the IRS has already committed to auditing their tax returns. Consistent with this argument, I find that relative to firms not under continual audit, firms under continual audit by the IRS report even lower reserves post-Schedule UTP.

My findings are important to tax administrators, policymakers, and financial statement users. First, learning that firms appear to modify their financial reporting for tax uncertainty in order to avoid disclosing positions on Schedule UTP affects how tax authorities interpret tax return disclosures of tax uncertainty. Specifically, my results suggest that firms avoid disclosing some uncertain tax positions on Schedule UTP. Second, the FASB and the International Accounting Standards Board are currently considering international standards for tax contingency reporting. My findings suggest that if the standards enable discretion, managers will use that discretion. Finally, financial statement users and researchers should be aware that financial statement reserves for tax uncertainty are not consistent across pre- and post-Schedule UTP environments because Schedule UTP appears to have changed some firms' reserve decisions.

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# The Effect of CAP on Tax Aggressiveness

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## 1. Introduction

The compliance assurance process (CAP) is an IRS initiative designed to resolve the uncertain tax positions of large corporations prior to their filing a tax return for the year in question. The Government Accountability Office (GAO, 2013) recommended that the IRS measure the effectiveness of the CAP program by developing performance measures and targets related to seven CAP goals, including ensuring taxpayer compliance. This research examines whether firms selected for the CAP program are less tax aggressive than a matched sample of non-CAP firms. We then examine whether firms become less aggressive after they enter the CAP program. To address these questions, we use several measures of tax aggressiveness previously developed in the literature.

Tax aggressiveness has been studied extensively in the literature, but to date, the variation in effective tax rates (ETRs) is not well understood (Hanlon and Heitzman, 2010). Weisbach (2002) goes so far as to question why firms do not use more tax shelters—the “undersheltering puzzle.” Possible reasons why some firms are less aggressive include tax manager risk aversion, firm focus on business operations, political costs, or that the firm practices high ethical standards and does not engage in questionable activities—including tax aggressiveness. Firms with these characteristics are likely the firms that the IRS is looking for when evaluating applications for CAP. Thus, we expect to find that CAP firms are less tax aggressive than non-CAP firms.

Firms that desire certainty and want to minimize tax audit costs are likely candidates to enter CAP. DeSimone, Sansing and Seidman (2013) find that the perceived probability of detection for uncertain tax positions may be a determining factor for CAP participation. Firms that take highly aggressive positions are less likely to enter CAP because of the full transparency requirement if they believe that the IRS will detect undisclosed uncertain tax positions. In the study most closely related to ours, Beck and Lisowsky (2013) find that firms with moderate-sized FIN 48 reserves<sup>1</sup> are the most likely to participate in CAP. They interpret these results to suggest that CAP participation is negatively related to tax aggressiveness, but positively related to tax uncertainty. In other words, firms with no FIN 48 reserves would gain little certainty by entering CAP, while highly tax aggressive firms are likely to avoid CAP to avoid disclosure of weak positions.

We extend these previous studies by analyzing whether the IRS selects firms that are not tax aggressive to participate in CAP (tax angels) and/or if firms become less tax aggressive after joining the CAP program. The IRS CAP program is a voluntary program in which participating large corporations work collaboratively with the IRS to identify and resolve tax issues in real time before the annual tax return is filed. The traditional post-filing audits for large corporations takes on average 50 months to complete from the time the return is filed to audit closing, not including the appeals process (GAO 2013, 7). To gain audit currency,<sup>2</sup> the IRS started CAP in March 2005 as a pilot program and made CAP permanent in March 2011.<sup>3</sup>

The program is designed to be mutually beneficial to both taxpayers and the IRS. A CAP firm benefits from U.S. federal income tax audit currency and certainty. Before a firm is accepted into CAP, prior year audits are closed, resulting in audit currency for the firm. Once in CAP, a firm is able to achieve certainty on the final determination of current

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<sup>1</sup> Financial Accounting Standards Board (FASB) Interpretation No. 48, Accounting for Uncertainty in Income Tax Positions—An Interpretation of FASB Statement No. 109 (FIN 48), effective for tax years beginning after December 15, 2006, clarified the accounting for uncertainty in income taxes recognized in a company's financial statements in accordance with FASB Statement No. 109, Accounting for Income Taxes (FAS 109). FAS 109 and FIN 48 are a part of U.S. generally accepted accounting principles (U.S. GAAP), and thus are now part of the FASB Accounting Standards Codification (ASC), which is effective for interim and annual periods ending after September 15, 2009. FASB ASC Topic 740, Income Taxes, provides the income tax guidance that was provided in FAS 109 and FIN 48, as well as other accounting pronouncements. FASB Subtopic 740-10 includes the provisions that comprised FIN 48.

<sup>2</sup> Currency means “the appropriate documents and corporate staff knowledgeable about a particular transaction are more likely to be available for consultation” (GAO 2013, 14).

<sup>3</sup> In March 2011, the IRS announced that the CAP would be expanded and made permanent. Interested taxpayers can now download the CAP application from the IRS website.

U.S. tax liability by settling most material tax issues before filing; post-filing examinations are eliminated or minimized. The IRS benefits by reducing examination cycle times, thus freeing resources to increase audit coverage among other taxpayers.

The GAO (2013) recommended that the IRS measure the effectiveness of the CAP program by developing performance measures and targets related to seven CAP goals: ensure taxpayer compliance; reduce overall examination time; increase currency for taxpayers; enhance the accurate, efficient, and timely resolution of complex tax issues; increase audit coverage by providing more efficient use of resources; reduce taxpayer administrative burden; and increase certainty for taxpayers. This research can help the IRS measure the effectiveness of the CAP program with respect to the goal of ensuring taxpayer compliance.

We compare CAP firms with a matched sample of non-CAP firms, considering both firm characteristics potentially associated with tax aggressiveness (such as size and foreign operations) and tax aggressiveness measures (such as unrecognized tax benefits (UTBs)).<sup>4</sup> We find some evidence that CAP firms are less tax aggressive than the matched firms, but in general our results are weak. Consistent with the “angel” hypothesis, we find that CAP firms have lower UTBs. In addition, CAP firms have higher foreign tax rates. This result, combined with the fact that R&D is associated with lower foreign tax rates, but higher federal tax rates, suggests that CAP firms are less aggressive income shifters and likely have less intangible property offshore.

GAO noted that IRS and non-IRS officials indicated that compliance may be higher under CAP, motivated in part by the corporation’s desire not to be removed from CAP. Thus, if the “angel” scenario is not descriptive pre-CAP, the CAP firms may become less tax aggressive in subsequent years. We conduct a within-CAP-firm analysis to examine pre- and post-CAP tax aggressiveness by examining UTB balances and the amount of the UTB that would affect the ETR if reversed. There is not a significant difference for the UTB measures from 2007-2009, likely because there were fewer active CAP firms in those years. As the number of firms in the CAP program increase over the years, these measures become lower in 2010 and 2011 for the CAP firms, suggesting that CAP firms become less tax aggressive once in the CAP program.

This paper reviews the CAP background in Section 2. Section 3 discusses firm characteristics associated with tax aggressiveness and Section 4 describes the tax aggressiveness measures. The samples are described in Section 5. Sections 6 and 7 report the descriptive statistics and results from the across-firm and within-firm analyses respectively. Section 8 concludes.

## 2. CAP Background

The CAP program began in 2005 with 16 firms, and by the end of 2011 there were 160 firms that had participated in CAP. Beginning in 2012, the CAP program moved from an invitation-only program to an application program. The IRS required applicants to have assets greater than \$10 million, have audited financial statements, not be in litigation with the IRS or any federal or state agency, and display a general willingness to be transparent and cooperative with the IRS. After the taxpayer completes the application, but before the taxpayer is accepted into the program, the taxpayer must sign a Memo of Understanding (MOU). The MOU represents a commitment by both the IRS and the taxpayer to the CAP program. In general, the MOU outlines the specific objectives of the review, identifies the audit timeframe, defines the roles and responsibilities of both parties and establishes disclosure guidelines for tax positions. Taxpayers who fail to comply with the requirements set forth in the MOU may be asked to leave the program.

The MOU also identifies the taxpayer’s assigned Account Coordinator (AC). Throughout the process, the AC identifies potentially uncertain issues by reviewing the taxpayer’s tax audit history, prior tax issues, financial performance, industry trends, and current business practices. As the issues are resolved throughout the tax year, the AC and the taxpayer enter into Issue Resolution Agreements (IRAs). At the close of tax year, the AC and the taxpayer incorporate the agreed tax treatment for the issues identified in the IRAs in the closing agreements (Form 906). If all the issues are resolved, then IRS will issue a “full acceptance letter,” stating that it will accept the taxpayer’s return, subject to a post-filing review if it is filed consistent with the closing agreement. If there are any open or unresolved issues, the IRS will issue a “partial acceptance letter,” which accepts the taxpayer’s return as it relates to the agreed upon transactions, but requires any unresolved issues to be resolved under the traditional audit process.

<sup>4</sup> The purpose of the matched sample is to control for selection bias. An alternative to this would be to use a 2-stage model where the first stage is designed to model the selection into CAP and the inverse Mills ratio resulting from this first stage is used in a second stage model.

Once the return is filed, the taxpayer is subject to a post-filing review by the IRS to ensure that all issues were reported as originally agreed upon. The post-file review is typically completed within 90 days of filing. If the issues remain unchanged and are reported as agreed, the IRS issues a “no change letter” and the case is closed. If new issues are identified or unresolved, then the IRS conducts an issue focused examination. Under this circumstance, the case may be closed “agreed with changes” in which unresolved issues are agreed upon and resolved, or the case may be closed “unagreed” in which the taxpayer is afforded full access to appeals proceedings similar to the traditional process.

### 3. Firm Characteristics Associated with Tax Aggressiveness

The GAO recommended that tax compliance be ensured for companies in the CAP program; however, tax compliance is difficult to measure using observable data. Firms take tax positions on hundreds of items each year with varying degrees of uncertainty. Due to the difficulty of measuring tax compliance, we examine its counterpart - tax aggressiveness. Researchers have extensively examined tax aggressiveness; thus, we use several well accepted measures of tax aggressiveness as well as some measures we develop for this study.

Prior to 2012, the IRS invited firms to enter the CAP program presumably based on an informal assessment of the firm’s compliance profiles. We examine 10 firm characteristics that may be associated with tax aggressiveness to determine if CAP taxpayers could be distinguished on the basis of these characteristics. Table 1, Panel B, provides definitions of these firm characteristic measures, which are determined using Compustat data. Beginning with *Size*, the relation between size and aggressive tax planning, though studied extensively, is unclear. Larger firms may have greater resources and opportunities to engage in aggressive tax planning; however, larger firms may also face greater political costs (Zimmerman, 1983). Rego (2003) finds that larger firms have higher worldwide book effective tax rates, consistent with the political cost argument. Wilson (2009), however, finds a positive association between tax shelter participation and firm size, suggesting that larger firms are more tax aggressive. To explore this relation, we construct a measure *Size* as the natural log of total assets.

Rego (2003) finds that multinational firms with more extensive foreign operations have lower effective tax rates and concludes that these results are consistent with economies of scale for tax planning. Wilson (2009) and Lisowsky (2010) also provide evidence that the presence of foreign operations is associated with their measures of tax aggressiveness. To capture these effects, we measure *Foreign* as the ratio of total foreign pretax income to total worldwide pretax income.

Profitable firms arguably have a greater incentive to reduce taxes relative to firms that are not profitable. We use two measures of profitability: cash flow from operations (*CFO*) and return on assets (*ROA*). Conversely, firms with net operating losses have less incentive to be tax aggressive. We use *NOL*, which is a binary variable equal to one if the firm has a tax net operating loss carryforward at the end of the year and zero otherwise.

Mills *et al.* (1998) argue that leverage proxies for the complexity of firms’ financial transactions, so firms with higher leverage could have the ability to minimize taxes through financing transactions. Alternatively, firms with higher leverage may have less need for other non-debt tax shields and thus engage in less tax aggressive behavior (Graham and Tucker, 2006). We measure *Leverage* as the ratio of long term debt to total assets.

Phillips (2003) concludes that firms with growth opportunities also have more tax planning opportunities. We include two measures that proxy for a firm’s growth opportunities, the market-to-book ratio, *MTB*, and research and development expense, *RD*.

Similar to capital structure, although depreciation is a non-debt tax shield, capital intensity leads to increases in overall tax planning opportunities. We include a measure of a firm’s investment in fixed assets, *CAPINT*. Similarly, because investments in intangible assets present additional opportunities for tax planning through transfer pricing, we include *INTAN*, as a measure of a firm’s intangibles. *RD* is also a proxy for intangible assets.

### 4. Tax Aggressiveness Measures

In this section, we discuss eight tax aggressiveness proxies commonly used in the literature as well as three measures that we develop for this study. We use all of these measures because all of them have measurement error. Table 1, Panel A, provides definitions of these tax aggressiveness measures: *ETR*, *CETR*, *CashETR*, *LRCashETR*, *BTD*, *PBTD*, *UTB*, *UTB\_ETR*, *TXWW\_ETR*, *TXFED\_ETR* and *TXFO\_ETR*. We use Compustat data for the tax rate and book-tax difference measures. We use Compustat and IRS data for the UTB measures, resolving any differences by examining the financial disclosures. The IRS UTB data are described in the Appendix.

**TABLE 1. Variable Descriptions**

Variable Name	Definition*
<b>Panel A: Tax Aggressiveness Variables</b>	
ETR	The book effective tax rate calculated as total expense ( <i>TXT</i> ) in year <i>t</i> divided by pretax book income ( <i>PI</i> ) in year <i>t</i>
CETR	The current book effective tax rate calculated as current tax expense ( <i>TXC</i> ) in year <i>t</i> divided by pretax book income ( <i>PI</i> ) in year <i>t</i>
CashETR	The cash effective tax rate calculated as cash taxes paid ( <i>TXPD</i> ) in year <i>t</i> divided by pretax book income in year <i>t</i> ( <i>PI</i> ) less special items ( <i>SPI</i> )
LRCashETR	The 5-year average cash effective tax rate calculated as the five-year sum of cash taxes paid ( <i>TXPD</i> ) divided by the fiveyear sum of pretax book income ( <i>PI</i> ) less special items ( <i>SPI</i> )
BTD	Total book tax differences computed as the difference between book income ( <i>PI</i> ) less minority interest ( <i>MII</i> ) and an estimate of taxable income. Taxable income is estimated by grossing up the sum of federal tax expense ( <i>TXFED</i> ) and foreign tax expense ( <i>TXFO</i> ) by the statutory rate and then subtracting the change in the net operating loss ( <i>TCLF</i> ) from year <i>t-1</i> to year <i>t</i> . BTD is scaled by beginning of the year total assets ( <i>AT</i> )
PBTD	Permanent book tax differences computed as the difference between total book tax differences ( <i>BTD</i> ) and temporary book tax differences [Computed by grossing up deferred tax expense ( <i>DTE</i> ) by the statutory rate]
UTB & UTB_ETR	UTB end of year and UTB-ETR as reported in financial statement footnotes pursuant to Financial Interpretation No. 48 (FIN 48 is now codified as part of ASC 740), in \$millions. (Source: IRS, 10-Ks). Both are scaled by beginning of the year total assets ( <i>AT</i> )
TXWW_ETR	The current tax effective tax rate calculated as <i>TXWW</i> in year <i>t</i> divided by pretax book income ( <i>PI</i> ) in year <i>t</i> ; <i>TXWW</i> = current federal tax expense ( <i>TXFED</i> ) + current foreign tax expense ( <i>TXFO</i> )
TXFED_ETR	The current domestic effective tax rate calculated as current federal tax expense ( <i>TXFED</i> ) in year <i>t</i> divided by pretax domestic book income ( <i>PIDOM</i> ) in year <i>t</i>
TXFO_ETR	The current foreign effective tax rate calculated as current foreign tax expense ( <i>TXFO</i> ) in year <i>t</i> divided by pretax foreign book income ( <i>PIFO</i> ) in year <i>t</i>
<b>Panel B: Firm Characteristic Variables</b>	
Size	Log of total assets in year <i>t</i> ( <i>AT</i> )
Foreign	Ratio of foreign pretax income ( <i>PIFO</i> ) to total worldwide pretax income in year <i>t</i> ( <i>PI</i> )
CFO	Operating cash flows in year <i>t</i> ( <i>OANCF</i> ) scaled by total assets in year <i>t</i> ( <i>AT</i> )
ROA	Pretax income in year <i>t</i> ( <i>PI</i> ) divided by total assets in year <i>t</i> ( <i>AT</i> ); winsorized at [-1, 1]
NOL	An indicator variable equal to 1 if the firm has a tax loss carryforward in year <i>t</i> ( <i>TLCF</i> ) and 0 otherwise
Leverage	Long term debt ( <i>DLTT</i> ) scaled by total assets in year <i>t</i> ( <i>AT</i> )
MTB	Ratio of market value of common equity ( <i>PRCC_F*CSHO</i> ) to book value of common equity in year <i>t</i> ( <i>CEQ</i> )
RD	Total research and development expense in year <i>t</i> ( <i>XRD</i> ) scaled by total assets at the beginning of the year ( <i>AT</i> )
CAPINT	Total gross property, plant and equipment in year <i>t</i> ( <i>PPEGT</i> ) scaled by total assets
INTAN	Goodwill and other intangibles in year <i>t</i> ( <i>INTAN</i> ) scaled by total assets at the beginning of the year ( <i>AT</i> )

\* Compustat variable names are reported in parentheses.

#### 4.1 ETR and CETR

A firm's effective tax rate (*ETR*), defined as some measure of tax liability divided by income, has long been used in the literature as a measure of tax aggressiveness. We define *ETR* as total book tax expense divided by pretax income. Similarly, the current book effective tax rate (*CETR*) uses the current book tax expense in the numerator.

The *ETR*-based measures have two limitations with respect to measuring tax aggressiveness. First, because total tax expense is comprised of current and deferred taxes, the *ETR* fails to account for tax aggressiveness associated with temporary book-tax differences because decreases in current tax expense are offset by corresponding increases in

deferred tax expense. Second, both the ETR and CETR understate a firm's level of tax aggressiveness if the firm records unrecognized tax benefits associated with aggressive tax positions, increasing a tax contingency reserve instead of reducing tax expense.<sup>5</sup>

#### 4.2 *CashETR and LRCashETR*

*CashETR*, calculated as cash taxes paid divided by pretax income, will reflect the benefits of aggressive tax planning because cash taxes is based on the actual tax outlays. This measure, however, may not be as useful as the *ETR* and *CETR* to the extent that prior years' taxes are being paid in the current year. Dyreng *et al.* (2008) introduce the long-run cash effective tax rate (*LRCashETR*), calculated as ten-year sum of cash taxes divided by the 10-year sum of pretax financial income. We use a five-year sum to avoid losing observations, similar to Rego and Wilson (2012) and Frischmann *et al.* (2008).

#### 4.3 *BTD and PBTB*

The total difference between book and taxable income (*BTD*) can also be used as a proxy for tax aggressiveness. Computing *BTD* requires estimating taxable income, which is typically done by grossing up current tax expense by the statutory tax rate. Empirically, Wilson (2009) finds that *BTD* is positively associated with a measure of tax sheltering.

Several other studies employ variants of book-tax differences as the proxy for tax aggressiveness. Rego and Wilson (2012) use permanent book-tax differences as their proxy, based on the assumption that managers prefer tax strategies that permanently reduce income tax expense rather than just deferring the cash outlay. While tax strategies that generate temporary book-tax differences could lead to lower current tax expense, such differences also lead to a corresponding increase in deferred tax expense, resulting in no change to total tax expense. They compute *PBTB* as total book-tax differences minus deferred tax expense grossed up by the applicable federal statutory rate.

#### 4.4 *UTB and UTB-ETR*

We also use *UTB* and *UTB-ETR* as measures of tax aggressiveness. The *UTBs* resulting from uncertain tax positions were first disclosed in tax footnotes for years beginning after December 15, 2006, FIN 48 (now included as part of FASB ASC 740) requires that corporations disclose the unrecognized tax balances in their financial statement footnotes. Under FIN 48's two-step process, the firm records a reserve only if it is more likely than not that the issue will not be sustained. CAP taxpayers most likely meet that threshold. In the second step, the firm estimates the tax benefit that will be recognized, which may be different from the tax benefit claimed on the tax return. Thus, a firm's *UTBs* represent the difference between the tax positions taken or expected to be taken in tax returns and the benefits recognized in the corresponding financial statements pursuant to ASC 740. In particular, ASC 740-10-50-15 and 15A require public entities to disclose: (1) a tabular reconciliation of the total *UTBs* at the beginning and end of the period;<sup>6</sup> and (2) the total *UTBs* that, if recognized, would affect the effective tax rate.

#### 4.5 *TXWW-ETR, TXFED-ETR and TXFO-ETR*

Finally we focus on domestic versus foreign tax rates, using *TXFED*, *TXFO*, and *TXWW* (*TXFED* + *TXFO*) and their related tax base, *PIDOM*, *PIFO*, and *PI*, to compute *TXFED\_ETR*, *TXFO\_ETR*, and *TXWW\_ETR*. *TXFED* is the current U.S. federal tax imposed on worldwide income. Firms that are tax aggressive likely shift income out of the U.S. into foreign jurisdictions. These firms may report higher federal tax rates *TXFED-ETR* as their benefit from U.S. tax incentives such as the R&D credit or the deduction for domestic production activities is reduced. These firms also likely report lower current foreign tax rates *TXFO-ETR* because they would likely report this shifted income in tax havens. *TXWW-ETR* is the federal and foreign current tax rates. This rate excludes state taxes because income shifting strategies out of the U.S. likely have little effect on the state income tax rate.

<sup>5</sup> The corporation credits the tax reserve instead of tax expense.

<sup>6</sup> The tabular reconciliations disclose "gross" *UTBs*, including the amount recorded as the liability for *UTBs* (the tax contingency reserve), amounts recorded as a reduction in a deferred tax asset (DTA) or an increase in a deferred tax liability (DTL), and amounts recorded as components of other equity or net asset amounts in the balance sheet. The *UTBs* are not reduced by the potential indirect effects of offsets in other tax jurisdictions, although some firms report *UTBs* with and without such indirect effects.

## 5. Samples: CAP and Non-CAP

### 5.1. CAP Sample

The IRS CAP program began with 16 taxpayers in 2005 and expanded to 140 taxpayers by 2011. From 2005 through 2011, 160 firms have been a part of the CAP program. Identifying the “year” for sample purposes was problematic because IRS classifies the CAP year differently from Compustat, our source of financial data. In addition, the IRS year classification was not consistent during our sample period. In an effort to create a consistent CAP year convention, beginning in 2012, the CAP year for IRS reporting purposes will be determined by the year of the first day of the firm’s fiscal year. For example, a new CAP firm with fiscal year end of November 2012 would be classified as a 2011 firm because the first day of the fiscal year was in 2011.

Prior to the new CAP year rule, the IRS typically followed the rule that firms with fiscal years ending in January through June were classified by the prior calendar year and firms with fiscal years ending in July through December used the current year.<sup>7</sup> Because we use Compustat data, we follow the Compustat convention that accounting periods ending in January through May are classified as the prior year, and periods ending in June through December retain the current year; we use the term *fyear* to describe the Compustat convention. Thus, firms with accounting periods ending in June will have a CAP year that is one year behind the *fyear*. For example, IRS statistics show that in the inaugural CAP year, 2005, 17 firms accepted the IRS invitation to join CAP. Following the *fyear* convention, 16 firms are 2005 firms, and 1 is a 2006 firm.

Table 2, Panel A, shows the CAP firms (public and private) by IRS CAP year. The panel shows the year when the 160 public and private firms that have been a part of CAP during 2005–2011 entered and left the CAP program. For example, in Panel A, of the 16 firms that entered in 2005, 5 ultimately left the CAP program: 2 left in 2006, 1 in 2008, and 2 in 2009. Moving to 2009, there were 94 firms at the beginning of the year and 16 firms joined CAP. All 16 firms were still in CAP in 2011. Of the 160 firms, 140 were in the program in 2011. Of the 20 firms that have left, 10 firms are public firms that continue to exist.

Table 2, Panel B, shows the CAP sample determination. We eliminate 10 private firms, 12 subsidiaries, 3 foreign firms, 1 firm that changed fiscal year end, 5 firms that were acquired in 2012, 1 firm that was not covered by Compustat prior to 2011, 1 bankrupt firm, and finally 2 firms for which we are unable to determine the status. The final CAP sample consists of 105 firms that were in the sample at the end of *fyear* 2012. The sample has 640 firm-years.

The *fyear* columns show the number of sample firms in the CAP sample in each year. For example, of the 110 firms (5 firms were acquired in 2012), 42 were active in the CAP program in 2007, 66 in 2008, 79 in 2009, 86 in 2010, and 108 in 2011. The CAP sample includes 486 active CAP firm-years.

### 5.2 Non-CAP Sample

The IRS provided the employer identification numbers (EINs) for 286 non-CAP firms that the IRS matched to the CAP firms based on income, assets, and debt equity ratio, using tax return data. The matched sample included private firms, but for our research, we use only the public firms, which we identified as public using information from the Schedule M-3, Part I, which was provided by IRS.<sup>8</sup>

Table 3 shows the non-CAP sample determination. We dropped 4 firms that were previously CAP taxpayers, 25 private firms, 42 subsidiaries, 3 foreign firms, 1 firm that changed fiscal year end, 1 bankrupt firm, and finally 22 firms for which we are unable to determine the status. Finally, we dropped 12 firms that were in the sample less than 4 years. The final non-CAP sample has 927 firm-years.

There were 160 firms that were subject to UTB filing requirements in the first year the firm is present in the sample, but 21 firms had an *fyear* of 2008, leaving 139 firms in *fyear* 2007.

<sup>7</sup> The IRS rule for determining the “year” can be determined by examining the “year” used to classify each CAP taxpayer.

<sup>8</sup> Schedule M-3, Part I, Financial Information and net Income (Loss) Reconciliation. 1a, asks, “Did the corporation file SEC Form 10-K for its income statement period ending with or within this tax year?”

**TABLE 2. CAP Firms from 2005 Through 2011**

Panel A: All CAP Firms: Public and Private								
	IRS YEAR							
	2005	2006	2007	2008	2009	2010	2011	Total
<b>Beginning number of firms</b>	0	16	34	73	94	101	112	
<i>Firms that joined each year:</i>								
Stayed in CAP through 2011	11	16	29	26	16	12	30	140
Left CAP before 2011	5	4	10	1				20
<b>Total firms that entered CAP</b>	16	20	39	27	16	12	30	160
<i>Firms that left each year:</i>								
Firms that entered in 2005		-2		-1	-2			-5
Firms that entered in 2006				-1	-2	-1		-4
Firms that entered in 2007				-4	-4		-2	-10
Firms that entered in 2008					-1			-1
<b>Total firms that left CAP</b>	0	-2	0	-6	-9	-1	-2	-20
<b>CAP firms by year</b>	16	34	73	94	101	112	140	140
Panel B: CAP Sample Years Subject to UTB Reporting Requirements: 2007–2012†								
	Compustat fyear							
	CAP UTB sample	2007	2008	2009	2010	2011	2012	
<b>Beginning number of firms</b>	160	66	93	101	111	138	140	
Firms that left the CAP program	-20	-16	-12	-3	-2			
<b>Remaining number of firms</b>	140	50	81	98	109	138	140	
Private firms	-10	-2	-5	-5	-7	-11	-11	
Subsidiaries	-12	-3	-6	-7	-9	-11	-11	
Foreign firms	-3		-1	-3	-3	-3	-3	
Fiscal year end change	-1	-1	-1	-1	-1	-1	-1	
Firms acquired in 2012							-5	
Bankruptcy	-1			-1	-1	-1	-1	
Not covered by Compustat before 2011	-1	-1	-1	-1	-1	-1	-1	
Unable to classify	-2	-1	-1	-1	-1	-2	-2	
<b>Total sample firms</b>	110	42	66	79	86	108	105	

† In Panel A, the IRS 2007 year shows 73 firms, whereas in Panel B, the Compustat fyear shows 67. The 6 firms have fiscal-year-ends after May and thus are considered 2007 fyears, but Panel B includes only the 2007 calendar year firms because the other 2007 fyear firms do not report UTBs until fyear 2008. Thus, all of the firm years shown in the Panel B are subject to UTB reporting requirements. The 2012 column assumes steady state from 2011, with the exception of 5 firms that were acquired in 2012. We did not have the new 2012 CAP firms at the time of this analysis, but we know from GAO (2013, 11) there were 161 CAP taxpayers.

**TABLE 3. Non-CAP Sample Determination**

	Non-CAP sample selection	Compustat fyear					
		2007	2008	2009	2010	2011	2012
Total Non-CAP Firms	286						
Former CAP firms	-4						
Private firms	-25						
Subsidiaries	-42						
Foreign firms	-3						
Changed fiscal year end	-1						
Bankruptcy	-1						
Unable to classify	-22						
<b>Subtotal</b>	<b>188</b>						
Not on Compustat	-16						
Total sample firms	172	149	167	164	160	156	152
Firms with less than 4 yrs	-12	-10	-7	-4			
	<b>160</b>	<b>139</b>	<b>160</b>	<b>160</b>	<b>160</b>	<b>156</b>	<b>152</b>

## 6. Across-Firm Analysis

### 6.1 Industry Distribution

Table 4 provides the industry distribution by one-digit SIC code for the CAP, non-CAP, and Compustat firms in general. The CAP sample has relatively more firms in the construction and transportation industries and relatively fewer in the manufacturing industry.

**TABLE 4. Industry Distribution for 2007 CAP, Non-CAP, and Compustat Samples**

		CAP	Non-CAP	Compustat
1	Agriculture, forestry, & mining	5.5%	10.0%	5.7%
2	Construction	20.0%	13.8%	15.7%
3	Manufacturing	18.2%	26.3%	23.8%
4	Transportation	18.2%	9.4%	8.0%
5	Wholesale	12.7%	16.3%	8.6%
6	Financial services	12.7%	13.8%	20.6%
7	Hotels, services	8.2%	8.1%	12.2%
8	Services	4.5%	2.5%	5.4%

NOTE: The Compustat sample is for the fyear 2007. In an attempt to provide a sample from which the CAP and non-CAP firms could be drawn, we drop subsidiaries, nontaxpaying entities, non-U.S. firms, and firms with assets less than 10 million, resulting in 5,180 firms in the Compustat sample in 2007.

### 6.2 Firm Characteristics

Table 5 provides descriptive statistics for the firm characteristics for the full sample period for the CAP and non-CAP samples. The descriptive statistics are consistent with expectations for CAP firms having lower *foreign* and lower *CFO*. Contrary to expectations for CAP firms, *ROA* is higher, *NOL* is lower and *CAPINT* is higher. *MTB* and *RD* differences are not significant. The CAP firms are significantly larger and more levered across years, but the relation of tax aggressiveness with *Size* and *Leverage* is not obvious. Thus, the evidence is mixed with respect to the firm characteristics.

**TABLE 5. Descriptive Statistics: Firm Characteristics, CAP and Non-CAP Sample Measures Across 2004–2012**

		N	mean	sd	p25	p50	p75
CAP	SIZE	640	<b>9.205</b>	1.309	8.328	9.093	10.192
	FOREIGN	640	<b>0.539</b>	0.499	0.000	1.000	1.000
	CFO	640	<b>0.098</b>	0.058	0.062	0.092	0.131
	ROA	640	<b>-0.001</b>	0.309	0.036	0.070	0.123
	NOL	640	<b>0.411</b>	0.492	0.000	0.000	1.000
	Leverage	636	<b>0.226</b>	0.136	0.132	0.220	0.303
	MTB	632	4.396	30.743	1.374	2.011	3.039
	RD	640	0.013	0.027	0.000	0.000	0.016
	CAPINT	622	0.580	0.368	0.266	0.560	0.850
	INTAN	634	0.204	0.194	0.025	0.160	0.336
Non-CAP	SIZE	927	8.956	1.460	7.893	9.062	10.111
	FOREIGN	927	0.617	0.486	0.000	1.000	1.000
	CFO	927	0.105	0.072	0.058	0.100	0.149
	ROA	927	-0.055	0.395	0.022	0.080	0.132
	NOL	927	0.506	0.500	0.000	1.000	1.000
	Leverage	925	0.208	0.180	0.085	0.178	0.286
	MTB	888	3.437	13.558	1.250	1.934	3.242
	RD	927	0.015	0.033	0.000	0.000	0.017
	CAPINT	850	0.560	0.428	0.220	0.499	0.803
	INTAN	919	0.216	0.213	0.029	0.145	0.360

NOTE: Bolded means are significantly different between the two samples at the .1 level or lower.

### 6.3 Firm Tax Aggressiveness Measures

Table 6 reports the tax aggressiveness measures for the CAP and non-CAP samples. CAP firms have higher foreign tax rates (*TXFO\_ETR*) and lower federal rates (*TXFED\_ETR*) than the non-CAP sample. Other ETR measures are not significantly different. The CAP sample has lower *UTB* and *UTB-ETR* relative to the non-CAP sample, indicating that the CAP firms have fewer uncertain tax positions that resulted in UTBs, consistent with the CAP “angel” hypothesis. The lower domestic rates, however, are inconsistent with the “angel” hypothesis.

**TABLE 6. Descriptive Statistics: Tax Aggressiveness Measures, CAP and Non-CAP Sample Measures Across 2004–2012**

		N	mean	sd	p25	p50	p75
CAP	<i>ETR</i>	368	0.314	0.078	0.279	0.319	0.355
	<i>CETR</i>	368	0.297	0.128	0.231	0.296	0.353
	<i>TXWW_ETR</i>	368	0.273	0.116	0.216	0.276	0.328
	<i>TXFED_ETR</i>	368	<b>0.272</b>	0.178	0.172	0.271	0.338
	<i>TXFO_ETR</i>	362	<b>0.312</b>	0.209	0.196	0.274	0.375
	<i>CashETR</i>	365	0.254	0.128	0.173	0.254	0.322
	<i>LRCashETR</i>	290	0.257	0.083	0.210	0.263	0.311
	<i>BTB</i>	213	0.035	0.057	0.009	0.030	0.053
	<i>PBTD</i>	213	0.027	0.058	0.004	0.019	0.038
	<i>UTB</i>	226	<b>0.009</b>	0.010	0.003	0.006	0.013
	<i>UTB-ETR</i>	226	<b>0.006</b>	0.008	0.002	0.004	0.008
Non-CAP	<i>ETR</i>	645	0.308	0.100	0.264	0.310	0.361
	<i>CETR</i>	645	0.294	0.120	0.224	0.287	0.350
	<i>TXWW_ETR</i>	645	0.270	0.112	0.207	0.266	0.312
	<i>TXFED_ETR</i>	645	0.299	0.183	0.209	0.284	0.354
	<i>TXFO_ETR</i>	619	0.274	0.174	0.182	0.256	0.325
	<i>CashETR</i>	643	0.253	0.128	0.176	0.252	0.319
	<i>LRCashETR</i>	495	0.260	0.086	0.206	0.262	0.323
	<i>BTB</i>	419	0.035	0.072	0.008	0.028	0.050
	<i>PBTD</i>	419	0.030	0.078	0.006	0.019	0.043
	<i>UTB</i>	398	0.014	0.013	0.005	0.010	0.018
	<i>UTB-ETR</i>	398	0.011	0.011	0.003	0.010	0.013

NOTE: Bolded means are significantly different between the two samples.

We conduct a separate year analysis only for the UTB measures. Table 7 results suggest that the reason we do not see a significant difference for the UTB measures in 2007–2009 is because there were fewer active CAP years in those years. As the number of firms in the CAP program increase over the years, these measures become lower in 2010 and 2011 for the CAP firms. In 2012, all the CAP firms are active in the CAP program. Only the *UTB-ETR* measure is significantly lower for the CAP firms relative to the non-CAP firms. The UTB measures suggest that the CAP firms may become less aggressive over time, but the alternative explanation is that the tax positions are resolved sooner for firms in the CAP program.

TABLE 7. CAP/Non-CAP Sample UTB and UTB-ETR, 2007–2012

	UTB							UTB-ETR						
	N	mean	sd	p25	p50	p75	p	N	mean	sd	p25	p50	p75	p
	<b>2007</b>							<b>2007</b>						
Non-CAP	139	0.012	0.013	0.003	0.009	0.017		134	0.008	0.009	0.001	0.005	0.011	
CAP	95	0.011	0.010	0.004	0.007	0.015	0.457	93	0.007	0.007	0.001	0.004	0.009	0.322
CAP years	42	0.009	0.008	0.002	0.007	0.014	0.152	40	0.006	0.007	0.001	0.004	0.010	0.431
	<b>2008</b>							<b>2008</b>						
Non-CAP	160	0.012	0.013	0.003	0.009	0.017		156	0.009	0.011	0.002	0.005	0.011	
CAP	110	0.010	0.012	0.002	0.007	0.015	0.161	107	0.007	0.008	0.001	0.005	0.009	0.107
CAP years	66	0.010	0.009	0.002	0.007	0.016	<b>0.093</b>	63	0.007	0.007	0.001	0.005	0.010	0.229
	<b>2009</b>							<b>2009</b>						
Non-CAP	160	0.012	0.013	0.003	0.008	0.017		156	0.008	0.010	0.002	0.005	0.011	
CAP	110	0.010	0.012	0.002	0.006	0.013	0.156	107	0.007	0.010	0.001	0.004	0.009	0.198
CAP years	79	0.009	0.01	0.002	0.006	0.011	<b>0.032</b>	76	0.006	0.008	0.001	0.003	0.008	<b>0.061</b>
	<b>2010</b>							<b>2010</b>						
Non-CAP	160	0.011	0.013	0.003	0.007	0.015		155	0.008	0.01	0.001	0.004	0.010	
CAP	110	0.008	0.010	0.002	0.005	0.011	<b>0.029</b>	107	0.006	0.009	0.001	0.003	0.007	<b>0.071</b>
CAP years	86	0.007	0.008	0.001	0.004	0.009	<b>0.005</b>	83	0.005	0.007	0.000	0.003	0.005	<b>0.012</b>
	<b>2011</b>							<b>2011</b>						
Non-CAP	156	0.011	0.011	0.003	0.007	0.014		151	0.008	0.009	0.002	0.005	0.010	
CAP	110	0.006	0.008	0.001	0.004	0.008	<b>0.001</b>	105	0.005	0.007	0.001	0.002	0.006	<b>0.010</b>
CAP years	108	0.006	0.008	0.001	0.004	0.008	<b>0.001</b>	103	0.005	0.008	0.001	0.002	0.006	<b>0.010</b>
	<b>2012</b>							<b>2012</b>						
Non-CAP	152	0.011	0.013	0.002	0.007	0.014		148	0.008	0.010	0.001	0.005	0.011	
CAP	105	0.010	0.041	0.001	0.003	0.007	0.724	101	0.004	0.006	0.001	0.002	0.005	<b>0.000</b>

Next, we perform a multivariate analysis by regressing three measures of tax expense on the three related incomes and the firm characteristic control variables and a CAP indicator variable as well as the CAP indicator interacted with the income measures. The models used for this regression are as follows:

$$TXWW_{it} = a_0 + \theta_1 PI_{it} + \theta_2 CAP_t + \theta_3 PI_i * CAP_t + \sum_k \theta_k CONTROL_{it}^k + \varepsilon_{it} \quad (1)$$

$$TXFO_{it} = a_0 + \theta_1 PIFO_{it} + \theta_2 CAP_t + \theta_3 PIFO_i * CAP_t + \sum_k \theta_k CONTROL_{it}^k + \varepsilon_{it} \quad (2)$$

$$TXFED_{it} = a_0 + \theta_1 PIDOM_{it} + \theta_2 CAP_t + \theta_3 PIDOM_i * CAP_t + \sum_k \theta_k CONTROL_{it}^k + \varepsilon_{it} \quad (3)$$

All variables are defined in Table 1 Panel B. A positive (negative) coefficient on the CAP interaction term is interpreted as CAP firms being associated with higher (lower) tax rates. We use robust regression, which controls for outliers by iteratively assigning weights to these observations to mitigate their influence. Table 8 reports the results. We find that the coefficient on  $PIFO * CAP$  is positive and significant in the foreign income tax regression. This result suggests that CAP firms shift less foreign income to low tax jurisdictions. If CAP firms shift less foreign income to low

tax jurisdictions, the incentive to shift U.S. income outside the U.S. is not as strong, suggesting that they are less likely to offshore intangible property or engage in other aggressive transfer pricing practices.

**TABLE 8. Estimates of Tax Rates on Pretax Income**

<b>Intercept</b>	<b>0.0010</b>		<b>0.0020</b>		<b>-0.0005</b>
<i>PI</i>	<b>0.2843</b>				
<i>PIDOM</i>			<b>0.3068</b>		
<i>PIFO</i>					<b>0.2109</b>
<i>CAP</i>	0.0010		-0.0009		<b>0.0007</b>
<i>PI*CAP</i>	0.0130				
<i>PIDOM*CAP</i>			-0.0107		
<b><i>PIFO*CAP</i></b>					<b>0.0358</b>
<i>SIZE</i>	<b>-0.0008</b>		<b>-0.0002</b>		<b>-0.0002</b>
<i>FOREIGN</i>	-0.0014		-0.0004		<b>0.0014</b>
<i>NOL</i>	<b>-0.0024</b>		<b>-0.0024</b>		0.0002
<i>Leverage</i>	-0.0047		<b>-0.0048</b>		0.0007
<i>MTB</i>	<b>0.0001</b>		<b>0.0001</b>		0.0000
<b><i>RD</i></b>	<b>-0.0411</b>		<b>0.0183</b>		<b>-0.0149</b>
<i>CAPINT</i>	-0.0015		<b>-0.0052</b>		<b>0.0018</b>
<i>INTAN</i>	-0.0011		<b>-0.0048</b>		<b>0.0014</b>
<i>N</i>	968		968		970
<i>R</i> <sup>2</sup>	0.621		0.609		0.550

Bolded coefficients are significant at the .1 level or lower.

## 8. Conclusion

We examine whether CAP firms are more tax compliant than a matched sample of non-CAP firms provided to us by the IRS. Since tax compliance is difficult to measure, we use the negative of tax compliance—tax aggressiveness—for our tests. We find some evidence that CAP firms are less tax aggressive than the matched firms, but in general our results are mixed CAP firms have lower federal effective tax rates, but higher foreign tax rates. We find that CAP firms have lower UTBs and UTB-ETR which may be measures of aggressiveness. From the descriptive statistics overall, we find some evidence that CAP firms are less aggressive using common measures from the tax avoidance literature.

The multivariate analysis generally shows that CAP firms are not more or less tax aggressive than non-CAP firms using traditional measures of tax aggressiveness. An interesting result from this analysis shows that CAP firms have higher foreign tax rates than non-CAP firms. This result suggests that CAP firms are less aggressive foreign income shifters than non-CAP firms and thus less likely to engage in more aggressive income shifting such as offshoring intangibles. In the next phase of this research, we plan to investigate further whether CAP firms are more tax compliant by examining various measures of international tax aggressiveness using information contained in various income tax filings.

## Appendix

### IRS UTB Data

The IRS collected UTB data from the 10-Ks filed with the SEC beginning with calendar-year end 2007 firms, which were the first to report UTBs. After dropping 3 firm-years missing the CIK, which we use to match with Compustat data, 162 firm-years affected by a fiscal year-end change, and 21 firm-years that report negative UTB, the IRS sample consists of 48,600 firm-years from 2007-2012, representing 12,801 unique firms.

The following cross-tabulation of firms by year and *Fyear*, where year is the year that includes the final month of the fiscal year, and *Fyear* follows the Compustat designation as the year that includes at least 7 of the 12 months of the fiscal year. In the year 2007, there were 5,596 2007 fyear firms; in the year 2008, there were 889 2007 fyear firms (fiscal year-end was in January-May, 2008) and 8,199 2008 fyear firms. There are fewer year 2007 firms because we include only the 2007 firms that were subject to UTB reporting.

### FIRMS by Year and Fyear

YEAR	fyear							Total
	2007	2008	2009	2010	2011	2012	2013	
2007	5,596							5,596
2008	889	8,199						9,088
2009		1,218	7,884					9,102
2010			1,188	7,601				8,789
2011				1,139	6,960			8,099
2012					498	5,636		6,134
2013						857	935	1,792
<b>Total</b>	<b>6,485</b>	<b>9,417</b>	<b>9,072</b>	<b>8,740</b>	<b>7,458</b>	<b>6,493</b>	<b>935</b>	<b>48,600</b>

Although IRS compiled the UTB data for all firms that filed a 10-K with the SEC, not all firms made a UTB disclosure. As shown below, the percent of firms not disclosing any UTB information averages 29.9 percent, ranging from a high of 34.6 percent in 2010 to a low of 21.3 percent in 2007.

### PERCENT of Firms Not Disclosing Any UTB Information

	fyear						Average
	2007	2008	2009	2010	2011	2012	
UTB>0	40.4	32.5	32.7	32.9	34.6	33.8	34.5
UTB=0	38.3	36.2	36.8	32.5	35.5	34.7	35.6
Missing	21.3	31.3	30.5	34.6	30.0	31.5	29.9

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## Understanding Taxpayer Behavior

Bruce ♦ Liu

Jones ♦ O'Hara

Erard ♦ Heys ♦ Morrison ♦ Mueller ♦ Ramos

# Tax Evasion and Self-Employment in the US: A Look at the Alternative Minimum Tax

*Donald Bruce (University of Tennessee) and Xiaowen Liu (Midwestern State University)*

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## I. Introduction

The alternative minimum tax (AMT) for individuals is a separate system of income taxation that operates in parallel to the regular income tax. Taxpayers who may be subject to the AMT must calculate their taxes twice (using both the regular and the AMT income tax rules), then pay the larger amount of tax. In other words, the AMT can be viewed as an additional tax levied on taxpayers whose regular tax is found to be too low relative to their income.

Although Congress originally enacted the AMT to ensure that high-income individuals pay at least a minimum amount of tax each year, it now affects many tax filers in the middle class. One reason for the expansion of AMT is that, unlike the regular tax system, the AMT tax brackets are not indexed for inflation. In addition, the tax cuts passed during the early 2000s exacerbate the AMT problem because they reduce regular income taxes without a corresponding permanent reduction in the AMT (Lim *et al.*, 2009). The tax cuts and lack of indexation combine to push the AMT onto millions of taxpayers. A total of 27 percent of households that paid the AMT in 2008 had adjusted gross incomes of \$200,000 or less (Bryan, 2010).

Every year taxpayers need to consider if they need to pay the AMT. The IRS web-site provides an AMT assistant to help taxpayers determine whether they may be subject to the AMT. If the results show someone might owe the AMT, he may need to complete Form 6251 to find out for sure and to determine how much he owes. And if this person triggers the AMT, his average tax rate would typically go up, sometimes substantially. The AMT system also brings additional administrative burden to taxpayers.

This paper exploits the parallel structure of the regular income tax and the AMT to investigate a series of questions. First, do households manipulate their incomes in order to avoid the AMT as they move toward the AMT threshold? If such “bunching” is found, is there any difference between self-employed individuals and wage earners? More importantly, does the behavioral response come from misreporting or real activity change?

Studying the effect of taxes on economic behavior is important. First, the behavioral response of taxpayers affects the tax revenue. Second, it affects economic efficiency or deadweight loss (Feldstein, 2008). This paper follows in the spirit of Saez (2010), who examined the bunching of taxpayers at kink points created by the Earned Income Tax Credit (EITC). It is the first to study potential bunching behavior created by the AMT at the top end of the income distribution, and whether such bunching behavior is driven by misreporting or real activity change. The results have important policy implications. If a behavioral response is found and it is mainly driven by misreporting, the welfare losses are the tax revenue loss and the costs of tax planning. However, if the response is driven by both misreporting and real activity change, the total deadweight loss is substantially greater than under the first case. Additional deadweight loss occurs because households adjusted their labor supply or other activities to avoid higher tax. The deadweight loss from both misreporting and real activity change is larger than that from misreporting only.

To analyze how households respond to the AMT, we use the IRS Individual Public Use Tax Files for 1994–2002. These files contain the information directly from a large sample of individual tax returns representative of the entire population of returns. We limit our analysis to those who filed Form 6251 and calculate each person’s gap between the regular income tax and the AMT, which we call the AMT gap. Then we plot histograms of the AMT gap and find evidence that suggests that taxpayers manipulate their income just below the AMT threshold. A formal test (McCrary, 2008) provides evidence that bunching exists. We further explore the difference between self-employed individuals and wage earners. We find the bunching created by self-employed individuals locates further away from the AMT threshold than the bunching created by wage earners, which suggests that the self-employed act more aggressively to avoid the AMT. To explore potential causes of the bunching, we use a consumption-based method (Pissarides and Weber, 1989)

to estimate whether the bunching is created by misreporting or real activity response. We find suggestive evidence of both a real response and misreporting.

## II. Literature Review

Some of the most related studies on the self-employed's behavioral response to the US income tax schedule focuses on the lower end of income distribution. Using tax return data, Saez (2010) found clear evidence of bunching at the first kink created by the EITC, and the bunching was solely concentrated among self-employed taxpayers. However, it was unclear whether the bunching represents changes in real labor supply or misreporting. Kuka (2013) took advantage of a natural experiment (1993 EITC expansion) to exploit the mechanism underlying the different bunching behaviors. He assumed people truthfully revealed their income in survey data, and compared estimates of labor supply effects from survey data (the March Current Population Survey) and the Public Use Tax File data. He concluded that the bunching behavior found in Saez (2010) was mainly driven by tax noncompliance (i.e. tax evasion).

Some related studies looked at behavioral responses to government programs. Ramnath (2013) used Public Use Tax Files to test whether taxpayers bunch their income at the notch created by the Saver's Credit. She found strong evidence that bunching occurs in response to the credit. In addition, she found that the credit failed to increase savings among low- and middle-income taxpayers. Some studies examined behavioral responses to foreign tax regimes. Chetty *et al.* (2009) used tax return data from Denmark and found that bunching occurred when the top rates started to apply. However, they did not find much evidence of bunching at lower kink points. Kleven and Waseem (2013) used tax return data in Pakistan to find bunching behavior at different notch points. They found larger and sharp bunching for the self-employed alongside much smaller bunching among wage earners. They attributed the bunching for wage earners to real labor responses. The sharper bunching for the self-employed was created by tax evasion in addition to real labor responses.

To our knowledge, no study has examined the behavioral response to the AMT. This study is among the first to explore the bunching behavior when taxpayers approach the AMT threshold.

## III. Data and Evidence of Behavioral Response to the AMT

Compared to the regular income tax, the AMT defines income differently, imposes different tax rates, and allows different deductions, exemptions and credits (Lim *et al.*, 2009). Whether a taxpayer is subject to the AMT depends on various aspects of his tax return, such as the number of dependents, state tax level, and filing status. In general, the AMT imposes a higher rate of tax on the marginal income than the regular tax does. Since there is no third-party reporting, self-employed taxpayers have more opportunity to move their incomes below the level where they might trigger the AMT. The resulting discontinuity in an individual/household's tax liability fosters a strong incentive to forgo that extra dollar of income—either by altering real activity or by misreporting income. Unlike nonlinearities introduced by the tax brackets in the regular tax system, the jump from the regular tax to the AMT gives taxpayers a stronger reason to manipulate their income and tax deductions.

This paper uses the Individual Public Use Tax Files for 1994–2002. We concatenate yearly data into one pooled cross-sectional dataset. The Public Use Tax Files are an annual cross-section of tax returns available since 1960. The files are rich in income information drawn directly from tax returns. Since the AMT is set to target high-income taxpayers, the fact that the Public Use Tax Files over-sample wealthy individuals or individuals with business income makes it a good dataset to study the bunching behaviors (Ramnath, 2013), especially the behaviors of self-employed individuals near the AMT threshold.

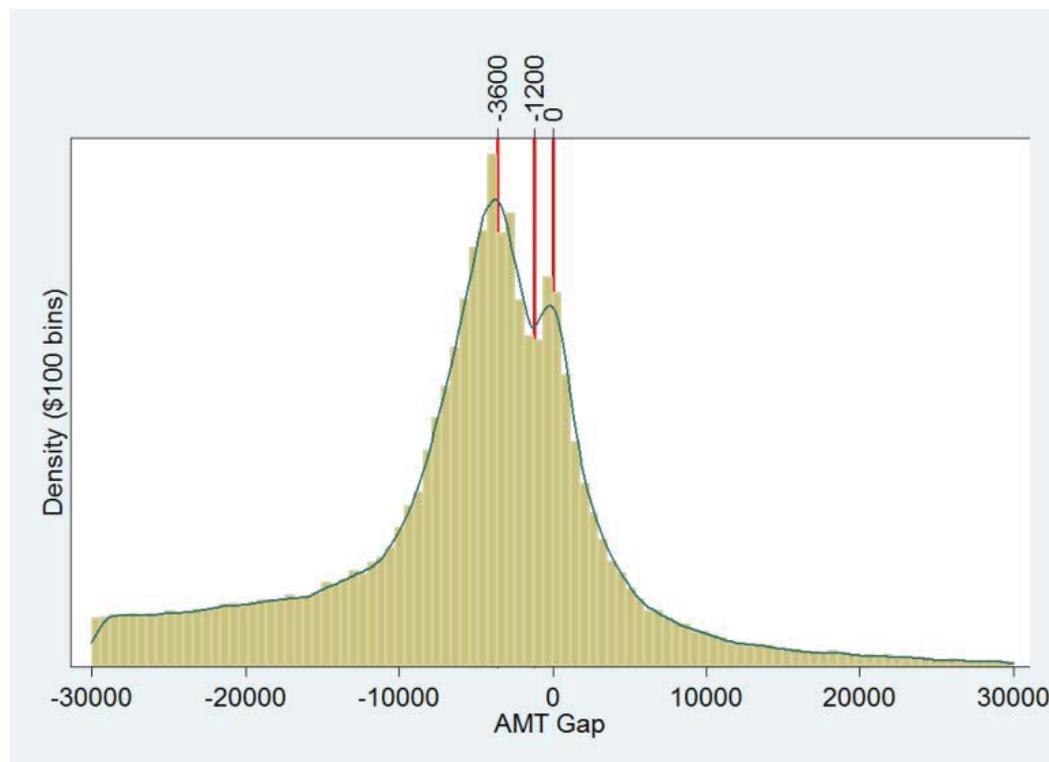
If a taxpayer is likely to owe the AMT, he is likely to work through tax Form 6251 to determine if he actually owes the AMT and how much he owes. We limit our sample to those who filed Form 6251, which yields a sample size of 120,488 returns. Those taxpayers who work through Form 6251 are arguably more informed about the AMT structure than those who do not file the form, and they are more likely to manipulate their incomes to avoid the AMT liabilities. In addition, these people are most likely at the margin of filing the AMT. Therefore, what we estimated can be interpreted as an upper bound of the behavioral response to the AMT. In addition, the results presented here are all suggestive evidence because the data are pooled cross-sections.

Previous studies have used histograms of Adjusted Gross Income (AGI) to find bunching around kink or notch points. Saez (2010) plotted histograms of the distribution of AGI with small bins and checked whether spikes appeared at kink points in the Earned Income Tax Credit (EITC) schedule. Ramnath (2013) used normalized AGI<sup>1</sup> to produce a histogram around the notch point in response to the Saver's Credit. Unlike prior studies, one of the challenges of detecting bunching behaviors brought by the AMT is that there is no clear population cutoff to trigger the AMT. Unlike EITC and Saver's Credit, every taxpayer's AMT liability is different even with the same amount of AGI. One's AMT liability depends not only on his AGI, but also on his filing status, state and local taxes, and number of personal exemptions, etc. The complicated tax structure makes it impossible to find the bunching just by plotting the AGI distribution.

To detect any discontinuity in the AMT, this paper creatively plots histograms and density distributions using an AMT gap concept. We define the AMT gap as the difference between the AMT liability and the regular tax liability. First, we calculated each person's AMT liability based on his tax return information on Form 1040 and Form 6251. Then we subtracted his regular tax liability from his projected AMT liability to calculate the gap. The AMT gap is positive if one's AMT exceeds his regular tax. Because bunching is most likely to be observed near a gap of zero, we drop the taxpayers whose AMT gaps are extremely high or extremely low. Our sample is limited to those within \$30,000 of their individual-specific AMT thresholds.

Since the AMT's rules are known ahead of time and tax returns for the self-employed are not based on third-party reporting, taxpayers (especially the self-employed) have an incentive to set their AGIs just below the threshold where the AMT will take effect. If there is a bunching in the AGI distribution, there will be a corresponding bunching in the tax liability distribution. Figure 1 shows the kernel density estimate of the AMT gap for 1994-2002 as the solid line.<sup>2</sup> The graph overlays a histogram of the actual data.

**FIGURE 1. Kernel Density of AMT Gap, 1994–2002**



NOTE: The solid line represents the kernel density estimate for the AMT gap distribution.

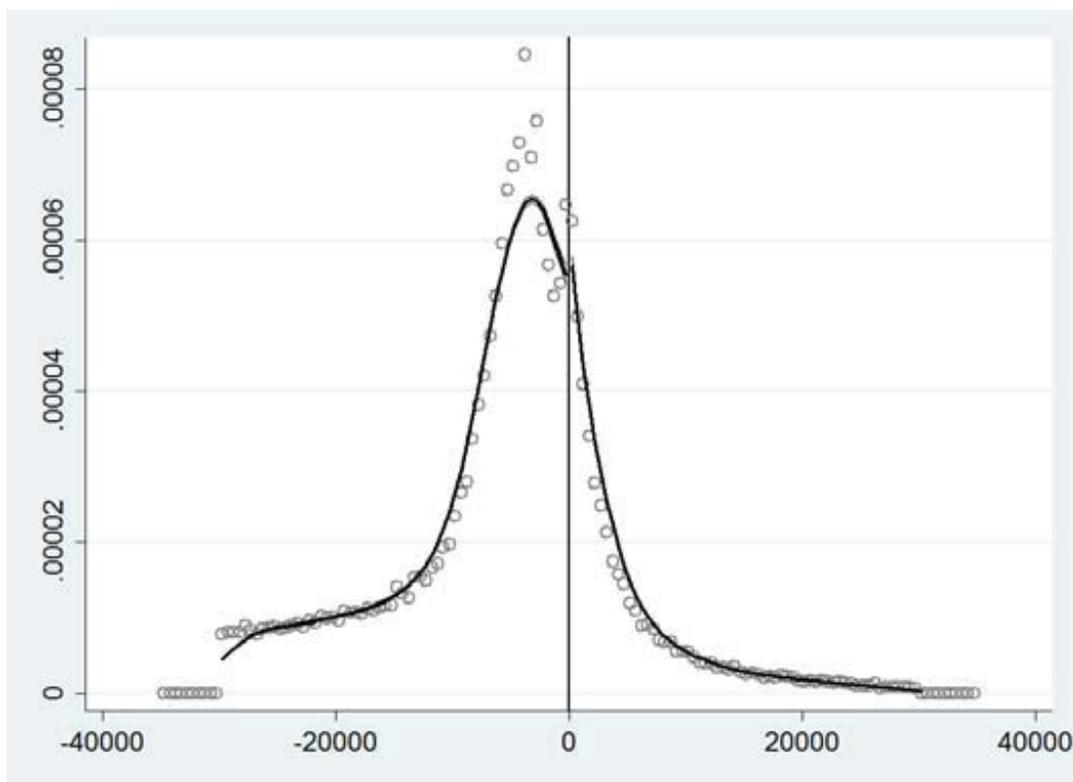
<sup>1</sup> She multiplies single filers' AGI by 2, and head of household's AGI by 4/3.

<sup>2</sup> We use the Epanechnikov kernel.

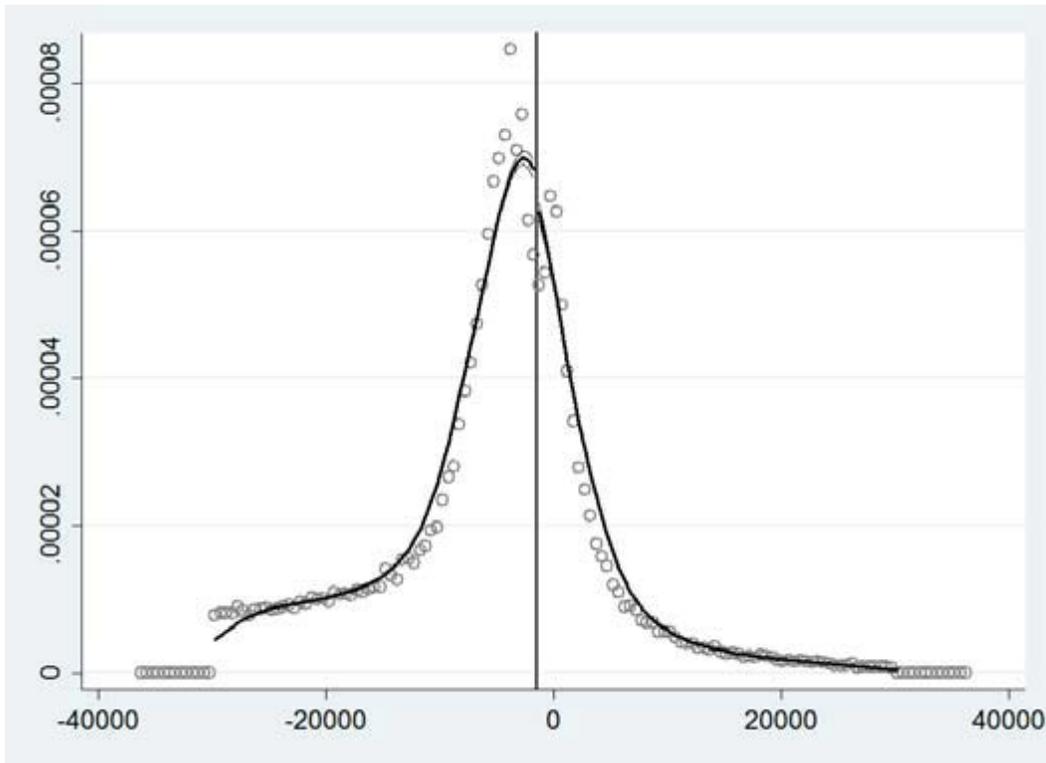
There are three interesting results in the graph. First, we observe taxpayers bunching just below the threshold at which the AMT exceeds the regular income tax. In addition, there is a sharp notch around  $-\$3,600$ . There also appears to be a dip in the distribution around  $-\$1,200$ . Although the kernel density graph provides clear evidence of bunching, we perform a more formal test for a break in the density. McCrary (2008) developed a test for detecting manipulation of a running variable in the context of regression discontinuity (RD) estimation. A running variable is what a policy is based on. In this paper, whether a person should pay the AMT depends on his AMT gap. In our case, the AMT gap is the running variable. Assuming the distribution of the AMT gap would be continuous if Form 6251 were merely a mathematical exercise that had no bearing on tax liability, a break in the estimated density would indicate manipulation of the running variable. In a RD design, bunching in the running variable has the potential to be problematic (Ramnath 2013). But in this paper, bunching serves as evidence of a behavioral response to the policy.

The McCrary Test first creates an under-smoothed histogram where no one bin contains points both to the left and to the right of the break. Then it uses local linear regression to smooth the histogram and provide an estimate of the density of the AMT gap. These two steps provide visual evidence for whether a break exists in the data. Following McCrary (2008) and Ramnath (2013), the test statistic for estimating the break is derived by taking the log differences in distribution of the AMT gap variable at the notch, given by  $\hat{\theta} = \ln \hat{f}^+ - \ln \hat{f}^-$ , where  $\ln \hat{f}^+$  is the log of the distribution of the AMT gap on the right of the break, and  $\ln \hat{f}^-$  is the log of the distribution of the AMT gap on the left of the break. The statistic  $\hat{\theta}$  measures the difference in the density at the notch between left hand side and right hand side. The null hypothesis is that  $\hat{\theta}$  is zero at the notch, which indicates no bunching occurred. Figures 2–4 show graphical results of the test. Table 1 gives the numeric results from the break tests and indicates all three breaks ( $-\$3,600$ ,  $-\$1,200$  and  $\$0$ ) are significant in the distribution of the AMT gap variable.

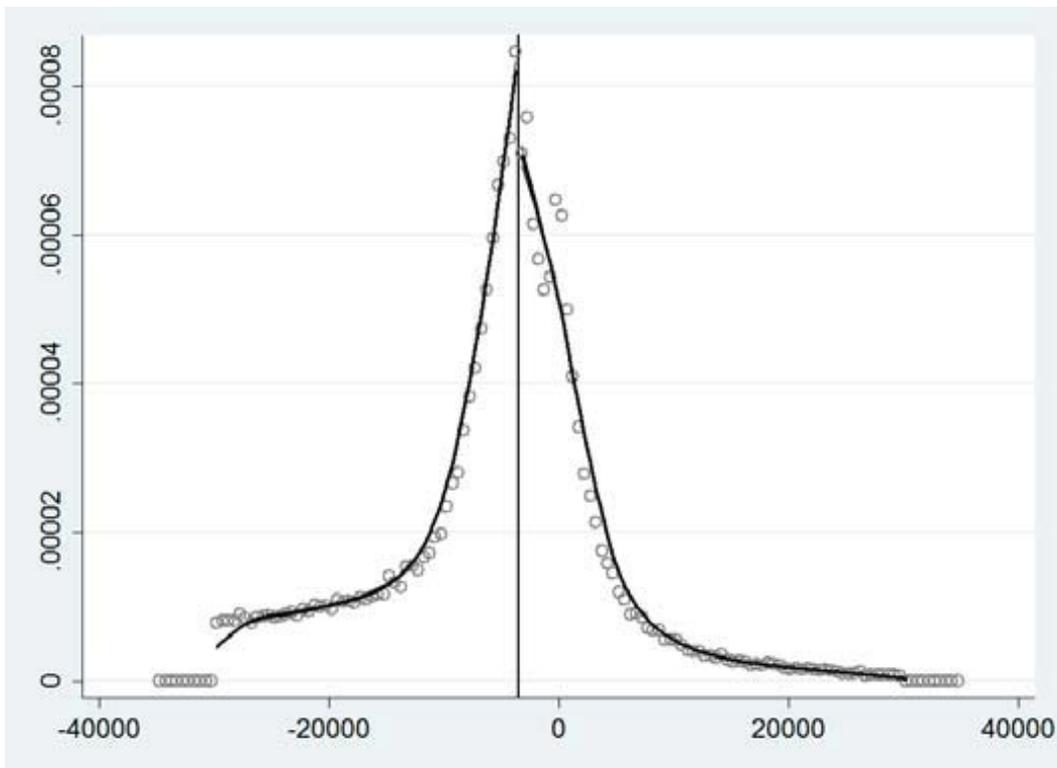
**FIGURE 2. McCrary Test of Estimated Density of AMT Gap ( $\$0$ ), 1994–2002**



**FIGURE 3. McCrary Test of Estimated Density of AMT Gap (-\$1,200), 1994–2002**



**FIGURE 4. McCrary Test of Estimating Density of AMT Gap (-\$3,600), 1994–2002**



**TABLE 1. Test for Breaks in the Estimated Density of the AMT Gap, 1994–2002**

	Test 1 (\$0)	Test 2 (-\$1,200)	Test 3 (-\$3,600)
$\hat{\epsilon}$	0.104***	-0.048***	-0.167***
standard error	(0.017)	(0.014)	(0.015)
binsize	500	500	500
bandwidth	4,892.5	6,046.0	4,751.6

\*\*\* indicates 1% statistical significance.

The main finding from the density graph is that there is a small bunching around the AMT threshold and a sharp bunching around -\$3,600 combined with a drop in the density around -\$1,200. This provides clear evidence of a response to the tax structure. In addition, the McCrary tests show that the density is always higher at the side that is further away from the AMT triggering point, which indicates that taxpayers try to manipulate their income to avoid the AMT.

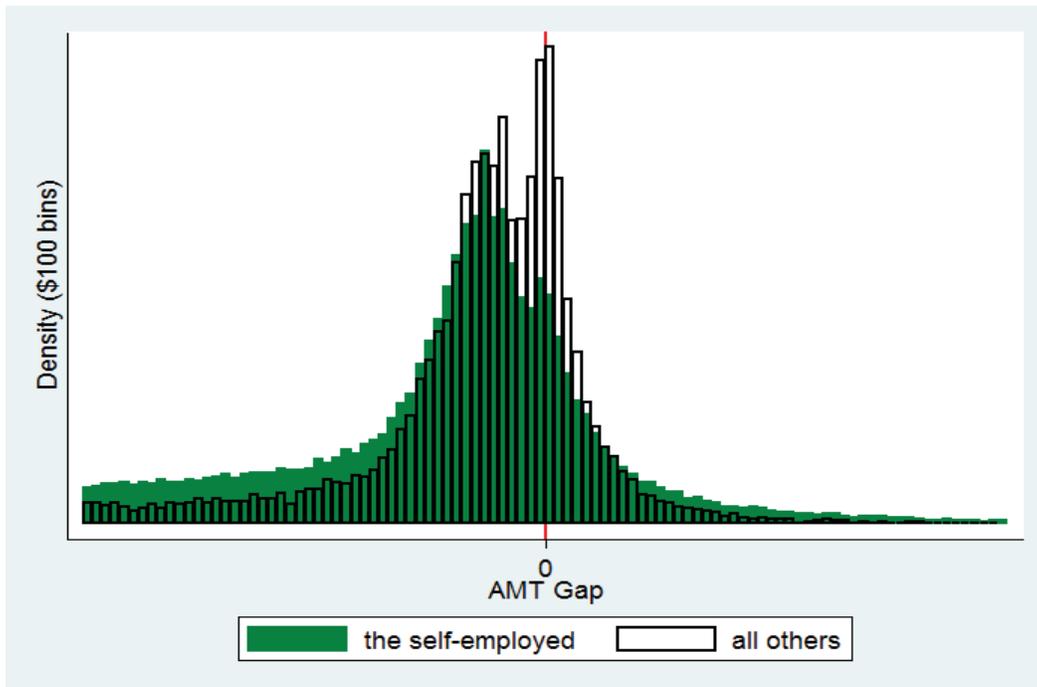
Given that bunching does exist in the data, we next explore the difference between the self-employed individuals and the wage earners. For the purpose of this paper, we start with a broad definition of self-employment. A person is treated as self-employed if any of his income/losses comes from Schedule C, Schedule E or Schedule F. A wage earner is one who has no Schedule C, E or F income. Detailed summary statistics of these two groups are presented in Table 2. The self-employed have higher median AGI, AMT liability, and regular tax liability. However, a lower percentage of the self-employed pay the AMT (23 percent) than wage earners (27 percent)

Figure 5 presents a histogram of all self-employed individuals overlaid by a histogram of all wage earners in 1994-2002. We notice two main differences between self-employed individuals and wage earners. The mass of the distribution of self-employed individuals is to the left of zero (the regular tax side). It suggests that the self-employed act more aggressively to avoid the AMT. We observe that wage earners also manipulate their income around zero, which suggests possible changes in real activity.

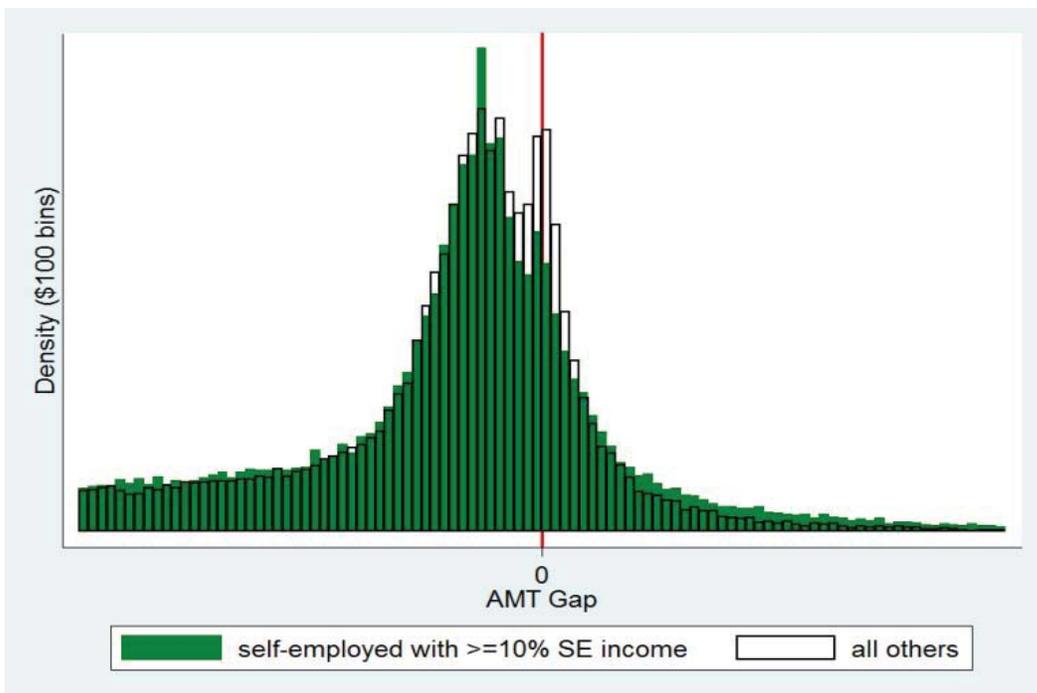
**TABLE 2. Summary Statistics of the Self-Employed and Wage Earners**

Variable	Self-Employed	Wage Earners
Adjusted Gross Income (median)	255,105.3	168,427.9
AMT Liability (median)	40,813.17	16,377.75
Regular Tax Liability (median)	41,190	19,190
Single (=1 if filed as single)	0.14	0.27
Head of Household (=1 if filed as head of household)	0.02	0.04
Married Filing Jointly (=1 if filed jointly)	0.81	0.66
Married Filing Separately (=1 if filed separately)	0.02	0.03
Average Number of Exemptions	2.72	2.52
State and Local Tax (median)	9,023.1	2,552.0
AMT Gap (median)	-4,302.8	-2,887.4
% Pay AMT	0.23	0.27
Interest Paid Ratio*	0.075	0.045
Property Tax Ratio	0.028	0.022
Charitable Donation Ratio	0.034	0.020
Sample Size	100,198	20,290

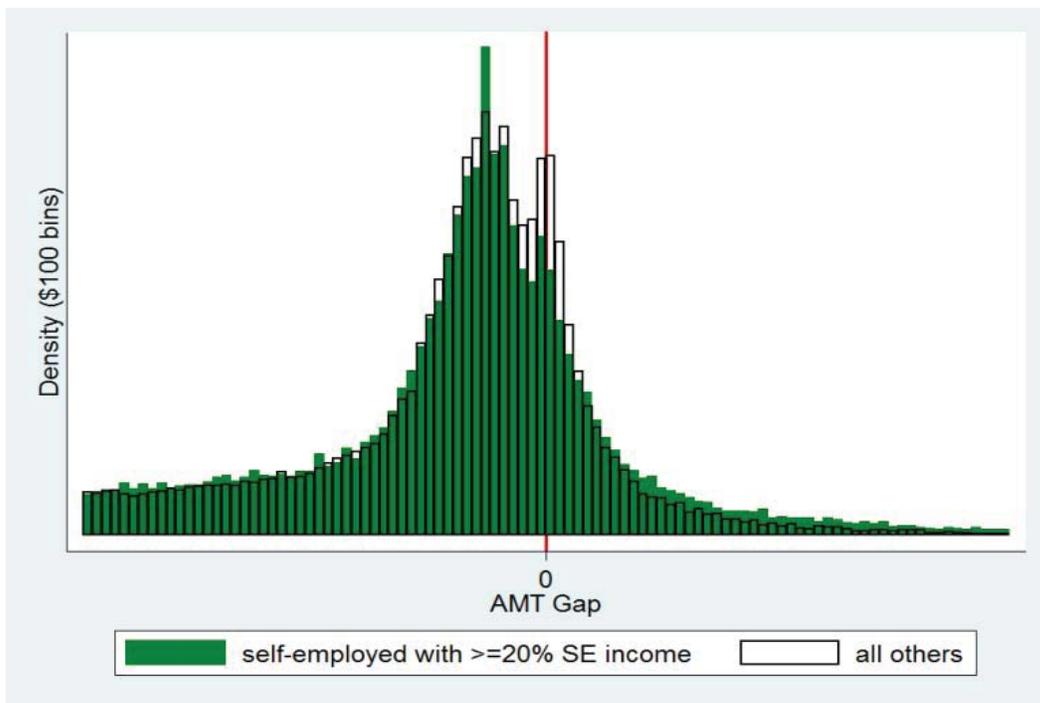
\*Interest paid ratio, property tax ratio, and charitable donation ratio are three tax-based consumption ratios on Schedule A. They will be discussed in details in Section IV.

**FIGURE 5. The AMT Gap by Self-Employment Status (Broad Definition)**

We further explore two narrower definitions of self-employment: taxpayers with at least 10 percent of their income/losses from Schedule C, E or F and those with at least 20 percent of their income/loss from Schedule C, E or F. Figure 6 presents a histogram of the self-employed with at least 10 percent of their income from Schedule C, E or F, overlaid by a histogram of the rest of the sample. We observe the similar result that the self-employed appear to act more aggressively to avoid the AMT. Next we define self-employment as having at least 20 percent of one's income from Schedule C, E or F. The overlaid histograms (Figure 7) show the same conclusion as Figures 5 and 6.

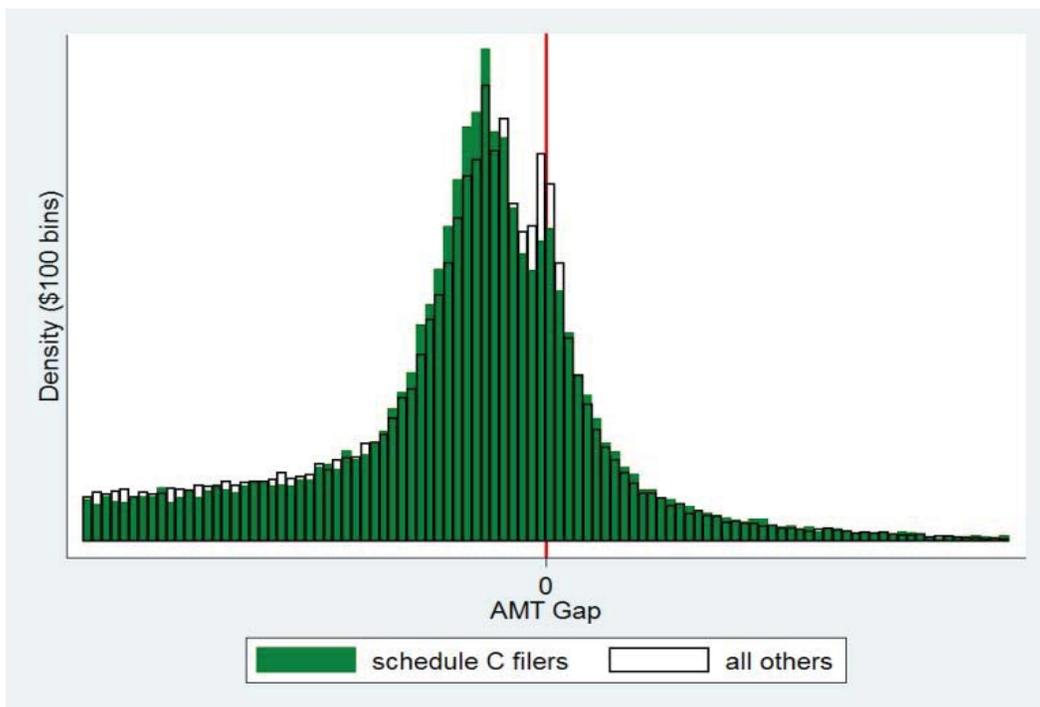
**FIGURE 6. The AMT Gap by Self-Employment Status (Narrower Definition)**

**FIGURE 7. The AMT Gap by Self-Employment Status (The Narrowest Definition)**

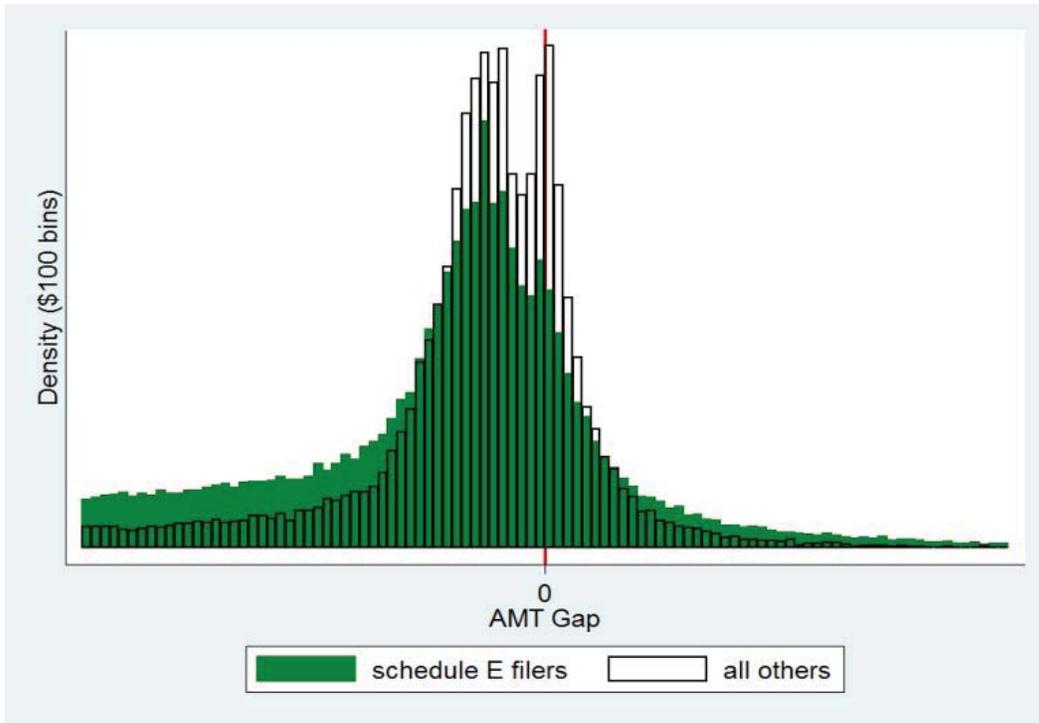


Next we look into comparisons of separate schedule filers (Figures 8–10). The results are similar to previous figures. More mass of the distributions of Schedule C filers, Schedule E filers, and Schedule F filers are located to the left of zero. All three groups have sharper notches than those in the comparison group.

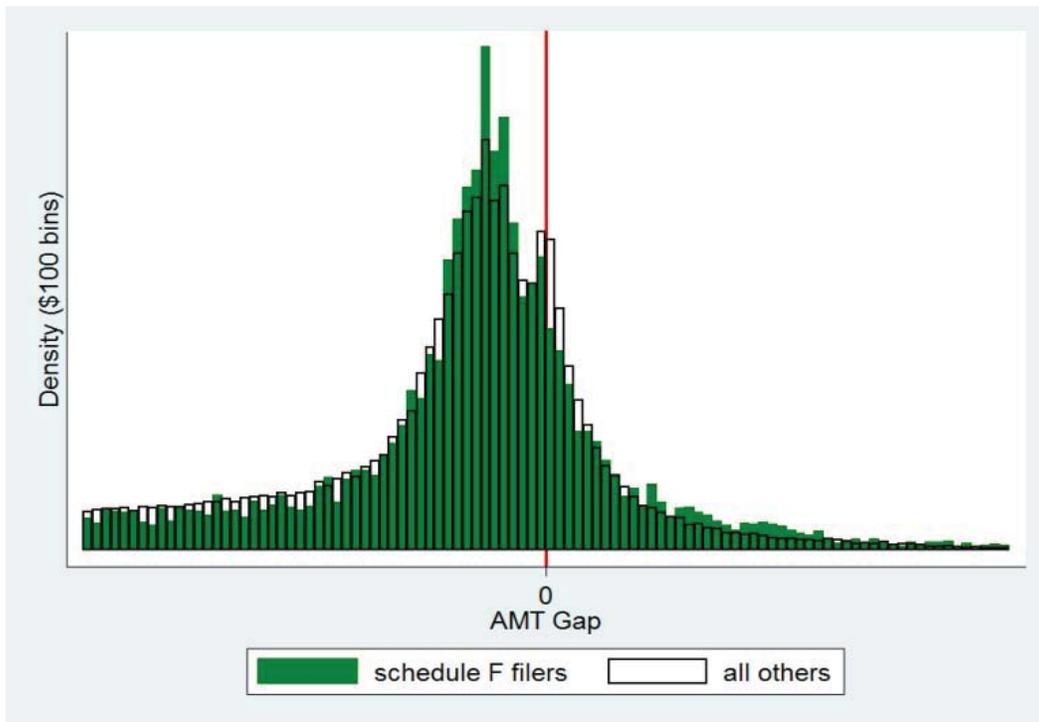
**FIGURE 8. The AMT Gap by Self-Employment Status (Schedule C)**



**FIGURE 9. The AMT Gap by Self-Employment Status (Schedule E)**



**FIGURE 10. The AMT Gap by Self-Employment Status (Schedule F)**



There are several explanations to the different behavioral responses between wage earners and the self-employed. On the intensive margin, the self-employed have greater flexibility to choose hours of work and intensity of work. On the extensive margin, they have larger labor supply flexibility (choose whether to work or not) than wage earners. In addition, wage earners and the self-employed might have different tax noncompliance behavior. Earnings from self-employment are easier to underreport to the tax authority (Kuka, 2013). Therefore the self-employed can take more aggressive actions to avoid the AMT. For example, the Schedule C filers can reduce their tax liabilities by overreporting business expenses. Since wage income is third-party reported and therefore difficult to underreport without being detected (Kleven and Waseem, 2011), the bunching in the distribution of wage income may be attributed to real response. However, wage earners could manipulate some of their itemized deductions, so the bunching could also mean some misreporting. We turn to this next.

#### IV. Misreporting or Real Activity Response?

Given that we have found clear evidence of bunching, the next question is whether it is driven by misreporting or real responses. Pissarides and Weber (1989) pioneered an expenditure-based approach to estimating taxpayer compliance. They estimated food expenditure equations conditional on household characteristics and reported income. The idea is assuming that self-employed households have the same preferences regarding food as wage earners and wage earners truthfully reveal their income, differences by employment status in the estimated relationship between reported income and food expenditures may be attributed to underreporting of income by the self-employed. One key assumption of the PW method is that the reporting of expenditure on some items by all groups is accurate.

Since food consumption information is not available in the tax return data, we creatively look at certain itemized deductions on the Schedule A and treat them as “tax-based consumption” items. Interest paid is one example, and it mainly includes two parts: home mortgage interest paid and investment interest paid. Since both of them are subject to third-party reporting, it is perhaps safe to assume that taxpayers truthfully reveal their consumption on these items. Another consumption item we look at is property tax paid. The analogy of using property tax is similar to the use of interest paid. We also consider charitable donations as one of the consumption items (Feldman and Slemrod, 2007). However, it should be pointed out that charitable donations can be easily manipulated or misreported by taxpayers. We consider all three ratios of tax-based consumption to total income (interest paid ratio, property tax ratio and charitable donations ratio). The summary statistics of three tax-based consumption ratios are in Table 2. The estimated equation is as follows:

$$\begin{aligned} \ln\left(\frac{C_{i,j}}{\text{Total Income}}\right) &= \beta_1 * \text{AMT Gap}_{i,j} + \beta_2 * \text{Self Employed}_{i,j} + \beta_3 * \text{AMT Payers}_{i,j} \\ &+ [\beta_4 * \text{AMT Gap}_{i,j} * \text{Self Employed}_{i,j}] + [\beta_5 * \text{Self Employed}_{i,j} * \text{AMT Payers}_{i,j}] \\ &+ [\beta_6 * \text{AMT Gap}_{i,j} * \text{AMT Payers}_{i,j}] \\ &+ [\beta_7 * \text{AMT Gap}_{i,j} * \text{Self Employed}_{i,j} * \text{AMT Payers}_{i,j}] + \gamma_{i,j} * Z_{i,j} + \text{Year}_j + \varepsilon_{i,j} \end{aligned}$$

We use log-level regression to capture the nonlinearity between the AMT gap and the ratios of tax-based consumption to total income.  $C_{i,j}$  represents a tax-based consumption item  $i$  at year  $j$ . As defined in the previous section,  $\text{AMT Gap}_{i,j}$  is the difference between a person’s AMT and regular tax.<sup>3</sup>

The main interest of this equation is  $\beta_1$ , which captures the relationship between tax-based consumption ratios and the AMT gap. Since it might change once taxpayers cross the AMT threshold, we include a dummy  $\text{AMT Payers}_{i,j}$  term to allow the effects of the AMT gap to differ between the two sides of the AMT threshold.

To account for the different responses to the AMT gap between the self-employed and wage earners, we include a dummy  $\text{Self Employed}_{i,j}$  which equals one if a person has any income/loss from Schedule C, E or F.

<sup>3</sup> If  $\text{AMT Gap}_{i,j}$  is negative, a higher value indicates that a person moves closer to the AMT threshold. If  $\text{AMT Gap}_{i,j}$  is positive, a higher value indicates that a person moves away from the AMT threshold.

In addition, we use the interaction term  $[ATM\ Gap_{i,j} * Self\ Employed_{i,j}]$ , which allows the AMT gap to affect consumption ratios differently between the self-employed and wage earners. We use a three-way interaction term  $[ATM\ Gap_{i,j} * Self\ Employed_{i,j} * ATM\ Payers_{i,j}]$  to capture the effect of AMT gap when a taxpayer is self-employed and pays the AMT.  $Z_{i,j}$  represents a series of economic controls, and  $Year_j$  is a series of dummies representing the filing year.  $\epsilon_{i,i}$  is the error term.

Following a strategy similar to the PW method, we test the following assumption. Consumption on housing is considered a fairly stable portion of one's income. It is unlikely someone would change his housing consumption according to his tax schedule on a yearly basis. A change in housing consumption should be a good indicator that there is a real activity change/labor supply change in this household. Recall that we define the dependent variables as the ratio of one's tax-based consumption (i.e., consumption on housing or charitable donations) to his total income. If there is no misreporting (i.e., only a change in real activity), the ratio should exhibit a stable pattern as individuals get closer to the AMT threshold, all else equal. However, if we observe the ratio changes as one moves closer to the AMT threshold, we can point to that as suggestive evidence that taxpayers manipulate their income according to the tax schedule. The results are presented in Table 3.

**TABLE 3. Regression on Response to AMT Gap (All Self-Employed)**

Variable	<i>ln</i> (Interest Paid Ratio)	<i>ln</i> (Property Tax Ratio)	<i>ln</i> (Charitable Donation Raio)
AMT_Gap	0.00001*** (0.000003)	0.00002*** (0.000002)	0.00001*** (0.000003)
SE (self-employed)	0.054* (0.030)	0.031 (0.019)	0.268*** (0.029)
SE*AMT_Gap	0.000005* (0.000003)	-0.0000008 (0.000002)	-0.000007*** (0.000003)
AMT_Payers	-1.417*** (0.050)	-0.902*** (0.031)	-0.865*** (0.046)
AMT_Payers*AMT_Gap	-0.00003*** (0.000007)	-0.00001*** (0.000004)	0.000004 (0.000006)
SE*AMT_Payers	0.094* (0.049)	0.180*** (0.031)	-0.006 (0.046)
SE*AMT_Payers*AMT_Gap	0.00002** (0.000007)	0.000003 (0.000004)	0.00002*** (0.000006)
Marginal Tax Rate	-5.387*** (0.079)	-3.725*** (0.051)	-3.468*** (0.074)
Total Number of Exemption	0.080*** (0.005)	0.007* (0.003)	0.060*** (0.005)
Married and File Jointly	-0.062*** (0.018)	0.048*** (0.011)	0.116*** (0.016)
Age 65 and Above	-0.694*** (0.017)	0.117*** (0.009)	0.597*** (0.014)
Sample Size	79,594	89,657	91,037

NOTE: \*\*\*, \*\*, \* indicate 1%, 5% and 10% statistical significance respectively.

The AMT gap measures the individual specific distance to the point of triggering the AMT. Results show that we reject the null hypothesis that there is no misreporting. As taxpayers move closer to the AMT triggering point, all three ratios of their consumption to income increase. Specifically, when the AMT gap increases by \$1,000, the ratio of interest paid to one's income increases approximately by 0.01 percent. The ratio of his property tax paid to total income increases by 0.02 percent and the ratio of his charitable donation to total income increases by 0.01 percent. Once they pass the AMT threshold, the ratio of interest paid to one's total income decreases as they move away from the threshold. These provide suggestive evidence that taxpayers underreport their taxable income to avoid the AMT, especially when they are about to trigger the AMT.

The self-employed start at a higher level of consumption ratio. Their ratio of interest paid to total income is 0.05 percent higher than the wage earners'. The ratio of charitable donations to total income is 0.26 percent higher than the wage earners'. According to the PW theory, if one's source of income is unrelated to his expenditure, any difference in the relationship between the expenditure ratio and the source of income can be attributed to (relative) underreporting by the individual. Our results are suggestive evidence that the self-employed relatively underreport more income or overreport more consumption, compared to wage earners. This is consistent with the findings by previous studies that the self-employed are likely to misreport (Feldman and Slemrod, 2007; Kleven and Waseem, 2011). However, it should be pointed out that it is possible that the self-employed have different preferences over these tax consumptions than do wage earners. For instance, some self-employed people may work at home and therefore prefer to invest more in the house for a larger work space.

We use case studies to better illustrate the difference between the self-employed and wage earners' behaviors. The first case is a wage earner with a 20 percent interest paid ratio and an AMT gap of -\$10,000, which means he is \$10,000 away from the AMT triggering point. When he moves from -\$10,000 to the AMT threshold (\$0), his interest paid ratio increases from 20 percent to 20.1 percent. Once he triggers the AMT, his interest paid ratio begins to decrease. If he moves from the AMT threshold (\$0) to \$10,000, his ratio will decrease from 20.1 percent to 18.4 percent. The second case is a self-employed taxpayer. All else equal, the self-employed who locates at -\$10,000 has a slightly higher interest paid ratio (20.054 percent). As he moves from -\$10,000 to the AMT threshold, his ratio increases from 20.054 percent to 20.114 percent. Similar to the wage earner, his ratio also begins to decrease after he crosses the trigger point. By calculation, his interest ratio is 18.69 percent when he pays \$10,000 of AMT.

To sum up, the self-employed have higher levels of tax-based consumption ratios, but they do not change these ratios as aggressively as is shown in the previous histograms. We attribute this to the following possibilities. Being self-employed gives taxpayers more evasion opportunities. For instance, the taxpayers who file Schedule C could either over-report business expenses or underreport business income on Schedule C. If that is the case, they do not need to aggressively move these three tax-based consumption ratios. To check our hypothesis, we ran the regression on Schedule C filers only (Table 4). The results show that Schedule C filers do increase the ratio of business expense to business income (i.e. gross income on Schedule C) when they move toward the AMT threshold. When they move \$1,000 closer to the AMT threshold, their business expense ratios increase by 0.02 percent. This suggests that Schedule C filers try to avoid the AMT either by over-reporting business expenses or by underreporting business income. Once they pass the AMT threshold, there is no effect of further changes in the AMT gap on the business expenditure ratio.

Other controls include the filers' marginal tax rate, total number of exemptions, filing status, and age. Marginal tax rate is the effective federal marginal tax rate. In general, research finds that the tax code creates incentives to consume more housing and to donate (Glaeser and Shapiro, 2003; Feldman and Slemrod, 2007). Contrary to previous literature, we find that a one-percentage-point increase in the marginal tax rate leads to a decrease in the interest paid ratio of 5.387 percent, a decrease in the property tax ratio of 3.725 percent, and a decrease in the charitable donations ratio of 3.468 percent.

**TABLE 4. Regression on Response to AMT Gap (Schedule C Filers only)**

Variable	<i>ln</i> (Business Expense Ratio)
AMT_Gap	0.00002*** (0.000002)
AMT_Payers	-0.062 (0.056)
AMT_Gap*AMT_Payers	-0.00002*** (0.000004)
Marginal Tax Rate	-0.875*** (0.163)
Total Number of Exemption	0.023** (0.010)
Married and File Jointly	-0.145*** (0.038)
Age 65 and Above	-0.064** (0.034)
Sample Size	23,320

NOTE: \*\*\*, \*\*, \* indicate 1%, 5% and 10% statistical significance respectively.

The coefficient on married and filing jointly taxpayers suggests that married couples have lower ratios of interest paid to their total income. Echoing Feldman and Slemrod (2007), we find evidence that married couples tend to give more than other households. Their ratio of charitable donations to total income is 0.116 percent higher than other filing groups. Our results show that more exemptions lead to higher ratios of all three expenditures to total income. The results are different from what Feldman and Slemrod (2007) found. They found more exemptions are associated with lower levels of charitable donations. Taxpayers who are 65 years old or older tend to have a lower interest paid ratio, but a higher property tax ratio and a charitable donation ratio.

The main regression (Table 3) uses a broad definition of self-employment. To check the robustness of our results, we ran an additional regression with a narrower definition of self-employment. We examined the self-employed with at least 20 percent of their income from Schedule C, E or F. It turns out that the results are robust (Table 5). We observe the same pattern of changes in all three tax-based consumption ratios along the AMT gap.

**TABLE 5. Regression on Response to AMT Gap (20% Self-Employment Income)**

Variable	<i>ln</i> (Interests Paid Ratio)	<i>ln</i> (Property Tax Ratio)	<i>ln</i> (Charitable Donation Ratio)
AMT_Gap	0.00002*** (0.000001)	0.00003*** (0.000001)	0.000007*** (0.000001)
SE (self-employed)	0.410*** (0.020)	0.303*** (0.013)	0.405*** (0.019)
SE*AMT_Gap	-0.000002 (0.000002)	-0.000002 (0.000001)	-0.000008*** (0.000002)
AMT_Payers	-1.236*** (0.033)	-0.687*** (0.021)	-0.800*** (0.030)
AMT_Payers*AMT_Gap	-0.00002*** (0.000003)	-0.00001*** (0.000002)	0.00002*** (0.000003)
SE*AMTC	-0.130*** (0.037)	-0.101*** (0.023)	-0.1000** (0.034)
SE*AMT_Payers*AMT_Gap	0.00002*** (0.000004)	0.0000003 (0.000003)	0.00001*** (0.000004)
Marginal Tax Rate	-5.253*** (0.079)	-3.662*** (0.050)	-3.387*** (0.074)
Total Number of Exemptions	0.075*** (0.005)	0.003 (0.003)	0.054*** (0.005)
Married Filing Jointly	-0.061*** (0.018)	0.050*** (0.011)	0.132*** (0.016)
Age 65 and Above	-0.672*** (0.016)	0.138*** (0.009)	0.632*** (0.014)
Sample Size	79,594	89,657	91,037

NOTE: \*\*\*, \*\*, \* indicate 1%, 5% and 10% statistical significance respectively.

Since our sample is a pooled cross-section of data over several years, we ran regressions for each year separately to check if the behavioral responses to the AMT are different across years (Table 6). Overall, the results are robust. We find taxpayers change their interest paid ratio as they move along the AMT gap in most years, except for Years 1994 and 1996. We attribute this to different environments for regular tax and AMT. For instance, in some years AMT parameters were not known until the end of the year. If that is the case, taxpayers can avoid the AMT/reduce their tax liabilities only by misreporting. In contrast, if a taxpayer knows the AMT parameters in advance, he might be able to adjust some of his household consumption or labor supply to avoid triggering the AMT.

**TABLE 6. Regressions on Response to AMT Gap (Interest Paid Ratios)**

Variable	Year 1994	Year 1995	Year 1996	Year 1997	Year 1998	Year 1999	Year 2000	Year 2001	Year 2002
AMT_Gap	0.00001	0.00002**	0.000004	0.00002*	0.00002**	0.00003***	0.00003***	-0.000003	0.00002***
	(0.00001)	(0.000009)	(0.000007)	(0.000009)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
SE (self-employed)	0.029	0.020	0.133	-0.032	-0.077	-0.051	-0.038	0.251***	-0.112
	(0.121)	(0.104)	(0.071)	(0.106)	(0.111)	(0.108)	(0.095)	(0.064)	(0.087)
SE *AMT_Gap	0.00001	0.00000	0.00001	0.000001	0.000001	-0.00001	-0.00001	0.00002*	-0.0000001
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
AMT_Payers	-1.547***	-1.237***	-1.257***	-1.415***	-1.220***	-0.928***	-1.220***	-1.465***	-1.791***
	(0.206)	(0.201)	(0.149)	(0.209)	(0.212)	(0.195)	(0.166)	(0.100)	(0.109)
AMT_Payers*AMT_Gap	-0.00001	-0.0001***	-0.00003	-0.00005	-0.00004	-0.00005*	-0.00003	0.000001	-0.00003*
	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00002)	(0.00001)	(0.00001)
SE*AMT_Payers	0.327	0.111	0.078	0.139	0.182	0.051	0.097	-0.024	0.179
	(0.203)	(0.196)	(0.143)	(0.207)	(0.208)	(0.190)	(0.159)	(0.104)	(0.109)
SE*AMT_Payers*AMT_Gap	-0.00001	0.00009**	0.00004	0.00005	0.00004	0.00006*	0.00003	-0.00001	0.00002
	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00002)	(0.00001)	(0.00002)
Marginal Tax Rate	-5.006***	-4.914***	-5.017***	-5.375***	-4.875***	-3.920***	-4.876***	-5.858***	-6.043***
	(0.287)	(0.282)	(0.273)	(0.295)	(0.303)	(0.290)	(0.269)	(0.159)	(0.168)
Total Number of Exemptions	0.075***	0.094***	0.053***	0.075***	0.082***	0.115***	0.100***	0.060***	0.079***
	(0.015)	(0.014)	(0.014)	(0.016)	(0.017)	(0.017)	(0.016)	(0.013)	(0.013)
Married Filing Jointly	-0.064	-0.131*	0.003	-0.087	0.037	-0.044	-0.117*	0.022	-0.181***
	(0.056)	(0.055)	(0.054)	(0.060)	(0.060)	(0.059)	(0.054)	(0.045)	(0.046)
Age 65 and Above	-0.771***	-0.731***	-0.617***	-0.891***	-0.744***	-0.696***	-0.678***	-0.568***	-0.648***
	(0.052)	(0.051)	(0.054)	(0.056)	(0.056)	(0.054)	(0.047)	(0.042)	(0.042)
Sample Size	7,684	8,100	8,244	6,913	7,788	8,383	10,172	11,287	11,023

NOTE: \*\*\*, \*\*, \* indicate 1%, 5% and 10% statistical significance respectively.

## V. Discussion and Conclusions

The Alternative Minimum Tax is an important part of the US income tax system. It is an important revenue source for the federal government and affects millions of households every year. Using Public-Use Files from 1994 to 2002, this paper presents for the first time evidence on behavioral responses to the AMT. We find clear and significant behavioral responses to the AMT threshold. The peculiar part of the AMT is that every taxpayer's AMT liability is different. We add to the literature by using the AMT gap concept to plot the behavioral response to the AMT. Specifically, we project each taxpayer's AMT liability based on their tax return and calculate the difference between their AMT liability and regular tax liability (i.e. the AMT gap). The AMT presents a large economic incentive to bunch, and we find that individuals indeed respond. The evidence of bunching is strong, with a statistically significant break in the density of the AMT gap at the notch (as seen by the McCrary test). In addition, we explore the difference between the self-employed and wage earners, and find the self-employed act more aggressively to avoid the AMT. Wage earners also bunch their income around the AMT threshold, which suggests either real activity change (since higher tax rates discourage people from earning income) or misreporting preference items such as itemized deductions.

We further investigate the question of whether such bunching behavior is caused by real responses or just misreporting in tax returns. Following the classic PW method, we take advantage of the relationship between tax-based consumption ratios and the distance to the AMT threshold. We find evidence that taxpayers might underreport their income as they move toward the AMT threshold. The self-employed have more opportunities than wage earners to avoid the AMT. Results from a restricted sample (Schedule C filers only) show that the Schedule C filers are likely to either underreport their business income or over-report their business expenses to avoid the AMT.

Overall, the findings suggest that the bunching created by the AMT comes from both real responses and misreporting. This has important policy implications. First, underreporting among the self-employed suggests revenue losses. Second, evidence suggests that the AMT has an impact on taxpayers' real activity. This real response is what pol-

icy makers need to pay attention to. If people change their activities according the tax schedule, then there is economic distortion to the economy, in addition to tax revenue loss. Future work could continue to explore the causal impact of the AMT on taxpayer's behavioral response if panel data become available.

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# Do Doubled-Up Families Minimize Household-Level Tax Burden?

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## 1. Introduction

Recently, there has been an increasing focus in the labor economics literature on behavioral responses to discontinuities in the tax code.<sup>2</sup> This literature is not so much focused on responses to an overall tax policy, but rather the way in which tax filers take advantage of the mechanical quirks of the tax system in order to gain as much out of the system as possible. Most of the activity analyzed, such as the bunching of income of self-employed taxpayers at kink points in the Earned Income Tax Credit's (EITC) benefit structure, or the claiming of children who do not exist, appears to be outside the letter of the law. However, as with any set of rules as complicated as the U.S. Federal income tax system, there exist interpretations and quirks that may be exploited in a legal manner. We examine such behavior in this paper, which looks at how multiple adult tax filers in a household are able to sort all the dependent children in the household in such a way as to minimize overall household tax burden. The behavior we examine falls into a specific category of tax avoidance—tax arbitrage between members of a family (Stiglitz, 1988). To our knowledge, ours is the first paper to look at the issue of optimal claiming of dependents by related household members. Our access to a unique data set—linked survey and Form 1040 data—gives us the necessary information to examine the issue.

There are several reasons why the question of dependent sorting is important. As with all tax avoidance, there are implications for public finance and tax-system equity (Andreoni, Erard, & Feinstein, 1998). The question of how child dependents are sorted in multifamily households is an important one for assessing their well-being. We show that the difference in household tax burden or refund can be as large as \$4,000 (for the 2010 tax year) depending on the choice of which filers in a household claim the dependents. Moreover, because of the EITC benefit structure, differences tend to be higher for households where at least one filer has low income. On the one hand, flexibility in tax rules may be an important policy goal, since it provides low-income, resource-pooling households with filing options that increase the total household refund. On the other hand, such flexibility may backfire if a filer does not actually take responsibility for the dependents he or she claims, since any refund money might go solely to the person claiming it rather than the household (for an example of such a concern playing out in terms of pension payments, see Duflo (2003)).

The question of who claims dependents also has implications regarding our measurement of complex households. For example, the alternative poverty measure calculated by the U.S. Census Bureau relies on precise estimation of transfers from the tax system and depends on an understanding of household structure and which adults in a household might be financially responsible for which children. Doubling up has long been used by young families in response to high rents or low wages (Haurin, *et al.*, 1993). During the Great Recession, “doubling-up” became a more common strategy for making ends meet, especially among low-income households that rely on tax credits as part of the social safety net (Mykyta & Maccartney, 2011).

Finally, the sorting of dependents also gives insight into how well tax rules are understood, either by taxpayers or tax preparers, as well as how that information might be disseminated from household to household. Several recent papers have looked at this question in regards to the EITC specifically (Chetty, Friedman and Saez, 2012; Chetty and Saez, 2009).

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<sup>1</sup> The views expressed in this paper are those of the authors and do not necessarily represent the views of the U.S. Census Bureau, the U.S. Department of the Treasury, or the Internal Revenue Service.

<sup>2</sup> See, for example, Saez (2010) and LaLumia and Sallee (2012).

The paper proceeds as follows. First, since this is the first paper to look at the question of dependent sorting, in Section 2 we describe at length the various credits and deductions in the tax code related to dependent children, the specific definition of sorting we use in the paper, and some considerations about where to place this behavior on the spectrum of tax avoidance/evasion. We present some evidence from simulations using synthetic tax data showing how families might minimize their overall tax burden. We also cover some of the relevant literature on tax avoidance. Section 3 describes the data we use for the analysis: the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) linked person-by-person to Internal Revenue Service data for tax years 2005–2010. Section 4 describes the empirical model we use to examine dependent sorting, and Section 5 presents the results of our analysis. Section 6 concludes.

## 2. Background and Literature

### 2.1. Deductions and Credits in the Tax Code

Holding everything else constant, a taxpayer is always as well off or better off if he or she is able to claim a dependent (Ellwood & Liebman, 2001), although the value of claiming a dependent varies over filers' incomes. The dependent exemption lowers taxable income for any taxpayer claiming it, so its value depends on the given tax bracket. For taxpayers whose dependents are children, the Child Tax Credit (CTC) and the EITC often apply. Head of household filing status, which may be used by otherwise single filers when a qualifying dependent can be claimed, allows filers a higher standard deduction and wider tax brackets. Each of these deductions and credits have rules that overlap but that are not perfectly coincident. The dependent exemption and head of household status have the same rules governing qualifying children, described below. However, the definitions of a qualifying child for the EITC and the CTC are each slightly different from the definition for the dependent exemption (see Table 1). Specifically, a qualifying child for EITC purposes does not need to satisfy the support test required for a dependent exemption, and the age of a qualifying child for CTC purposes is more restrictive (under age 17) than for a dependent exemption.

**TABLE 1. The Rules Defining Qualifying Child for Several Tax Benefits**

Type of Test	Dependent Exemption	Head of Household	Earned Income Tax Credit	Child Tax Credit
Family-Related Attributes of the Claimant		<ul style="list-style-type: none"> <li>Unmarried (or "considered unmarried") on the last day of the tax year</li> <li>Has a qualifying dependent (not necessarily a child) living with claimant for more than half of the year</li> <li>Must have paid more than half of the cost of keeping a home</li> </ul>		
<b>Attributes of a Qualifying Child</b>				
<b>Relationship</b>	<ul style="list-style-type: none"> <li>Related to the claimant biologically (son, daughter, grandchild, sibling, etc.) <b>OR</b></li> <li>A formally adopted or foster child</li> </ul>		Same as for dependent exemption	Same as for dependent exemption
<b>Age</b>	<ul style="list-style-type: none"> <li>Less than 19 <b>OR</b></li> <li>Less than 24 and a full-time student <b>OR</b></li> <li>Permanently and totally disabled and any age</li> </ul>		Same as for dependent exemption	Less than 17
<b>Residency</b>	Lived with the claimant for more than half of the tax year		Same as for dependent exemption	Same as for dependent exemption
<b>Support</b>	Claimant must have provided more than half of the support for the child during the tax year		Does not apply	Same as for dependent exemption
<b>Tax Return Filing</b>	Child cannot have filed a joint return for the same tax year unless the child and spouse filed only to claim a refund (i.e., were not legally required to file)			

## 2.2. *Sorting of Dependents*

We define sorting based on household relationship information in the CPS ASEC and the rules regarding the claiming of dependents. For the purposes of our analysis, sorting households must have:

- More than one adult 1040 tax filer (we define adults as 18 years of age or older, and we exclude those who are claimed on someone else's return);
- At least one dependent claimed on a 1040 form by one of the adult filers.
- The number of children modeled as claimable by the reference person (based on relationship and income responses in the CPS ASEC) being less than the number claimed in tax records, while simultaneously the number modeled for a second filer in the same household is more than the number claimed. (Sorting is also defined in the reverse case, when the number of claimed children is more than the number of modeled children for the reference person and less for the second filer.) We are thus exploiting the differences between tax filing behavior based on the survey data and actual behavior reflected in the IRS data.
- Because of tax rules regarding the relationship of children to those claiming them, we include only relatives of the household head as possible filers to sort to or from. These include children, grandchildren, siblings, parents, and "other relatives" of the CPS reference person.<sup>3</sup>

We are thus examining sorting from the CPS reference person to or from other related filers in the CPS household, but we do not examine sorting between other household members. Since the CPS questionnaire asks about relationships only between the reference person and other members of the household, this choice is due to recognizing the difficulty involved in determining relationships between other household members. For example, in a cohabiting household, we would not be able to tell whether a person who is unrelated to the reference person *is* related to the cohabitor. It should be noted, however, that we capture instances when the reference person sorts to or from multiple household members.

## 2.3. *Simulations Showing Possible Full Tax Outcomes*

Although an individual filer is always better off if he or she can claim a child, when it comes to sorting children among filers, the goal is to minimize *overall household* tax burden and maximize household refunds. Therefore, a household might not achieve an optimal tax outcome for each filer through sorting. For example, a household with two children might be better off overall if one person claims both children, even if claiming one of the children would help another member of the household minimize his or her individual tax burden.

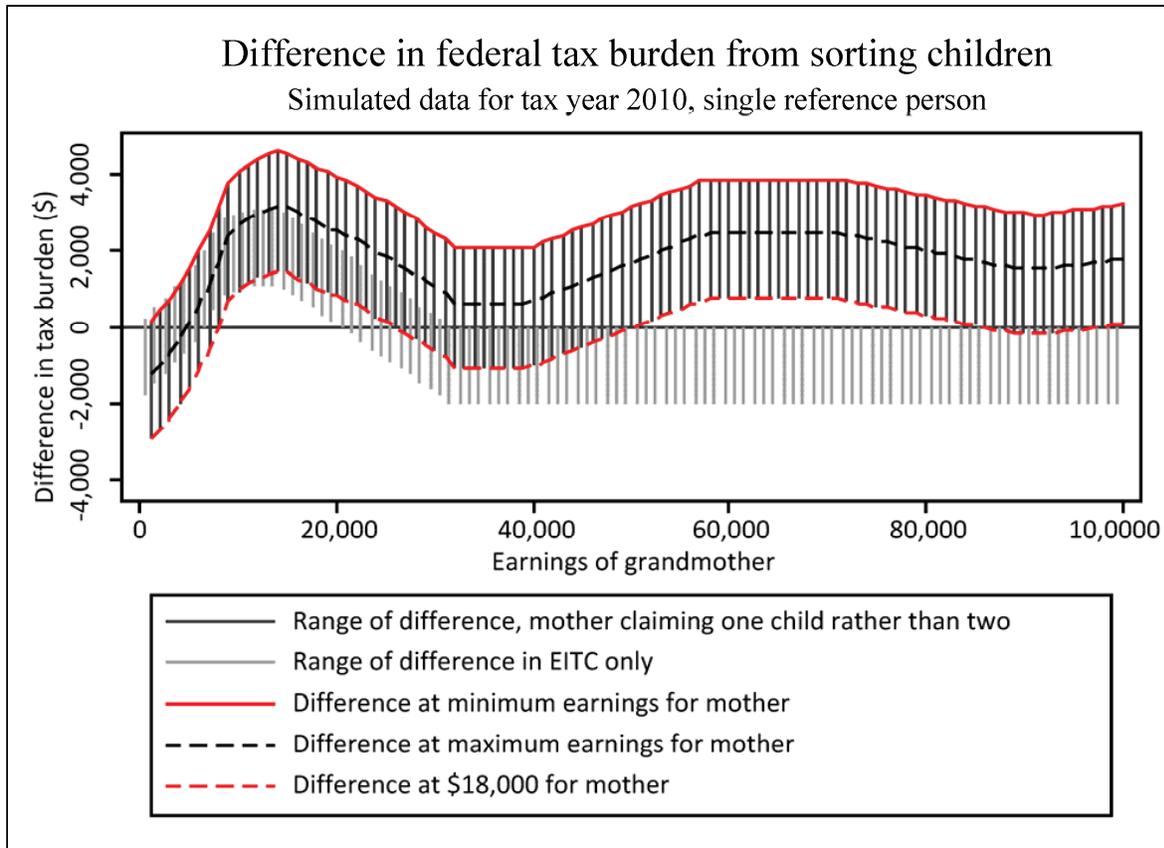
To examine the interaction between taxes, credits, filing status, and the benefits of sorting, we created simulated tax data and used NBER's TAXSIM (see Feenberg and Coutts (1993) for more information) to calculate overall tax burden for two cases. In both cases, a single mother with two children lives with her mother, whom we call the grandmother. Both women are 1040 filers. The grandmother is also unmarried, and if surveyed in the CPS, would be the reference person. In the first case, the grandmother claims no children and the mother claims both children, and in the second case the grandmother and mother each claim one child. For both mother and grandmother, we allow earnings to range from \$1,000 to \$100,000, and we use the average values of interest, rental, and Supplemental Security Income (SSI) from our true data (the linked CPS and IRS file) from 2010, rounding to the nearest \$100. Using the grandmother as the first filer, we created 100 observations for earnings (in \$1,000 increments) for her, and calculated her tax burden as either a single filer with no dependents or a head of household filer claiming one child. For each value of the mother's earnings, we calculated her tax burden as head of household claiming either one or two children. Finally, for each value of the grandmother's earnings, we linked every value for the mother (leading to a simulated data set of 10,000 observations). The difference between the two cases is simply overall household tax burden in case 1 (grandmother's tax plus mother's tax) minus overall household tax burden in case 2. The differences in tax burden, including

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<sup>3</sup> We model the reference person as the tax filer in cases where the reference person answered the CPS questionnaire but his or her spouse files the 1040 form for the tax year.

all taxes and credits, are graphed in Figure 1 as vertical black bars vis-à-vis the grandmother's earnings. The gray bars show the difference in EITC only. Differences above the y axis indicated combinations of earnings for which the family is better off if it sorts.

**FIGURE 1. Simulation of the Benefit of Sorting Children Between a Mother and a Grandmother**



Source: Invented data for tax year 2010, with tax outcomes generated using NBER's TAXSIM program. A difference in tax outcome for a household is calculated for two scenarios: When two dependent children are claimed by their mother, and when one child is claimed by an unmarried grandmother who files singly under the first scenario and head of household under the second. All possible differences are graphed as a function of the grandmother's income (black bars). To show the influence of EITC receipt on the difference, EITC differences are graphed separately in gray (but are included in the total difference).

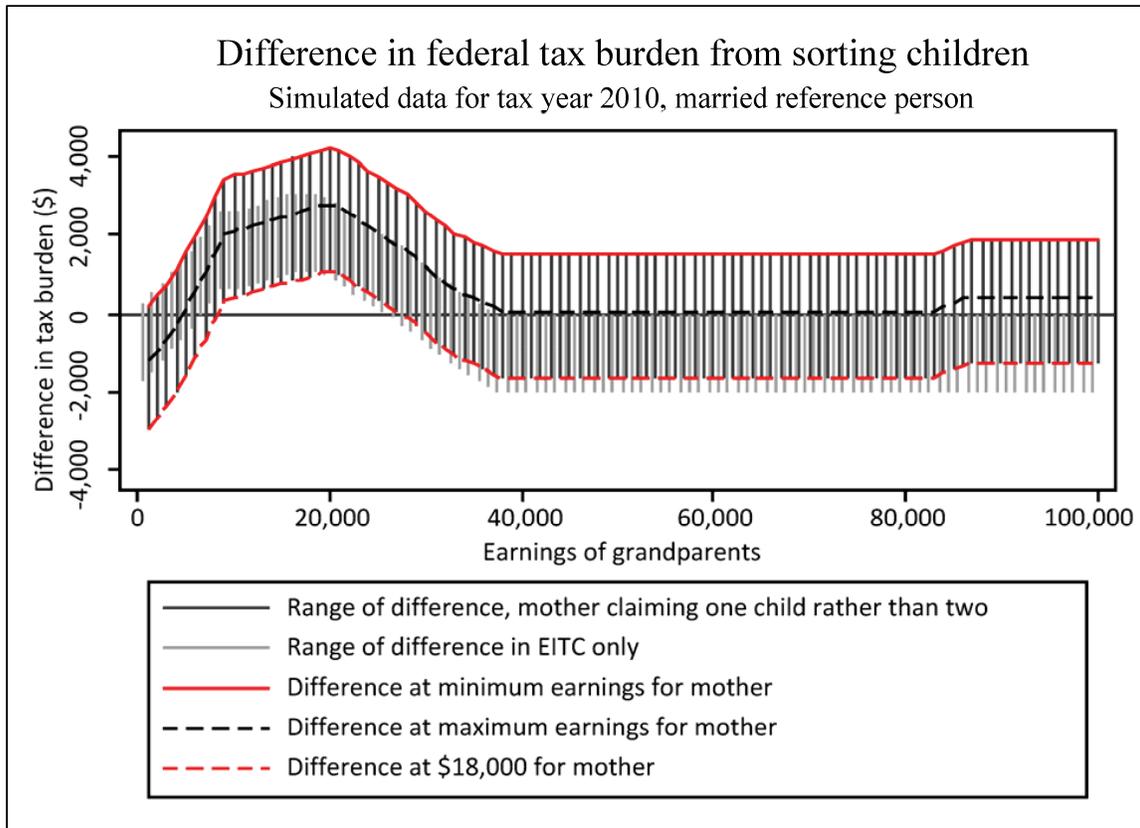
As can be seen in the figure, for nearly every value of the grandmother's earnings in combination with all possible earnings from the mother, the household described is as well off or better off if it sorts children between the two earners. For situations when the grandmother's earnings are on the extreme low end of the scale, there is a detriment to sorting unless the mother's earnings are also extremely low. The family would be better off if the mother claimed both children. For a few cases when the grandmother's income is modest (between approximately \$30,000 and \$50,000) and the mother's is also modest (between \$18,000 and \$30,000) the family is also better off if they do not sort. Maximum values for sorting occur when the grandmother has low to modest earnings and the mother has very low earnings. For example, the maximum difference of \$4,595 is achieved when the grandmother's earnings are \$14,000 and the mother's are \$1,000 (mainly because the grandmother's earnings place her at the maximum point in the EITC schedule). Values close to the maximum are also achieved when the grandmother's earnings are modest to high and the mother's are low.

Figure 1 demonstrates that, for any value of the grandmother's earnings, a maximum difference occurs when the mother's earnings are at a minimum (\$1,000). Because of her low earnings, the gain the mother receives from claiming a second child versus the gain the grandmother receives in claiming one is widest at this point. Meanwhile, for any value of the grandmother's earnings, a maximum value for the mother puts them in an area where the difference in tax burden is average. Interestingly, the same value for the mother's earnings,

\$18,000, constitutes the point where the difference between the two filing cases is minimized for every choice of the grandmother's earnings.

Difference in total EITC plays a large positive part in the overall difference until the grandmother's earnings are larger than the maximum income for the EITC. At that point, it is more beneficial, in terms of EITC, for the mother to claim both children. However, the benefit to the household of both mother and grandmother claiming head of household status is large, and for most combinations of incomes outweighs the loss in EITC. This outcome is different when the grandmother is married and files jointly, as shown in Figure 2.

**FIGURE 2. Simulation of the Benefit of Sorting Children Between a Mother and a Grandmother Who Files a Married-Joint Return**



Source: Invented data for tax year 2010, with tax outcomes generated using NBER's TAXSIM program. A difference in tax outcome for a household is calculated for two scenarios: When two dependent children are claimed by their mother, and when one child is claimed by an unmarried grandmother who files jointly under both scenarios. All possible differences are graphed as a function of the grandmother's income (black bars). To show the influence of EITC receipt on the difference, EITC differences are graphed separately in gray (but are included in the total difference).

Figure 2 shows that once the grandparent's earnings are above the threshold for the EITC, the family is better off from sorting only about half of the time (and usually when the mother's earnings are very low—\$1,000 to \$10,000). In this case, the gain the grandparents receive from the adjustments to their taxable income (the dependent deduction and child tax credit) outweigh the small gain the mother gets from the difference in benefit level in EITC and Child Tax Credit from two children versus one child.

#### 2.4. Tax Avoidance or Evasion?

An important question to ask is whether any observed sorting falls under the definition of tax avoidance or evasion. Slemrod and Yitzhaki (2002) provides definitions of each issue, with illegality being the distinguishing characteristic of evasion. Thus, while avoidance is a result of choices that fall within taxation rules, evasion generally boils down to weighing the costs of compliance versus the cost of getting caught. An analysis of avoidance would include the costs of interpreting rules and taking advantage of them, while evasion would

include the possibility of an audit and potential penalties as part of its cost structure. It is impossible to know, using the data available, whether the sorting we observe falls under perfectly acceptable interpretations of tax rules or whether it would qualify as rule-breaking when subjected to an audit. For the purposes of this paper, we make the assumption that any sorting of children we observe is allowed by income tax rules.

The issue of tax avoidance—specifically personal income tax avoidance—has received less attention in the economic literature than has tax evasion. When it has been examined, the attention has focused on the accounting problem presented by tax avoidance of various kinds, including the avoidance of sales and corporate taxes (see, for example, Feldstein (1999) and Slemrod (2007), among many others). Andreoni, Erard, & Feinstein (1998) provides a review of the issues surrounding personal income tax compliance, including general equilibrium considerations and auditing rules. In his general theory of income tax avoidance, Stiglitz (1988) outlined and modeled three, possibly overlapping, methods of avoidance: postponement of taxes, tax arbitrage across individuals who face different tax brackets, and tax arbitrage across income streams that face different schemes of taxation. The behavior we model falls firmly into the second category, although Stiglitz does not mention the treatment of dependents for arbitrage. To the extent that a dependent child represents a tax savings, the transfer of the child to one filer from another constitutes a form of “tax induced transaction” that improves a household’s tax standing without incurring a monetary cost.

Research into the mechanics of intra-family arbitrage as a response to specific aspects of tax code is scarce. One stream examines transfers between spouses facing individual income taxes. Because individual taxation of spouses occurs mainly in Western European countries, the research is concentrated there. An example is Stephens Jr. & Ward-Batts (2004), who found that a change from joint to individual taxation in the UK led to a shift in the share of asset income claimed by wives. Because of the generally lower marginal income tax rate that wives face, households can make a Pareto improvement in their tax position by transferring asset income from husbands to wives. A second stream examines gifts and bequests to family members. For example, Ohlsson (2007) uses a design quirk of the Swedish tax system to investigate how often heirs avoid an inheritance tax by passing on the inheritance immediately to grandchildren. The author found that the propensity to pass down the inheritance increased with the size of the tax.

When dependent claiming has been studied, it has fallen under the category of tax evasion—specifically, the case of nonexistent dependents rather than the case of who claims whom. For example, LaLumia & Sallee (2012) investigated a change in rules in the US income tax code between years 1986 and 1987 that required taxpayers, for the first time, to report Social Security Numbers for dependents on tax returns. The initial rule limited the requirement to children age 5 and older, with the rule applying to increasingly younger dependents in subsequent tax years. The authors found a sharp decrease in the number of dependents reported (a loss of 5.5 percent, equivalent to 4.2 million children) in tax year 1987, an effect attributable to cheating in the preceding tax year.

The value of claiming a child that does not exist varies depending on where a taxpayer falls in the income distribution, their filing status, and the other types of credits he or she might be able to claim (LaLumia & Sallee, 2012). For low-earning taxpayers, the EITC represents a valuable incentive to claim children. Meyer & Rosenbaum (2001) examined the issue of noncompliance and mystery children specifically for the EITC using tax data from 1994, finding that an increase of 10 percent in the EITC benefit was associated with a 4 percent increase in the probability of claiming a child. Liebman (2000) also examined ineligible EITC recipients, finding that between 11 and 13 percent of EITC recipients in tax year 1990 did not have a child in their household, according to the Current Population Survey. However, the author found that a large proportion of erroneous EITC payments were made to households who did have children, and that many of these households were similar to eligible households. Indications are that the rules surrounding the EITC lead to confusion regarding eligibility, with families erroneously applying for the credit due to attributes that make them close to eligible (Blumenthal, Erard, & Ho, 2005).

As a policy, the EITC provides opportunities for examining differential responses to changes in its rules that have occurred from time to time. There is a long research tradition of using these exogenous changes in the analysis of labor force response (Eissa & Liebman, 1996; Meyer & Rosenbaum, 2001), marriage rates (Rosenbaum, 2000), and fertility (Baughman & Dickert-Conlin, 2009). The latest major change to benefit

levels vis-à-vis the number of children in a household occurred in 2009, when a higher benefit schedule was instituted for families with three or more children. We use this change in the EITC rules to examine the effect of EITC rules on sorting.

### 3. Theoretical and Empirical Model

McCubbin (2000) presents a theoretical model for claiming fictional children that can be adapted to the choice of sorting in the face of ambiguous rules. The model begins with the choice of whether or not a filer reports a child when the filer does not actually support a child. In our case, the filer's choice is whether or not to claim a child in the household when the household also includes a filer who is more directly related to the child. McCubbin models the taxpayer's utility decision as:

$$\begin{aligned} \text{Max}(x_r, y_r): & [1-p]U(y_t - \tau[y_r - \delta x_r] + E(y_r, x_r)) \\ & + pU(y_t - \tau[y_r - \delta x_r] + E(y_r, y_r) - \pi(y_t - y_r, x_r - x_t, T, \gamma)) \end{aligned}$$

subject to  $0 \leq x_r \leq 2$ . In our case, the restriction on  $x_r$  is either 3, in the case of the EITC alone, or irrelevant if there is a benefit to claiming more children for a given taxpayer. In the model,  $y_r$  is reported income and  $x_r$  reported children, while the same variables with the subscript  $t$  are the true values for these measures. The probability of detection is  $p$ ,  $\tau$  is the tax rate, and  $\delta$  is the amount of income exempt from tax for each reported child.  $E(y_r, x_r)$  is the credit,  $\pi$  is the penalty for non-compliance, and  $T$  the tax underreport plus the overreport of EITC. The final term,  $\gamma$ , is a vector of demographic characteristics of the filer.

After taking the first order condition, McCubbin derives the main driver of claiming fictitious children:  $\frac{\partial E(y_r, x_r)}{\partial x_r}$ , which expresses the increase in the tax benefit from claiming a child (in the case of McCubbin, erroneously, and in our case, from optimally sorting). McCubbin points out that the penalty function in the case of evasion is crucial to the predictions of the model. In our case, we are making an assumption that the sorting behavior we are modeling is permitted by the EITC rules in most cases. However, we can assume that there is a cost to finding out about sorting, in which case a derivation of the explanatory term would be similar.

The largest benefit to household sorting is from the EITC and the head of household filing status. The dependent exemptions and the Child Tax Credit are per child, while the EITC has a different schedule for additional children, and the head of household status provides a larger deduction and wider tax brackets. The benefit will clearly be larger for larger EITC amounts. In modeling the problem at hand, using either total household EITC amount or actual EITC receipt is problematic, since sorting/non-sorting is codetermined with either value. Therefore, we use a simulation to generate the maximum total EITC achievable for a family under all sorting possibilities. Following the model outlined above, we use the difference between this variable and the total household EITC generated through original modeling—in which the children reported in the CPS are assumed to be the children claimed. To account for heterogeneous households, we also examine in separate models those families in which at least one filer is EITC-eligible under original modeling.<sup>4</sup> To give a complete picture of sorting behavior, we also examine the relationship between sorting and 1) the eligibility of the reference person, 2) the eligibility of the first relative filer<sup>5</sup> in the household, and 3) the number of eligible filers in the household as originally modeled and via optimal sorting.

To empirically model sorting behavior, we use probit models with the explanatory variables explained above, plus reference person, state-level, and household characteristics. Reference person characteristics include adjusted gross income (AGI), filing status, age, sex, race, Hispanic origin, and education. State characteristics include the value of state EITC to the reference person under original modeling and the state minimum wage (both logged). Household characteristics include total AGI, the relationship category of the first relative—child, parent, etc.—and the age of the first relative. To control for unobservable geographic differences in

<sup>4</sup> This allows us to partially distinguish between households where doubling up occurs for economic reasons and higher income households whose adult children have not "fledged" yet. An example of the latter would be a recent college graduate with high-income parents and younger siblings who briefly returns home.

<sup>5</sup> There may be multiple related individuals filing within a household. Relative to the reference person, the first relative is the first parent, child, or sibling of the reference person who also files a tax return.

tax policy, we include region fixed effects.<sup>6</sup> and we include year fixed effects to control for any changes that occurred in tax policy over time. We cluster the standard errors on region to account for the possibility of spatial autocorrelation (Bertrand, Duflo, & Mullainathan, 2002).

Finally, using a difference-in-differences specification, we also exploit the change in EITC policy that took place in 2009. In that year, the EITC schedule for families with three or more children was increased, with a higher phase-in percentage and higher maximum credit. To our knowledge, this was the only change involving the number of dependents made in the tax rules over the period studied. We thus examine two groups before and after the rule change: those with an EITC-eligible filer under original modeling and those without. This model is identified based on the fact that the rule change would impact sorting incentives only for the eligible group. As long as the trend in the sorting incentive did not change for either group except through this rule change, the model should capture its effect. In this model, the dependent variable is a 1 when a household both sorts and at least one filer in the household claims exactly three children. Because it is possible to sort to three children only if there are three or more in the household, we limit the sample to such households for this analysis.

#### 4. Data

The data we used for this project were the matched CPS ASEC-IRS linked files for 2005 to 2010. IRS data included the universe of Form 1040 filers.<sup>7</sup> Census data included the CPS ASEC from 2006 to 2012, which provide information for the tax year preceding the survey year.

Records were linked in the Center for Administrative Records and Research (CARRA) at the U.S. Census Bureau. The linking process involves assigning to individuals in each data set a unique person identifier, called a Protected Identification Key (PIK). CARRA assigned these unique identifiers via the Person Identification Validation System (PVS), which employs probabilistic record linkage techniques (see Wagner and Layne (2014) for more information). CARRA uses personally identifiable information (PII) such as Social Security Number, name, date of birth, and address to assign a PIK by comparing the same fields in a master reference file constructed from federal administrative data sources. CARRA then removes the PII from the data file to anonymize the data and preserve confidentiality so it can be used for statistical purposes and research. Only those observations that received the unique key are used in the analysis.

Only certain variables from the 1040 are available for use. These include filing status, number of exemptions, wage and salary income, AGI, and number of dependent children claimed. We also have flags for certain schedules that the filer submitted, but we do not know values reported on the schedules. Importantly, we do not have a value for total tax burden or for other credits besides the EITC.

The steps in modeling EITC eligibility involve first modeling eligibility based solely on survey data. **We determine the number of qualifying children that a reference person claims according to survey answers, and assume this is the number that would be claimed for tax purposes.** This number is further refined by information from tax data. For example, we adjust the children claimable for a filer if the filer was claimed as a dependent by someone else, shifting the child to the person that claimed them. This is separate from sorting, as the relative filer is a dependent.

Once all of the modifications to modeled children are made,<sup>8</sup> we restrict the sample to only those households where there was at least one other adult tax filer who was related to, but not married to, the reference person. If the reference person was married and the spouse filed, all of the tax information was applied to the reference person. We then appended information from each other related filer in the household to the reference person (now also called the reference filer). In the vast majority of cases, there is a single adult relative in the household, whom we call the “first relative filer.” We then created our variable “sorter” as follows:

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<sup>6</sup> There are not enough year-state observations in the “sorter” category to include state fixed effects.

<sup>7</sup> This includes the entire family of Forms 1040, 1040-A, and 1040-EZ.

<sup>8</sup> For a full description of how our EITC eligibility modeling unfolds, see Plueger (2009).

We compared the number of children modeled in the CPS-ASEC to the number of children actually claimed on the 1040 by the reference filer, as well as by each related filer. **If the reference filer claimed more children than suggested in the Census data while a related filer claimed fewer children than modeled, we considered that household to have sorted children. Similarly, if the reference filer claimed fewer children than modeled while a related filer claimed more, we also considered that household to have sorted.**

In all analyses, the reference person in each household is the unit of observation, and our dependent variable is equal to 1 for reference filers in households that sorted and zero otherwise.

The main independent variable of interest is the optimal tax burden a household can achieve through sorting children. While we do not have a full tax model that can be run on restricted data at this time, the simulations on artificial data using TAXSIM showed that the optimal household tax burden is strongly determined by EITC amount. We use the eligibility modeling described before to create all of the possible EITC credit outcomes for each filer in the household if children are sorted. In the data, we observe sorting between the first filer and a maximum of three other relative filers, so we limit the number of modeling repetitions to 4 filers and 6 children. The number of times a simulation is run for a household is based on the possible combinations of filers and children, which is  $\frac{(n+r-1)!}{n!(r-1)!}$ , where  $n$  is the number of children and  $r$  is the number of filers.<sup>9</sup> For each combination, we capture the total household EITC achieved through that sorting, and in the end save the maximum amount possible. The difference between this and the total original modeled amount for the household is the main explanatory variable under consideration.

## 5. Results

### 5.1. Summary Statistics

We first looked at the predictors of whether or not a household included multiple related adult tax filers, and whether the incidence of multiple-related-filer households increased between tax years 2005 and 2010. We limited the sample to households in which at least one dependent child was modeled for someone in the household. Table 2 shows means for the variables used in the analysis and presents t statistics indicating whether or not the means are different between households with and without multiple adult tax filers. Reference persons in homes with multiple related filers tend to have lower AGI and to be older, and are more likely to be single, female, Black alone, Asian alone, and other or mixed race. They are less likely to be White alone or married. Finally, they tend to have lower levels of education than reference persons not in multiple-related-filer households. Panel B shows that the rate of multiple-related-filer households increased between 2005 and 2010 (changing from 10.5 percent of tax-filing households with one child or more to 12.6 percent), consistent with other studies on the subject.

In Table 3, multiple-filer households with reference persons who sort children are compared with those who do not. The incidence of sorting over the population of multifamily households is about 11 percent. Reference persons in sorting households are more likely to be single or head of household rather than married, and to be Black alone or other race rather than White alone or Asian alone. They also have lower AGI, are older, and have lower educational attainment than do reference persons in multiple-relative-filer, non-sorting households. In terms of household characteristics, sorting households have more filers and more children than non-sorting households, and they are less likely to have a child as the first filing relative and more likely to have a grandchild, sibling, or other relative.

This brings us to the composition, in terms of relatives, of sorting and non-sorting households. Table 4 shows the type of relative reported to the CPS by the reference person for the “first relative” and “second relative” in multiple-related-filer households. The only reason why some relatives are labeled “first” and others are “second” is due to the ordering of the coding for the variable in the survey data. For the vast majority of both groups, only one other adult related filer lives in the household. Non-sorting households were more likely

<sup>9</sup> The maximum number of repetitions is thus 84.

to have an adult child or a parent in the household, while sorters were more likely to have a grandchild or a relative in the “other” category. Sorters have a higher rate of having a second adult related filer compared with non-sorters (21 percent versus 14 percent). The most common configuration for households with more than one related filer is two children, followed by households with a parent and a sibling and those with a child and a relative in the “other” category. All other categories were represented less than 1 percent of the time in either sorting or non-sorting households. Sorters were more likely to have two or more relatives in the household, but the rates for certain configurations were statistically different between sorters and non-sorters while others were not. The rates that differ were households with two children, a child and a relative from the “other” category, a child and a grandchild, two siblings, or one sibling and a relative from the other category. Other configurations did not differ between types of households.

**TABLE 2. Summary Statistics of Variables Used in Model, Comparing Households With and Without Multiple Filers**

Panel A	Means		
	Without a relative filer	With a relative filer	t-statistic
AGI of reference person (log)	10.89	10.51	39.37
Dependent children	1.94	1.84	13.09
Single	0.04	0.19	-81.96
Married	0.72	0.59	38.09
Head of household	0.23	0.22	4.86
Age of reference person	40.60	48.28	-100.56
Female reference person	0.50	0.53	-7.77
White alone	0.83	0.76	24.37
Black alone	0.10	0.14	-15.65
Asian alone	0.04	0.06	-14.08
Other race	0.03	0.04	-9.69
Hispanic	0.13	0.21	-29.27
Less than high school	0.09	0.16	-33.29
High school graduate	0.26	0.33	-20.81
Some college	0.31	0.30	0.75
BA/BS or more	0.35	0.21	39.69
Panel B	Percentage of Households		
	Without a relative filer	With a relative filer	
2005	89.47	10.53	
2006	89.08	10.92	
2007	87.28	12.72	
2008	87.41	12.59	
2009	87.90	12.10	
2010	87.42	12.59	
<b>Total</b>	<b>88.10</b>	<b>11.90</b>	
Observations	147,229	19,897	

Source: CPS-ASEC/IRS linked file for tax years 2005–2010. The unit of observation is the CPS reference person. Included are all reference persons who filed a Form 1040 and who had a dependent child in their household.

**TABLE 3. Summary Statistics, Sorters Versus Non-Sorters Among Multi-Filer Households**

	Means		
	Non-Sorter	Sorter	t-statistic
AGI of reference person, log	10.56	10.12	11.51
Total AGI (log)	9.65	9.67	-0.68
Single	0.19	0.23	-4.49
Married	0.61	0.45	14.06
Head of household	0.21	0.32	-12.44
Age of reference person	48.17	49.14	-3.26
Age of first relative filer	31.21	31.00	0.61
Female reference person	0.52	0.58	-5.60
White alone	0.77	0.67	10.49
Black alone	0.12	0.23	-13.48
Asian alone	0.06	0.05	3.23
Other race	0.04	0.06	-3.23
Hispanic	0.20	0.28	-8.86
Less than HS	0.15	0.24	-10.92
High school graduate	0.33	0.37	-3.38
Some college	0.31	0.29	1.92
BA/BS or more	0.22	0.11	11.61
Child	0.70	0.66	3.32
Grandchild	0.01	0.03	-5.58
Parent	0.13	0.12	1.34
Sibling	0.06	0.08	-2.45
Other	0.10	0.12	-2.27
Number of dependent children	1.76	2.45	-28.28
Number of filers	1.17	1.25	-8.11
Observations	17,729	2,150	

Source: CPS-ASEC/IRS linked file for tax years 2005–2010. The unit of observation is the CPS reference person. Included are all reference persons who filed a Form 1040, who had a relative filer in their household, and who had a dependent child in their household.

**TABLE 4. Relative Composition of Sorting Versus Non-Sorting Households (Percentages)**

	Means	
	Non-Sorter	Sorter
Child alone	58.90	50.19
Grandchild alone	1.09	2.84
Parent alone	10.45	8.65
Sibling alone	5.48	5.91
Other alone	9.67	11.16
<b>Subtotal</b>	<b>85.59</b>	<b>78.75</b>
Child-child	8.22	12.00
Parent-sibling	1.59	1.91
Child-other	1.37	2.09
Other-other	0.52	0.60
Child-grandchild	0.50	0.98
Parent-other	0.40	0.70
Child-sibling	0.34	0.37
Sibling-sibling	0.33	0.70
Sibling-other	0.32	0.88
Child-parent	0.30	0.51
Parent-parent	0.24	0.42
<b>Subtotal</b>	<b>14.40</b>	<b>21.25</b>
Observations	17,729	2,150

Source: CPS-ASEC/IRS linked file for tax years 2005–2010. The unit of observation is the CPS reference person. Included are all reference persons who filed a Form 1040, who had a relative filer in their household, and who had a dependent child in their household. Relative filers were listed in order in the data based on their CPS code (thus, "child" was coded "4," "parent" coded "5," and so on). Categories were defined based on combinations of the first relative filer and the second relative filer listed. Categories that do not appear were represented by fewer than 6 persons in the "sorter" category; thus, the subtotal percentages do not sum to 100 percent.

## 5.2. Probit Results

The marginal effects from the probit models described in Section 3 are shown in Table 5. In each model, the dependent variable is 1 for reference persons in households that sort. The main explanatory variables are: modeled eligibility for the reference person or any related adult filer based on our original EITC eligibility modeling (models 1-4); the maximum number of related filers in a household possible under optimal sorting (models 5 and 6); the maximum total household EITC possible under optimal sorting (models 7 and 8); the difference between total household EITC and maximum possible EITC under optimal sorting (models 9 through 12). Odd-numbered models include characteristics for the reference person only, while even-numbered models include characteristics for the first relative filer and the household. The sample for models 11 and 12 is restricted to those households that included an EITC-eligible filer under original modeling.

Looking at the results of models 1 through 4, we see that a change for the reference person from non-eligible for EITC to eligible (under original modeling) is associated with a 0.04 increase in the probability of sorting when only reference person characteristics are included. This decreases slightly, to 0.03, when household characteristics are added to the model. When any other member of the household is eligible, the likelihood of sorting increases by about 0.05 when only reference filer characteristics are included and 0.04 when household characteristics are included. Turning to the models using dependent variables generated by our simulation, model 5 shows that as the number of potentially eligible filers in the household increases by 1, the propensity to sort increases by about 0.05 (0.03 when household characteristics are included). As predicted, the larger the possible household EITC, the more likely it is that the household will sort, and this result holds true for all households. Models 7 and 8 show that a 10 percent increase in simulated household EITC is associated with a 0.01 greater likelihood that a household will sort.

Interestingly, models 9 and 10 show that the *difference* between modeled and optimal EITC is not associated with sorting when looking at all households, with a reported marginal effect and standard error of 0. It should be noted, however, that we include all households with adult related filers, including those in which no filer is originally modeled as eligible for the EITC. When we limit the analysis to only those households

where at least one filer was eligible for EITC under original modeling (models 11 and 12), the coefficient on the difference is positive and statistically significant, indicating that a 10 percent increase in the difference is associated with about a 0.01 increase in sorting. These results, when taken together, may indicate the influence of information. In other words, sorting may occur only in households where at least one filer determines on his own—or through a paid preparer—that he is eligible for EITC, and the sorting takes place after the information is generated. The sample restriction may separate out cases in which the reference filers are not eligible for EITC due to high adjusted gross income, but have adult, filing children and younger children living in the same home. In such a household, if the reference filer is never eligible for EITC due to income, and a relative filer is never eligible due to not having children, the household may not have the information necessary to consider sorting.<sup>10</sup>

**TABLE 5. Probit Models Predicting Sorting Behavior.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Reference person eligible for EITC	0.05*** (0.00)	0.03*** (0.01)										
Relative eligible for EITC			0.05*** (0.00)	0.04*** (0.01)								
Maximum filers eligible					0.05*** (0.00)	0.03*** (0.00)						
Maximum per person EITC (log)							0.01*** (0.00)	0.01*** (0.00)				
EITC difference per person (log)									0.00 (0.00)	0.00 (0.00)	0.01* (0.00)	0.01* (0.00)
Reference person characteristics included	yes	yes	yes	yes	yes							
Household characteristics included	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Observations	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	9,017	9,017

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Source: CPS-ASEC/IRS linked file for tax years 2005-2010. Marginal effects are reported; clustered standard errors in parentheses. Also included in even-numbered models were fixed effects for year and region. The unit of analysis is the CPS reference person, and included are Form 1040-filing reference persons with at least one other related adult filer and at least one dependent child in the household. Columns 11 and 12 include only households in which a filer was modeled as eligible for the EITC. Eligibility for EITC is determined using the survey-reported number of dependents for the filers in the household. The dependent variable marks households that sort children among related adult Form 1040 tax filers, according to the definition described in the text.

Table 6 provides some evidence that the economic relationship between filers in sorting and non-sorting households may be different. For reference filers and first and second relative filers in sorting households, earnings are considerably less than in non-sorting households. Non-sorting reference filers earn \$22,000 more on average than sorting reference filers. More important, the difference between the earnings of reference filers and first relative filers in non-sorting households is much larger than in sorting households, indicating that reference filers in non-sorting households may see themselves as financial providers to these relatives, even if they no longer claim them for tax purposes.

### 5.3. Sorting to Exactly Three

Table 7 shows the results of the difference-in-differences analysis. As in Table 5, the odd-numbered models include only reference-person characteristics while the even-numbered include household characteristics. Here, the dependent variable is a 1 when a household sorts and at least one filer in the household claims exactly three children. The unit of analysis is again the reference person, and the standard errors are corrected by clustering

<sup>10</sup> The full set of results is reported in appendix Table A1. Also provided are the same models as the probits, but using OLS, in Table A2. The results of the probit models and linear probability models are similar.

at the region level. Because it is not possible to claim three children unless there are three or more children in the household, we limit the sample to households that meet this definition. We also control for the number of children—three or more—in the remaining households. All other control variables from the preceding model were included.

**TABLE 6. Earnings and Differences in Earnings Between Sorters and Non-Sorters**

	Non-Sorter	Sorter	t-statistic
Reference filer earnings	55,057.23	33,742.74	10.67
First relative filer earnings	20,351.31	18,321.55	3.14
Second relative filer earnings	20,138.69	19,775.68	0.35
Reference minus first filer earnings	36,125.81	17,127.17	8.96
Observations	17,729	2,150	

Source: CPS-ASEC/IRS linked file for tax years 2005-2010. The unit of observation is the CPS reference person. Included are all reference persons who filed a Form 1040, who had a relative filer in their household, and who had a dependent child in their household. Earnings were calculated using the 1040 wage and salary earnings, supplemented with W-2 wage information.

**TABLE 7. Difference-in-Differences Model**

Dependent variable equals 1 when a household sorts and at least one household filer claims three children, and 0 otherwise

	(1)	(2)	(3)	(4)	(5)	(6)
Eligible*post	0.07*** (0.01)	0.07*** (0.01)				
Post	0.02 (0.012)	0.01 (0.01)				
Eligible	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Eligible*2006			0.00 (0.02)	0.00 (0.02)	0.00 (0.02)	0.0 (0.02)
Eligible*2007			0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Eligible*2008			-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Eligible*2009			0.08* (0.23)	0.08* (0.021)	0.08* (0.023)	0.08* (0.021)
Eligible*2010			0.07* (0.022)	0.07* (0.022)	0.07* (0.022)	0.07* (0.022)
Reference person characteristics	yes	yes	yes	yes	yes	yes
Household characteristics	no	yes	no	yes	no	yes
Year fixed effect	no	no	yes	yes	yes	yes
Linear time trend	no	no	no	no	yes	yes
Observations	4,039	4,039	4,039	4,039	4,039	4,039

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Source: CPS-ASEC/IRS linked file for tax years 2005-2010. Clustered standard errors in parentheses. Also included were region fixed effects. The unit of analysis is the CPS reference person, and included are Form 1040-filing reference persons with at least one other adult related filer and at least three dependent children in the household. The dependent variable is an interaction of "sorter," defined in the text, and a marker equal to 1 when any filer in the household claims exactly three children. The first three rows describe the results of a difference-in-differences model where the post period is defined as year 2009 or later.

In the simple difference-in-differences, reported in columns 1 and 2, the coefficient of interest is the interaction term *Eligible\*post*, which indicates how much sorting to exactly three children increased in the post period for EITC eligible households compared with EITC-ineligible households. In the post period, sorting to three children increased about 7 percent for eligible households compared to those ineligible.<sup>11</sup>

<sup>11</sup> The full results appear in appendix Table A3.

In the interest of completeness, some alternative specifications are offered. Columns 3 and 4 report results when the eligibility marker is interacted with a year fixed effect, giving the difference in reporting by year. The coefficients on the interaction terms indicate that the increase in sorting to exactly three did not differ in a significant way between 2009 and 2010, the two years in the data when the rule was in effect. The coefficients from models 2 and 4 do not change in models 5 and 6 when we include a linear time trend in the model.

This increase in sorting to three children provides some supporting evidence that sorting in general is a behavior that occurs in direct response to tax rules, as opposed to being an artifact of the optimization exercise. Because the sorting incentive changed only for EITC-eligible families, the most plausible explanation for the increase is that tax filers—or, more likely, tax preparers—took advantage of the new rule to improve the return for large households.

## 6. Conclusion

The analysis presented in this paper is the first that we know of to examine the sorting of dependents in multi-family households. The results add to our knowledge about a particular type of tax-avoidance behavior—that of intra-family arbitrage—that has in general received little attention in the literature. This work also contributes to research recently conducted on tax-filing behavior that takes advantage of discontinuities and other incentives in the income tax laws of the United States. Our topic is particularly relevant at present due to the increasing incidence of households “doubling up” during the Great Recession.

Our results indicate that households with more potential EITC-eligible filers and more children are also more likely to sort. Moreover, households with at least one filer who was eligible for the EITC in initial modeling were more likely to sort when the benefit, measured as maximum possible EITC minus total modeled EITC, was larger. However, in households where no one was eligible for EITC in initial modeling, no sorting occurred in connection with an EITC increase. This gives some indication of an information effect, since presumably higher income filers or those without children are not likely to know about eligibility rules. In looking at the difference in earnings between filers in households, sorting was associated with households where filers' earnings were closer in value, indicating that the economic relationship between filers in sorting households differs from those in non-sorting households.

Our analysis has several limitations. First, based on the survey data available, we are making an assumption that all households with multiple adult filers live together for the purposes of combining resources, and that they lived together for the tax year. Thus, we are comparing households that are truly multi-family over the tax year with those that may simply have a relative staying with them for a short time without any combining of household resources. It is difficult to distinguish between two such households without panel data, since both the survey data and the tax data provide information on where a filer was living at or around the time of filing. Moreover, our analysis begins and ends with our eligibility modeling for the EITC. Using the information given to us by survey respondents, we do our best to correctly assign dependents, and then compare that information to what the respondents claimed on their taxes. While we take the survey information as the true basis for determining which dependents belong to whom, there is the chance that the tax information reported on the income tax return is actually true. On the other hand, an analysis of sorting behavior when exactly three children are claimed provides some support that we are finding a true effect and not an artifact of our data or our modeling.

In spite of these limitations, the results of the analysis add to our understanding of how multi-family households navigate the tax and transfer system and use quirks in the rules to their advantage. Because the benefit of sorting is often large, differences between refunds under sorting may mean that a household escapes the standard definition of poverty. The fact that sorting occurs only in households where at least one filer is originally modeled as eligible for EITC further adds to our understanding of how tax rules are communicated within households, and between tax preparers and filers. And last, as with any tax avoidance, the avoidance of income taxes through dependent sorting has implications for public finance and equity in taxation. Understanding this behavior should inform any investigation into the resources of complex households, including modeling for the alternative poverty measure or determining the nature of responsibility for children in households that pool resources.

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## Appendix: Expanded Material

TABLE A1. Full Probit Models Predicting Sorting Behavior. Dependent Variable Equals 1 When a Household Sorts and 0 Otherwise

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Eligible for EITC, reference person	0.05*** (0.00)	0.03*** (0.01)										
Eligible for EITC, relative			0.05***	0.04***								
Maximum filers eligible					0.05***	0.03***						
Max per person EITC (log)							0.01***	0.01***				
EITC difference per person (log)									0.00 (0.00)	0.00 (0.00)	0.01* (0.00)	0.01* (0.00)
AGI of reference person	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Single	0.03*** (0.01)	0.04*** (0.01)	0.03*** (0.01)	0.04*** (0.01)	0.03*** (0.01)	0.04*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.00 (0.01)	0.00 (0.01)
Head of Household	0.04*** (0.01)	0.04*** (0.01)	0.05*** (0.00)	0.05*** (0.00)	0.04*** (0.01)	0.04*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.04*** (0.01)
Age of reference person	0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)									
Female reference person	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.01)	0.00 (0.01)						
Black alone	0.05*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.05*** (0.01)	0.05*** (0.01)							
Asian alone	0.00 (0.01)	-0.01 (0.01)	0.00 (0.01)	-0.01 (0.01)	0.01 (0.01)	-0.01 (0.01)	0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)	-0.02 (0.02)	-0.02 (0.02)
Other race	0.03*** (0.01)	0.02* (0.01)	0.03*** (0.01)	0.02 (0.01)	0.03*** (0.01)	0.02* (0.01)	0.04*** (0.01)	0.03** (0.01)	0.04*** (0.01)	0.03** (0.01)	0.03 (0.02)	0.03 (0.02)
Hispanic	0.04*** (0.00)	0.02** (0.01)	0.03*** (0.01)	0.02* (0.01)	0.03*** (0.01)	0.02* (0.01)	0.04*** (0.00)	0.03** (0.01)	0.04*** (0.00)	0.03*** (0.01)	0.01 (0.01)	0.01 (0.01)
High School graduate	-0.03*** (0.01)	-0.02* (0.01)	-0.03*** (0.01)	-0.02** (0.01)	-0.03*** (0.01)	-0.02* (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.03** (0.01)	-0.03* (0.01)
Some college	-0.04*** (0.00)	-0.03*** (0.00)	-0.05*** (0.00)	-0.03*** (0.00)	-0.04*** (0.00)	-0.03*** (0.00)	-0.05*** (0.00)	-0.04*** (0.00)	-0.05*** (0.00)	-0.04*** (0.00)	-0.05*** (0.01)	-0.04*** (0.01)
BA/BS or more	-0.08*** (0.01)	-0.07*** (0.01)	-0.09*** (0.01)	-0.07*** (0.01)	-0.08*** (0.01)	-0.07*** (0.01)	-0.09*** (0.01)	-0.08*** (0.01)	-0.09*** (0.01)	-0.09*** (0.01)	-0.09*** (0.02)	-0.08*** (0.02)
Total AGI (log)		0.00 (0.00)		0.00 (0.00)		0.00 (0.00)		0.00 (0.00)		0.00* (0.00)		0.00 (0.00)
Child		-0.02 (0.01)		-0.02 (0.01)		-0.02* (0.01)		-0.03* (0.01)		-0.03 (0.01)		-0.01 (0.02)

Footnotes at end of table.

**TABLE A1. Full Probit Models Predicting Sorting Behavior. Dependent Variable Equals 1 When a Household Sorts and 0 Otherwise—Continued**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grandchild		0.01 (0.02)		0.01 (0.02)		0.01 (0.02)		0.00 (0.02)		0.00 (0.02)		0.00 (0.05)
Parent		0.00 (0.02)		0.00 (0.02)		-0.00 (0.02)		-0.01 (0.02)		-0.01 (0.02)		0.01 (0.03)
Other		0.01 (0.02)		0.01 (0.02)		0.01 (0.02)		0.02 (0.02)		0.01 (0.02)		0.03 (0.02)
Age of first relative		-0.00 (0.00)		-0.00 (0.00)		0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)
State EITC (log)		-0.00 (0.00)		0.00*** (0.00)		0.00 (0.00)		0.01*** (0.00)		0.01*** (0.00)		-0.00 (0.00)
State minimum wage (log)		0.04 (0.02)		0.09* (0.05)								
Year=2006		-0.02 (0.01)		-0.02* (0.01)		-0.02 (0.01)		-0.02* (0.01)		-0.02* (0.01)		-0.04* (0.02)
Year=2007		-0.02 (0.01)		-0.04 (0.02)								
Year=2008		-0.03* (0.01)		-0.06** (0.02)								
Year=2009		-0.03* (0.01)		-0.03* (0.01)		-0.03* (0.01)		-0.03* (0.01)		-0.03 (0.01)		-0.06** (0.02)
Year=2010		-0.03* (0.02)		-0.03 (0.02)		-0.03 (0.02)		-0.03* (0.02)		-0.03 (0.02)		-0.06*** (0.02)
New England		-0.02*** (0.00)		-0.04*** (0.00)								
Southeast		0.02*** (0.00)		0.02*** (0.00)		0.02*** (0.00)		0.02*** (0.00)		0.03*** (0.00)		0.01* (0.00)
East Central		0.01*** (0.00)		0.02*** (0.00)		0.01*** (0.00)		0.02*** (0.00)		0.02*** (0.00)		0.01** (0.00)
North Central		-0.01*** (0.00)		-0.01*** (0.00)		-0.01*** (0.00)		-0.01** (0.00)		-0.00 (0.00)		-0.01* (0.00)
Southwest		0.03*** (0.00)		0.03*** (0.00)		0.03*** (0.00)		0.04*** (0.00)		0.04*** (0.00)		0.02*** (0.01)
West		0.00 (0.00)		0.01 (0.00)		0.00 (0.00)		0.02*** (0.00)		0.02*** (0.00)		-0.00 (0.01)
Number of dependent children		0.04*** (0.00)		0.02*** (0.01)								
Number of filers		0.02*** (0.00)		0.02*** (0.01)								
Observations	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	9,016

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.

Source: CPS ASEC-IRS linked file for tax years 2005-2010. Marginal effects are reported; clustered standard errors in parentheses. The unit of analysis is the CPS reference person, and included are 1040-filing reference persons with at least one other adult related filer and at least one dependent child in the household. Columns 11 and 12 include only households in which a filer was modeled as eligible for the EITC. Eligibility for EITC is determined using the survey-reported number of dependents for the filers in the household. The dependent variable marks households that sort children among adult related 1040 tax filers, according to the definition described in the text.

TABLE A2. OLS Models Predicting Sorting Behavior. Dependent Variable Equals 1 When a Household Sorts and 0 Otherwise

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Eligible for EITC, reference person	0.05*** (0.01)	0.04*** (0.01)										
Eligible for EITC, relative			0.06*** (0.00)	0.04*** (0.01)								
Maximum filers eligible					0.05*** (0.00)	0.03*** (0.00)						
Max per person EITC (log)							0.01** (0.00)	0.01** (0.00)				
EITC difference per person (log)									0.00 (0.00)	0.00 (0.00)	0.01* (0.00)	0.01* (0.00)
AGI of reference person	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.01 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Single	0.03** (0.01)	0.04*** (0.01)	0.02* (0.01)	0.04** (0.01)	0.03** (0.01)	0.04** (0.01)	0.03** (0.01)	0.02* (0.01)	0.03** (0.01)	0.02* (0.01)	0.00 (0.01)	0.00 (0.01)
Head of Household	0.04*** (0.01)	0.05*** (0.01)	0.06*** (0.01)	0.05*** (0.01)	0.04** (0.01)	0.04* (0.01)						
Age of reference person	0.00** (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)						
Female reference person	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.01)	0.00 (0.01)
Black alone	0.07** (0.01)	0.06** (0.01)	0.06** (0.01)	0.06** (0.01)	0.06** (0.01)	0.06** (0.01)	0.07** (0.02)	0.06** (0.01)	0.07** (0.01)	0.07** (0.01)	0.05* (0.02)	0.05* (0.02)
Asian alone	0.00 (0.01)	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.01 (0.01)	0.02 (0.02)	0.02 (0.02)
Other race	0.04* (0.01)	0.02 (0.01)	0.04* (0.01)	0.02 (0.01)	0.04* (0.01)	0.02 (0.01)	0.04* (0.01)	0.03* (0.01)	0.04* (0.01)	0.03* (0.01)	0.03 (0.02)	0.03 (0.02)
Hispanic	0.04*** (0.00)	0.02* (0.01)	0.04*** (0.01)	0.02* (0.01)	0.04*** (0.01)	0.02* (0.01)	0.04*** (0.01)	0.03** (0.01)	0.04*** (0.01)	0.03** (0.01)	0.01 (0.01)	0.01 (0.01)
High School graduate	-0.03** (0.01)	-0.02* (0.01)	-0.04** (0.01)	-0.02* (0.01)	-0.03** (0.01)	-0.02* (0.01)	-0.04** (0.01)	-0.04** (0.01)	-0.04** (0.01)	-0.04** (0.01)	-0.03* (0.01)	-0.03 (0.01)
Some college	-0.05*** (0.01)	-0.03** (0.01)				-0.03** (0.01)					-0.05* (0.01)	-0.05* (0.01)
BA/BS or more	-0.08*** (0.01)										-0.08** (0.02)	-0.08** (0.02)
Total AGI (log)		0.00 (0.00)		0.00 (0.00)		0.00 (0.00)		0.00 (0.00)		0.00 (0.00)		0.00 (0.00)
Child		-0.02 (0.02)		-0.02 (0.02)		-0.03 (0.01)		-0.03 (0.02)		-0.03 (0.02)		-0.01 (0.02)

Footnotes at end of table.

**TABLE A2. OLS Models Predicting Sorting Behavior. Dependent Variable Equals 1 When a Household Sorts and 0 Otherwise—  
Continued**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grandchild		0.02 (0.03)		0.02 (0.03)		0.02 (0.03)		0.01 (0.03)		0.02 (0.03)		-0.00 (0.06)
Parent		0.00 (0.02)		-0.00 (0.02)		-0.01 (0.02)		-0.01 (0.02)		-0.01 (0.02)		0.01 (0.03)
Other		0.01 (0.02)		0.01 (0.02)		0.01 (0.02)		0.02 (0.02)		0.02 (0.02)		0.03 (0.03)
Age of first relative		-0.00 (0.00)		-0.00 (0.00)		0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)
State EITC (log)		-0.00 (0.00)		0.00* (0.00)		0.00 (0.00)		0.01** (0.00)		0.01** (0.00)		-0.00 (0.00)
State minimum wage (log)		0.04 (0.02)		0.04 (0.02)		0.04 (0.02)		0.04 (0.02)		0.04 (0.02)		0.09 (0.05)
Year=2006		-0.02 (0.01)		-0.02 (0.01)		-0.02 (0.01)		-0.02 (0.01)		-0.02 (0.01)		-0.04 (0.02)
Year=2007		-0.02 (0.01)		-0.02 (0.01)		-0.02 (0.01)		-0.02 (0.01)		-0.02 (0.01)		-0.03 (0.02)
Year=2008		-0.03 (0.01)		-0.03 (0.01)		-0.03 (0.01)		-0.03* (0.01)		-0.03 (0.01)		-0.05* (0.02)
Year=2009		-0.03 (0.01)		-0.03 (0.01)		-0.03 (0.01)		-0.03 (0.01)		-0.02 (0.01)		-0.05* (0.02)
Year=2010		-0.03 (0.01)		-0.03 (0.01)		-0.03 (0.01)		-0.03 (0.01)		-0.03 (0.01)		-0.06** (0.01)
New England		-0.02** (0.00)		-0.02** (0.00)		-0.02** (0.00)		-0.02** (0.00)		-0.02** (0.00)		
Southeast		0.02*** (0.00)		0.03*** (0.00)		0.02*** (0.00)		0.03*** (0.00)		0.03*** (0.00)		0.01* (0.00)
East Central		0.01*** (0.00)		0.02*** (0.00)		0.01*** (0.00)		0.02*** (0.00)		0.02*** (0.00)		0.01 (0.00)
North Central		-0.01* (0.00)		-0.01* (0.00)		-0.01* (0.00)		-0.00 (0.00)		-0.00 (0.00)		-0.01 (0.01)
Southwest		0.03*** (0.00)		0.03*** (0.00)		0.03*** (0.00)		0.04*** (0.00)		0.04*** (0.00)		0.03** (0.01)
West		0.00 (0.00)		0.01 (0.00)		0.00 (0.00)		0.01* (0.00)		0.02* (0.00)		-0.00 (0.01)
Number of dependent children		0.06*** (0.00)		0.06*** (0.00)		0.05*** (0.00)						
Number of filers		0.02** (0.00)		0.02** (0.00)		0.02** (0.01)						
Constant	0.08 (0.04)	-0.15* (0.05)	0.12* (0.04)	-0.12* (0.05)	0.03 (0.03)	-0.18** (0.04)	0.09* (0.04)	-0.03 (0.04)	0.13** (0.03)	0.03 (0.05)	0.13** (0.02)	-0.03 (0.10)
Observations	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	19,878	9,016

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.

Source: CPS ASEC-IRS linked file for tax years 2005-2010. Coefficients are reported; clustered standard errors in parentheses. The unit of analysis is the CPS reference person, and included are 1040-filing reference persons with at least one other adult related filer and at least one dependent child in the household. Columns 11 and 12 include only households in which a filer was modeled as eligible for the EITC. Eligibility for EITC is determined using the survey-reported number of dependents for the filers in the household. The dependent variable marks households that sort children among adult related 1040 tax filers, according to the definition described in the text.

**TABLE A3. Difference-in-Differences Models; Dependent Variable Equals 1 When a Household Sorts and at Least One Household Filer Claims Three Children, 0 Otherwise**

	(1)	(2)	(3)	(4)	(5)	(6)
Eligible*post	0.07** (0.01)	0.07*** (0.01)				
Post	0.02 (0.01)	0.01 (0.01)				
Eligible	-0.00 (0.00)	-0.01 (0.00)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Eligible*2006			0.00 (0.02)	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Eligible*2007			0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Eligible*2008			-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Eligible*2009			0.08* (0.02)	0.08** (0.02)	0.08* (0.02)	0.08** (0.02)
Eligible*2010			0.06* (0.02)	0.07* (0.02)	0.06* (0.02)	0.07* (0.02)
AGI of reference person	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Single	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Head of Household	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Age of reference person	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)
Female reference person	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Black alone	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Asian alone	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Other race	0.01 (0.02)	0.01 (0.01)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)
Hispanic	0.02 (0.02)	0.02 (0.01)	0.03 (0.02)	0.03 (0.02)	0.03 (0.02)	0.03 (0.02)
High School graduate	0.00 (0.01)	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
Some college	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
BA/BS or more	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)
New England	0.01* (0.00)	0.00 (0.00)	0.00* (0.00)	-0.00 (0.01)	0.00* (0.00)	-0.00 (0.01)
Southeast	-0.01*** (0.00)	-0.02** (0.00)	-0.01*** (0.00)	-0.01* (0.00)	-0.01*** (0.00)	-0.01* (0.00)
East Central	0.01*** (0.00)	0.00* (0.00)	0.01*** (0.00)	0.01* (0.00)	0.01*** (0.00)	0.01* (0.00)



# RAS Affordable Care Act Microsimulation Model

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and Brock Ramos (IRS, Research, Analysis, and Statistics)*

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## Introduction

Implementation of the Patient Protection and Affordable Care Act (ACA) changes the health insurance landscape in the U.S., affecting businesses and individuals. ACA creates new responsibilities for taxpayers, employers, and State and Federal Governments. It also enhances the role of the Internal Revenue Service (IRS) in its administration of subsidies to purchase health insurance and payments in lieu of meeting coverage requirements. In carrying out its new administrative responsibilities, the IRS will interface with the Department of Health and Human Services (HHS) and the new Exchanges to share information. Quantitative estimates of employer-sponsored health insurance (ESI) offers and individual decisions to obtain health insurance coverage under the new ACA regime are essential inputs to guide the development of IRS systems, business processes, forms, and outreach programs to meet new responsibilities for administering subsidies and payments under the Act. Even more fundamentally, IRS seeks to understand behavior surrounding health insurance and respond with informed program design and administration.

To understand the potential implications of ACA on agency volume and workload, IRS Research Analysis and Statistics (RAS) undertook three progressive research steps:

- **Review of the Literature.** In 2010, RAS began a review of the relevant health insurance literature within the context of ACA. This review explored the key behavioral decisions for individuals in obtaining health insurance and how ACA sought to influence them, as well as driving factors in the success of credits and outreach.
- **Review Third-Party Models and Plausible Estimates.** Given the complexities of healthcare policy, several microsimulation models of the United States healthcare system have been developed. These models allow researchers to estimate outcomes based on employer, individual, and family behaviors as they relate to the decision to offer and take-up health insurance. Government agencies, including the Congressional Budget Office (CBO) and the Treasury Office of Tax Analysis (OTA), as well as private organizations such as The Lewin Group, the Urban Institute (UI), and RAND, have built major simulations over years. IRS explored these models and leveraged their estimates for initial planning purposes.
- **Design and Develop a Microsimulation Model.** In 2012, RAS collaborated with IBM and Brian Erard & Associates to build a microsimulation model for tax administration planning purposes. This model allows IRS to model administrative impacts of the new legislation and assess likely outcomes and workload volumes, supported by studies and research. This model fulfilled a unique role in two respects: first, it allowed IRS to perform ‘what if’ analysis; and second, it reported results at the tax return level. The RAS Model provides a return-based data file representing nonelderly taxpayers and their characteristics, including imputed health insurance and customer service usage. The model outputs statistics on the number of returns in different health insurance status categories (Employer Sponsored Insurance (ESI), Private, Public, Uninsured, and Exchange)—both before and after implementation of key ACA tax provisions—the number of employers offering ESI post-reform, the number of returns reporting the individual shared responsibility payment (ISRP), and the number of returns reconciling the premium tax credit (PTC).

The estimates will better prepare IRS to meet the workload demands, informing future implementation, budget, and resource allocation decisions.

This paper describes the model and foundational studies undertaken prior to design. We provide some short background on health insurance and its representation in microsimulation models. Then we discuss the model that was built for IRS and its outputs.

## Microsimulation Models for Health Insurance

Over the last two decades, several microsimulation models have been built to describe the U.S. health insurance ecosystem. Starting from a microsimulation foundation with either tax or health data, these models predict future health-care coverage under ACA. Two are maintained by government agencies: The Congressional Budget Office's Health Insurance Simulation Model<sup>1</sup> (hereafter called simply CBO) projects impacts of current legislation, while Treasury Office of Tax Analysis (OTA) serves as the source for executive branch estimates. Both of these models focus on the implications of the law for public revenue. Alternative third-party microsimulation models also include those developed by Jonathan Gruber at MIT, the Urban Institute's Health Information Policy Simulation Model (which we refer to as UI), The Lewin Group's Health Benefits Simulation Model (Lewin);<sup>2</sup> and RAND's COMPARE Model (RAND).<sup>3</sup>

Microsimulation models are a popular technique to examine public policy impacts. They are classified by their focus on individual, representative records, to which rules and behaviors are applied. Figure 1 summarizes the four main components of models, as adapted from Abraham, 2012.<sup>4</sup>

**FIGURE 1. Health Policy Microsimulation Model Components**



Under this project, multiple third-party models were compared and contrasted across these dimensions. While there are similarities in terms of the underlying data sources and assumptions, the models also have important differences. These variations reflect differences in a number of design choices and assumptions, such as: the choice of base data, assumptions about exchange viability and availability (policy decisions as yet to be determined), participation parameter assumptions, and elasticity or utility-based frameworks. Authors exploring the prominence of analytic models in the health policy field suggest that such large variance in the models' point estimates is common. Glied and Tilipman (2010)<sup>5</sup> conclude that models, reflecting the uncertainty of source surveys and modeling decisions, generally have proven accurate within 30 percent of actual program consequences. Despite this rather high level of uncertainty, the authors conclude that the models can still be quite helpful to policymakers and administrators. Namely, they provide an understanding about the range of results, while generating insights into key dynamics and the leverage of various assumptions.

In 2012, IRS began the development of its own administrative model for two primary reasons. First, the individual-based (rather than tax return-based) output and policy focus of existing models was not well suited for understanding the impact of changes in employer and taxpayer behavior on IRS workload volumes in administering tax-related ACA provisions (such as the PTC and ISRP) and assisting taxpayers with meeting their responsibilities under these provisions. Second, it was apparent from the existing models that plausible alternative behavioral assumptions sometimes led to widely different predicted outcomes. IRS therefore sought a simulation model that could perform 'what if' analyses to understand the potential impacts of alternative scenarios on key workload parameters. The resulting RAS-ACA Model is a microsimulation model that provides a flexible platform to support the IRS for future years as actual data is acquired.

<sup>1</sup> CBO technical documentation: <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/87xx/doc8712/10-31-healthinsurmodel.pdf>.

<sup>2</sup> Lewin report publications can be found at <http://www.lewin.com/publications/?published=anytime&expertiseid={99087FB4-3394-4446-9BAE-980833611DE7}>.

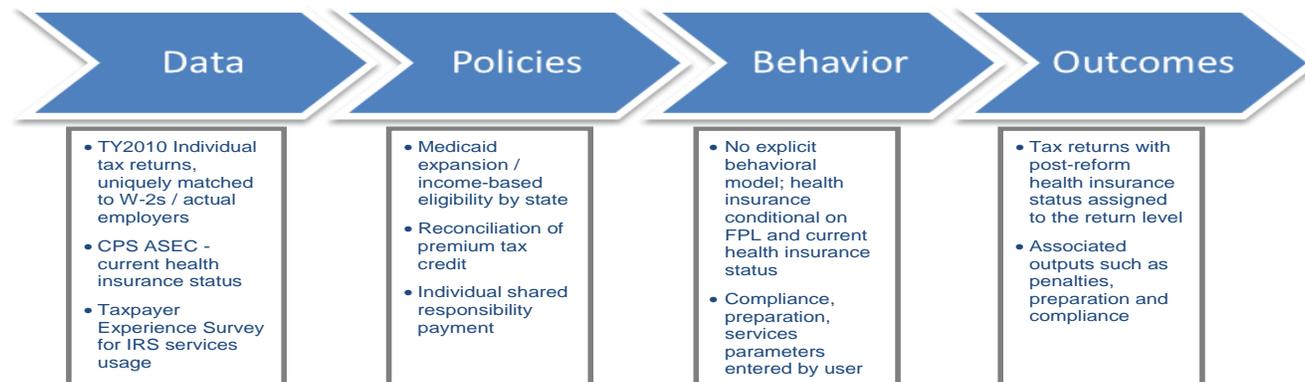
<sup>3</sup> RAND COMPARE model related publications can be found at <http://www.rand.org/health/projects/compare/publications/coverage.html>.

<sup>4</sup> Adapted from Abraham, J. (2012). Predicting the Effects of the Affordable Care Act: A Comparative Analysis of Health Policy Microsimulation Models, State Health Reform Assistance Network Policy Brief.

<sup>5</sup> Glied, Sherry and Nicholas Tilipman. Simulation Modeling of Health Care Policy. Annual Review of Public Health. 2010. n.p. <http://www.biomedsearch.com/nih/Simulation-modeling-health-care-policy/20235853.html>.

In designing the model, IRS relied on the best practices of existing models without replicating unnecessary elements. The final design is summarized across the four dimensions, as indicated in Figure 2. Each element is discussed in this paper.

**FIGURE 2. IRS RAS-ACA Microsimulation Model Components**



## Data

Microsimulation involves studying the interaction of many complex, interrelated variables within one data file. To simulate health insurance policy, models rely on several types of data: demographic/population data; employer offering information; insurer offerings/premium prices and coverage, as well as medical expenditures. All models must integrate or match data from several sources since all of the variables required are seldom available solely from one source. Our model is simpler in that we focus on just three outcomes (exchange coverage, any other coverage, and no coverage) without a detailed behavioral model, and therefore we do not include medical costs or premium elasticities.

A critical feature of a microsimulation model is the quality of its input data source. This rich input file represents real, record-by-record data with a variety of fields, serving as the foundation onto which imputations and calculations are performed to create the final file. Successful models strike a careful balance between many of the desirable features of an input file:

- Representative of the underlying population—ideally at granular levels (ex., State-level, county-level) and subgroups of interest;
- Rich in relevant descriptive and predictive variables; and
- Usually a sample, for reasonable run times (small and tractable).

Common choices for the core data file are nationally representative data files such as the Current Population Survey's Annual Social and Economic Supplement (CPS ASEC—used by Urban Institute and Jonathan Gruber) or the Survey of Income and Program Participation (SIPP—used by CBO and RAND).

We focus on taxpayers, so we use IRS Compliance Data Warehouse (CDW) records as our base. To represent the complexity of the healthcare landscape, we select three key administrative data sources to capture the important linkages between employers and employees. The first source is employer records, public and private, from payroll records (Forms 941, 943, 944). Government entities file a payroll tax form and thus are included in our sample, although they do not file an annual tax return. The latest data year available was Tax Year 2010, which is used consistently for all data pulls. The employers in these files are linked to employees through a match to our second key data source: W-2 records. The employees (along with the information extracted about their employers) are then matched to our third key data source: individual income tax returns. Through this process, we match information from 131 million individual non-dependent returns, 5.1 million employer returns, and 216 million W-2 filings. Our starting population of individuals comes from tax returns, which restricts the population to filers. Nonfiling employees are identified by matching W-2 records to individual income tax returns, yet we focus only on filers in the model.

**Sampling:** To select a sample of employers and their employees, we undertake a two-stage cluster sampling approach. Under this approach, we begin by drawing a stratified random sample of employers from the relevant population of either private or government employers; very large employers are sampled with certainty. In the second stage we draw a sample of employees from each of the sampled employers. We include an increasing number of employees for the sample as the size of the employer increases. We sample all workers from smaller establishments in an effort to

carefully model participation in ESI and other health insurance options for such workers. In the case of larger establishments, we felt that the increased sample sizes would be sufficiently large to represent health insurance participation among all employees. Two main stratifiers are used in selecting employers; size and employer type. Size of the firm is derived using a combination of two measures: average employees (as reported on payroll forms) and a count of W-2 employees, which represent anyone employed throughout the year. Our sampling strata include 12 size categories and 3 employer types: Private, Federal Government, and State & Local Government. Once the selection of employees is complete, we match them to their individual income tax returns (when present). We then supplement our data file by including employer information for the spouse (where the primary filer is the employee matching to an employer from our sample) and for the primary filer (where the spouse is the employee matching to an employer from our sample). Finally, we exclude returns from our sample in which the primary filer (and the spouse, in the case of joint returns) age 65 or over.

To account for those without wage income (those taxpayers who did not have an employer), we draw a stratified random sample from the sub-population of individual income tax returns of nonelderly filers with no reported wage earnings. The strata are based on the Federal poverty level (FPL) measure of income, the presence of earnings from self-employment, and the presence of pension or social security earnings. We oversample those with FPL in the PTC range, especially those with retirement or self-employment income. As the majority of these individuals do not have ESI, they are likely candidates for the PTC.

**TABLE 1. Combined Sample of Employers, Individuals and Returns**

Employer Type	Number of Employers	Number of Individuals	Number of Returns
Private	19,052	360,085	–
Government	826	76,424	–
Nonwage Earners	–	–	33,380
<b>Total</b>	<b>19,878</b>	<b>436,509</b>	<b>33,380</b>

**Imputations for Health Insurance:** In the future, IRS will receive information from all employers regarding their ESI offer status. For the current project, however, it is necessary to impute this status.

Our approach relies on tabulations of ESI offer status by employer characteristics in the Medical Expenditure Panel Survey Insurance Component (MEPS-IC) for 2010. In the case of private employers, the MEPS-IC provides a breakdown of ESI offer rates by establishment size and industry. By applying these offer rates to the overall counts of employers within each size and industry category, we arrive at the target number of employers in each category to be assigned to offer ESI. In the case of State and local government employers, the MEPS-IC provides separate breakdowns of ESI offer rates by employer size and by Census region. Within each category, we begin by assigning ESI offer status to employers that appear to provide ESI based on their filing of a report of an employee health insurance plan on Form 5500, claim of a health insurance premium credit on Form 8941, or claim of a deduction (over \$100) on their income tax return for employee benefit program expenditures. We then randomly assign additional employers within that category to offer ESI to approximately achieve the target number of offering employers. We assign all Federal employers in our sample to offer ESI.

In addition to imputing ESI offer status for employers in our sample, we also impute current health insurance status to each return in our sample. For a small portion of the returns in our sample, we are able to predict the likely health insurance status based on claims of a health savings account or self-employed health insurance expense deduction. For the remaining returns, we have developed and implemented an econometric methodology for our imputations based on the 2011 CPS ASEC (which contains information about earnings in 2010).

For this project, we assign a return-based measure of health insurance status based on the status of the primary taxpayer and, in the case of joint returns, the spouse. The CPS ASEC includes an indicator for the imputed individual income tax return filing status for each household in the sample (one of the imputed statuses is nonfiler). We restrict our attention to imputed filers who are under age 65 (or in the case of married joint-filing status, who have a spouse under age 65). To derive our return-based measure of health insurance status, we begin by identifying the health insurance status of the primary filer and, in the case of joint returns, the spouse (some hierarchies are employed to resolve

multiple forms of health insurance) and whether ESI is attributed to the primary or spouse. This provides us with an imputed indicator for four categories of health insurance status to our return-level database:

1. ESI
2. Private
3. Public
4. Uninsured

We estimate separate models for wage and nonwage earners.

**Wage Earners:** For wage-earner returns, we begin by estimating a model for the probability of ESI coverage status among nonelderly ASEC returns with wage earnings. Although some taxpayers who currently work for an employer that does not offer ESI still receive ESI coverage (typically, through a former employer), ESI coverage tends to be much more likely among workers whose employers do offer ESI. Unfortunately, the ASEC does not identify whether the respondent's employer offers ESI. Rather, we only observe whether ESI is received. To address this problem, we employ a bivariate probit model with partial observability:

$$\begin{aligned} P_O^* &= \beta_O' x_O + \epsilon_O \\ P_{R|O}^* &= \beta_R' x_R + \epsilon_R \\ \Pr(R|\bar{O}) &= 0.20, \end{aligned}$$

where  $P_O^*$  is a latent variable for the propensity of the employer to offer ESI,  $P_{R|O}^*$  is a latent variable for the conditional propensity for a return to have ESI coverage status given that the employer offers ESI, and  $\Pr(R|\bar{O})$  represents the conditional probability that a return has ESI coverage status given that the employer does not offer ESI. This latter conditional probability is set equal to 0.20, which is roughly consistent with the likelihood of a nonwage earner return having ESI status in the ASEC return population. In this model, the  $x$  terms represent vectors of explanatory variables, the  $\beta$  terms represent vectors of coefficients to be estimated, and the  $\epsilon$  terms are random disturbances assumed to be normally and independently distributed. We do not observe the latent variables, and we do not observe whether the employer offers ESI. Rather, we observe only an indicator for whether a return has ESI coverage status; this is the source of partial observability. Although this model can be estimated using only the ASEC data, accumulated experience with partial observability models suggests that the performance of such an approach in identifying the propensity for an employer to offer ESI is likely to be subpar. Consequently, we have employed an alternative approach that incorporates additional information about the likelihood of an ESI offer.

Recall that the imputed measure of employer ESI-offer status in our return-level database was derived at the employer level from a breakdown of ESI offer rates in the MEPS-IC for such factors as employer size, industry, and whether the employer is private or government. It was then established as a return-based measure by linking the employers and their assigned ESI offer status to individual returns in our database. Rather than estimate the employer ESI-offer probit specification

$$P_O^* = \beta_O' x_O + \epsilon_O$$

in our above model directly from the ASEC, we instead estimate this probit equation using the subsample of wage-earner returns in our return-level database. The dependent variable in our specification is the imputed ESI offer status indicator, and the explanatory variables include interactions between employer size and an indicator for a government employer and interactions between employer size and industry category. Effectively, our probit model serves as a convenient way of translating the original MEPS-IC tabulations of ESI-offer rates by employer size and employer type into a formula for predicting the likelihood that an employee works for an employer who offers ESI (based on the size and type of his or her employer).

Estimation of our specification yields an estimate of vector  $\beta_O$ , which is then substituted for the actual value  $\beta_O$  in our full bivariate probit model with partial observability. The remaining parameters of the model (in vector  $\beta_R$ ) are estimated from the ASEC sample using the method of maximum likelihood. The explanatory variables  $x_R$  in our specification for the conditional probability that a return has ESI offer status given that the employer offers ESI include

the natural log of the age of the employee, the natural log of the number of child dependents, and indicators for part-time/full-time status, dual wage-earner returns, gender, married joint-filing status, the interaction between gender and married-joint filing status, the presence of self-employment earnings (Schedule C or Schedule F), the presence of unemployment insurance, and State of residence.

The results of the above estimation strategy provide us with predictive equations for imputing ESI coverage status to returns in our return-level data base. The next step is to develop additional predictive equations for imputing the other three health insurance coverage categories (private, public, and uninsured). To estimate the likelihood of a return falling into one of these three categories, we estimate a multinomial logit model using the subset of returns in the ASEC sample from these categories. The explanatory variables include all of the regressors in  $x_R$  above (which are used in the prediction of ESI coverage) as well as an indicator for whether the taxpayer is a local, State, or Federal Government employee.

**Nonwage Earners:** In the case of nonwage earners, a multinomial logit model for all four health insurance coverage statuses is estimated using the ASEC nonelderly nonwage earner subsample. For this analysis, the explanatory variables include the natural log of FPL, the natural log of age, the natural log of the number of dependent children, and indicators for nonjoint returns with male filers, married joint returns, the presence of self-employment earnings, the presence of unemployment insurance, the presence of Social Security benefits, the presence of pension earnings, and State of residence.

**Imputations for Taxpayer Services:** The complexity of ACA will drive taxpayers to use IRS services in greater numbers. However, IRS faces two challenges in estimating future service usage due to ACA. First, like many of the behaviors under ACA, there is little or no prior data from which to estimate marginal increases. Secondly, with respect to services, IRS captures identifying information related only to account issues. Consequently, the presence or absence of usage of the major service channels by specific taxpayers cannot be identified in most cases. In order to address this second challenge, prediction equations for taxpayer service usage were developed based on the Taxpayer Experience Survey (TES) and then applied to impute service usage for each return in the model input file. This was done for four service channels—phone, Taxpayer Assistance Center (TAC), mail and email.<sup>6</sup>

Our preliminary analysis of the four survey indicators in the TES indicated that the usage of the four categories of service was not independent. In other words, the likelihood of one service category being used depended on whether other service channels were used. It was therefore desirable to employ a statistical model that: (1) allowed for the possibility of a taxpayer using multiple service channels; and (2) accounted for dependencies across service channels. This led to the selection of a multivariate probit model. Under this model, we have:

$$\begin{aligned} P_1^* &= \beta_1' x_1 + \epsilon_1 \\ P_2^* &= \beta_2' x_2 + \epsilon_2 \\ P_3^* &= \beta_3' x_3 + \epsilon_3 \\ P_4^* &= \beta_4' x_4 + \epsilon_4, \end{aligned}$$

where the  $P^*$  terms represent latent variables for the propensity to use each service, the  $x$  terms represent explanatory variables, the  $\beta$  terms represent coefficients to be estimated, and the  $\epsilon$  terms represent random errors. These errors are assumed to follow a multivariate normal distribution. Also estimated with the model are the correlations between these error terms (measures of unobserved dependencies among the different service channels). In this model, the latent  $P^*$  variables are not observed. Rather, one observes only the 0-1 indicator for whether a service channel was employed. With four service channels, traditional maximum likelihood estimation was not a tractable option. Instead, we employed a methodology known as simulated maximum likelihood, which relies on repeated random draws from truncated normal distributions to estimate the value of the likelihood function for alternative sets of parameter values until convergence is obtained. Provided that sufficient random draws are employed, the resulting estimates have desirable properties and are similar to traditional maximum likelihood estimation results.

We began by selecting candidate explanatory variables, limiting our selection to variables that were present in both the TES data file and our return level data base. These included indicators for four FPL categories, interactions between

<sup>6</sup> While VITA may be considered the fifth relevant channel, a direct indicator of VITA participation is already available on the model input file.

each of these categorical indicators and an indicator for taxpayer receipt of a relevant IRS notice, and indicators for married-filing jointly status, the presence of a dependent, primary taxpayer under age 30, presence of self-employment income (Schedule C or Schedule F), and an EITC claim. After first estimating our model using all of these candidate variables, we performed Wald tests to identify jointly insignificant regressors. After removing such regressors, we estimated a more parsimonious final model. For all four equations, the explanatory variables in the final specification included the FPL indicators and their interactions with the notice indicator. The phone equation also included indicators for married-filing jointly status and the presence of a dependent. The mail equation also included indicators for a married-filing jointly status and an EITC claim, and the email equation also included an indicator for an EITC claim.

After estimating the weighted model using the TES subsample of returns filed by taxpayers under age 65, we next used the estimation results to predict the probability in our return-level database associated with each of the 16 possible combinations of services (1 possible way to not select services from any channel, 4 possible ways to select a service from only one channel, 6 possible ways to select services from two different channels, 4 possible ways to select services from three different channels, and 1 possible way to select services from all four channels). We then used a uniform random draw to impute different combinations of service indicators to returns in our sample based on the estimated probabilities associated with each combination of services.

### ***Other Considerations***

**Weighting:** Since the PTC is available to those without Medicare, we exclude tax units where both the primary and spouse are age 65 or older. Since the focus of our model is Form 1040 filers, we exclude the sampled employees who were nonfilers or who filed late (past our cut-off date of October 9, 2012). For modeling purposes, we weight by three key units of analysis: employers, employees, and individual income tax returns. We construct a set of firm weights (firmwt) that make the 19,476 sampled employers in our data file broadly representative of all employers in the population. For the individual income tax return, our weighting accounts differently for those with and without wage earnings. In the case of wage earning individuals, each sampled employee was associated with a unique Tax Year 2010 Form 1040 return. To transform our employee-based sample weights into return-based weights, we accounted for two cases where the probability of selection was higher: first, individuals who worked for more than one sampled employer, and second, married taxpayers filing jointly who each worked for a sampled employer. The sample weight was adjusted downwards in such instances to account for oversampling of such returns.

**Aging:** Our file is aged from 2010 by State-level growth factors for each of the years in 2014–2017 by applying forecasts from IRS Publication 6149. These account for growth of all returns, including elderly returns.

**Final File:** Ultimately, we arrived at two interrelated model files: (1) a nationally representative sample of tax returns (Return Level Weighted); and (2) a nationally representative sample of employers (which also includes additional employers who were not sampled, but are associated with sampled individual income tax returns; this file is named Employer List).

- We have a sample of 401,039 individual returns representing 114,628,010 nonelderly returns. Of those returns, weighted, the model estimated the prereform health insurance status statistics to be 65,587,248 returns on ESI, 8,935,391 returns on Private, 13,249,133 returns on Public, and 26,856,238 returns uninsured.
- We have a sample of 19,476 employers, representing a population of 4,769,044 employers (this is augmented with 78,328 employers included as employers of primary taxpayer's spouses).

### **Policies**

Microsimulation models are most often used to inform policymakers and analysts of potential policy impacts. While policy rules seem straightforward to implement, they seldom are. Each model has a different set of assumptions and levels of granularity, often determined by the limitations of source data. As models were being specified for ACA, policy guidance was still in development. Major assumptions and policy provisions in the case of ACA have changed over the duration of this study. A few examples are:

- **Employee Choice Vouchers:** Free choice vouchers were eliminated in 2011 Budget Compromise passed April 15, 2011.

- **Medicaid Expansion:** The Supreme Court ruling in *National Federation of Independent Business, et. al., v. Sebelius* (June 28, 2012) limited the ability to withhold Federal Medicaid funds from States opting out of Medicaid expansion.
- **Employer Shared Responsibility:** In July 2013, implementation of the Employer Shared Responsibility provision was delayed until Tax Year 2015 and fully phased in for Tax Year 2016. Additional regulatory guidance clarified affordability guidelines, mandating that employee payments not exceed 9.5 percent of the W-2 wages, applied to individual (self-only, not family) plans.
- **Individual Shared Responsibility:** In 2014, third-party information returns will not be reported to the IRS, potentially decreasing the impact of the individual shared responsibility provision.

These changes illustrate one of the key motivators for having a microsimulation model—the ability to conduct ‘what if’ analysis when policy changes.

Our model represents basic eligibility rules for the PTC, the imposition of the ISRP for those without health insurance and Employer Shared Responsibility Payments (ESRP) for Applicable Large Employers (ALEs).

**PTC and Reconciliation:** IRS is responsible for administering the end-of-year reconciliation of APTC/PTC. The Exchange will determine upfront taxpayer eligibility, reflecting Modified Adjusted Gross Income (MAGI) or its approximation at enrollment. For a significant number of taxpayers, the applicable FPL will vary from the initial Exchange determination as income fluctuates throughout the year. When the PTC amount for the full year is greater than advance payments received, the excess is considered a credit for the taxpayer and is applied against their tax balance or added to their refund. However, if income increases during the year (or family size decreases), a taxpayer may have a tax liability from the APTC. This APTC repayment amount is based on FPL and premium amount. To simulate the reconciliation process, the model compares the actual 2010 and 2011 FPL (based on Modified Adjusted Gross Income and number of exemptions) for sampled returns. For taxpayers who do not have a return in 2010 and 2011, their FPL change is randomly assigned to fit the distribution of the observed FPL changes. Effectively, the 2010 FPL serves as the estimated FPL used to qualify for APTC. The 2011 FPL serves as the end-of-year FPL on which the PTC is based. Currently, the change in FPL occurs 6 months into the year. The model then compares APTC and PTC amounts based on this variation. Moving forward, the model will be updated to use distribution parameters of more recent tax years to estimate more recent FPL change scenarios. We will also explore FPL changes at different points in the year.

**Individual shared responsibility payments:** The ISRP amount for each person on a tax return will be calculated as the greater of a flat payment (legislation specifies \$95 in 2014, \$325 in 2015, and \$695 in 2016, adjusted for inflation thereafter) and a payment based on the percentage of applicable family income (1.0 percent in 2014, 2.0 percent in 2015, and 2.5 percent in 2016, adjusted for inflation thereafter), but will not exceed the applicable Bronze plan amount. In estimating these payments, we have wide confidence intervals since penalties are applied for individuals and our model simplifies all members of the household unit to one insurance status.

**Employer shared responsibility payments** are overstated by the model. Our overestimation derives from the uncertainty in modeling offer behavior between the employer and employees. First, it proved very challenging to enforce a notion of take-up rate for a given employer. Therefore, the behavioral transitions for the individuals are unable to aggregate up to a very meaningful result for an employer. For this reason, applying the level of rules required for an employer (offer value, number of full-time/part-time employees, etc.) entails high-level estimation and represents an overstatement of the number of employers likely to face responsibility payments. An ALE will be subject to the ESRP in two circumstances: (1) they do not offer insurance; or (2) they do not offer affordable insurance (both circumstances require at least one full-time employee to receive the PTC for the ESRP to apply). This model projects ESRP only for ALEs not offering insurance.

## Behavior

Behavior, such as participation in public programs, can be modeled in various ways, including cell-based imputation, elasticity approaches and/or utility-based equations. Among microsimulation models, CBO and the Lewin Group use elasticity-based approaches, whereas RAND and Urban Institute use a utility-maximization approach to estimate behavioral change.

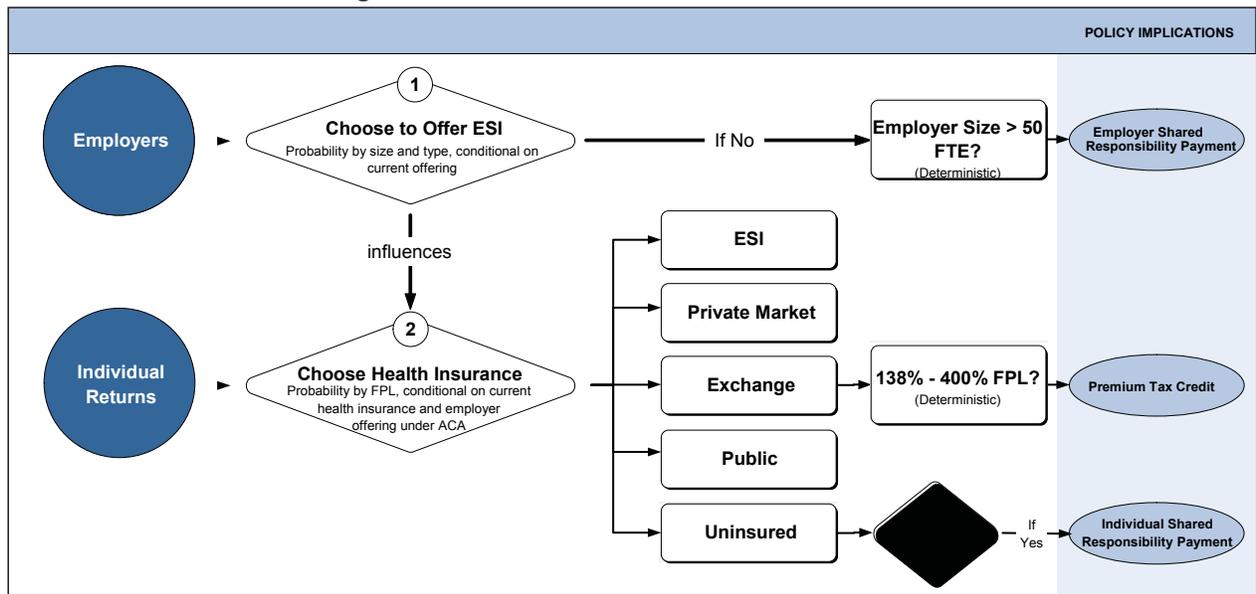
- **Elasticity-based models** exploit variation in prices over time to estimate changes in marginal preferences by the group. The disadvantage of elasticity-based models is that historical data are challenging to estimate, so measures of current elasticity vary substantially. Moreover, historical data may not be a good representation of decisions with such vast policy changes. Specifically, prediction in an elasticity-based model is based on empirical evidence from past experience. Therefore, when confronted with new experiences or policy with little to no empirical evidence, elasticities may provide limited information.
- In contrast, a **utility-maximization approach** permits individuals and firms to weight the benefits of an option (e.g., reduced out-of-pocket expenditure, lower risk) against the costs (e.g., higher premiums). Utility-based models allow greater flexibility to evaluate decisionmaking under new situations. However, the predictions of such a model are sensitive to the empirical specification of the utility function, and observed choices are not always consistent with the predicted outcomes.

By design, the RAS-ACA Model has no built-in behavioral model to drive post-ACA transitions. Rather the model represents these two interrelated behavioral decisions through employer / employee linkage, determining the provision of the largest source of health insurance, ESI (as shown in Figure 3).

**Behavioral transition 1: Employer Choice to Offer ESI.** Given uncertainty about employer behavior, employers keep, offer, or drop insurance based on parameters entered by the user (assigned by employer size for three types of employers: private, State or local government, and Federal Government). In the baseline, we assume employers who currently offer are likely to continue offering.

**Behavioral transition 2: Choice of Health Insurance for the Return.** The key factor in determining coverage will be the available choices to the individual. Therefore, the probability transitions are assigned based on the employer’s offering status. Decisions will be dependent on available family income, as expressed through FPL, as well as other characteristics not available for our model, such as health status, risk aversion, religious and social norms and values. Since current-day preferences express some of these unobserved characteristics, we assign new insurance status conditional on today’s insurance status. Transitions are entered by the RAS analyst to govern return-level insurance, by current health insurance status and FPL.

**FIGURE 3. Behavioral Design for Health Insurance Decisions**



Users rely on an external model, informed judgment, or intuition to choose behavioral parameters. One of the most important sources of the baseline parameters is the model used by OTA. They provided a framework for reasonable transitions from one insurance status to another for different FPL groups. RAS then explored the outcomes of various scenarios where those transitions were adjusted to obtain a better understanding of likely outcomes. In the future, this approach may be further refined.

The model does not currently account for major behavioral assumptions concerning inertia and psychological factors, ESI take-up rates and auto-enrollment provision, or the participation rates for public programs. These could be built into a behavioral engine. However, the analyst can also project the outcome and assign via cell-based imputation in SAS.

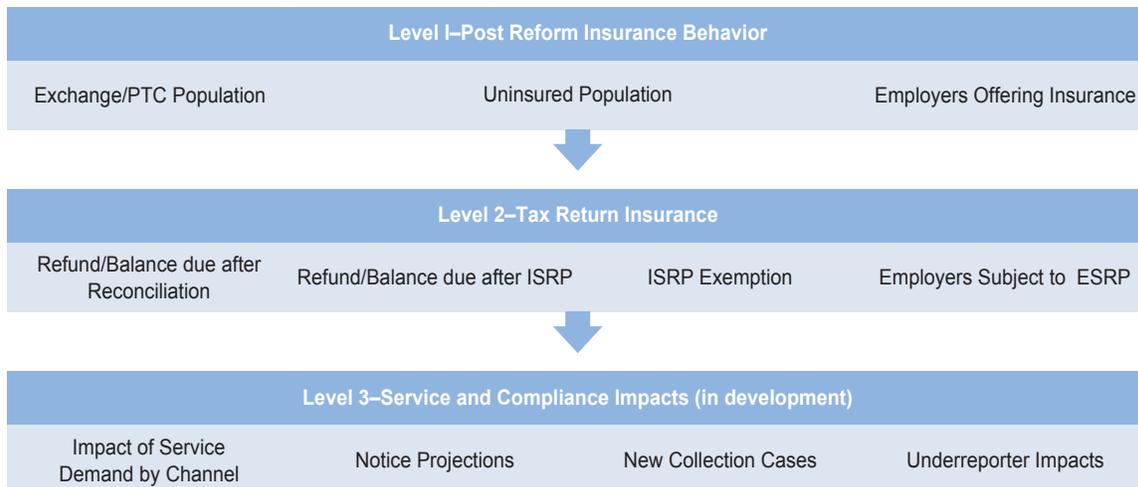
## Outcomes

The RAS-ACA Model generates outputs at three levels. Level 1 estimates project post-reform insurance behavior by FPL. These estimates project the number of tax returns, grouped by FPL category, distributed across five insurance categories: ESI, Private, Public, Uninsured, and Exchange. These estimates are similar to outputs from other microsimulation models, but they are restricted to the population of Federal individual income tax filers and they are return-based rather than individual-based. At this level, the outputs we are most concerned with are the Exchange population, PTC eligible returns, the uninsured population, and employer offer decisions.

Level 2 estimates focus on how ACA provisions will impact tax returns. These estimates use Level 1 outputs as inputs and incorporate data from tax returns. For instance, the PTC population selected in Level 1 is used to determine the impacts of reconciliation. Tax data is used to determine FPL change, prereform balance due or refund, and how reconciliation impacts their balance due or refund. The key level 2 outputs are: refund/balance due change as a result of reconciliation, refund/balance due change as a result of ISRP, number of taxpayers exempt from ISRP due to unaffordable premiums, and the number of employers subject to ESRP.

Level 3 estimates project the impact of ACA tax provisions on customer service demand and compliance activity; Level 1 and 2 outputs serve as inputs for these projections. For instance, if Level 2 estimates project few returns required to repay a portion of their APTC as a result of reconciliation, projections of collection activity as a result of ACA will likely be low. Figure 4 illustrates what is estimated at each level and the relationship of the three levels.

**FIGURE 4. Model Projection Hierarchy**



## Baseline Scenarios

We rely on external projections for guidance since we do not have a modeled behavioral component. Baseline scenarios are based on external projections from CBO and OTA. Therefore, our Level 1 baseline outputs approximate OTA and CBO outcomes on a return level. We are able to match these outcomes using behavioral transitions provided by OTA broken out by current health insurance status and FPL.

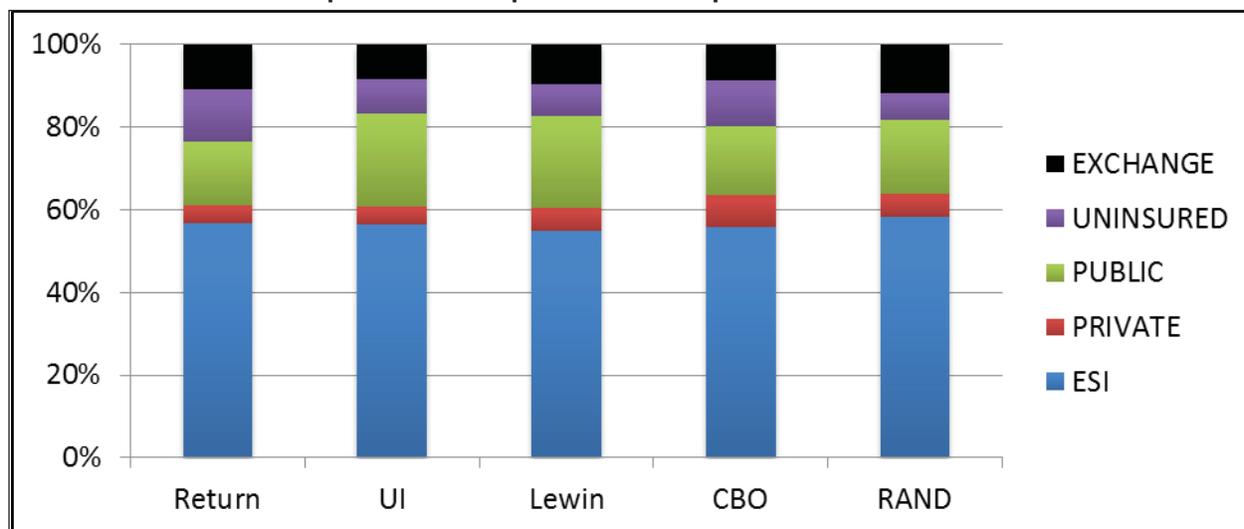
Establishing the relationship between returns and individuals requires a separate set of assumptions. The average tax unit consists of about 2.1 individuals. However, as FPL increases, the size of the household generally increases as

well. Therefore, we must make assumptions about the average tax unit size among the different insurance statuses. For instance, we can assume returns choosing Public insurance are likely to be low income, and thus, have a lower individual-to-return ratio.

Furthermore, CBO and OTA use average annual estimates for each of their insurance categories that do not account for churning (i.e. moving in and out of health insurance statuses). Churning is an important factor because everyone who receives APTC is required reconcile their advanced credit with the credit they should have received. Annual averages likely understate reconciliation activities. Therefore, we calibrate the behavioral transitions to approximate CBO and OTA estimates on a return level while allowing for additional churning into the Exchange and PTC populations. Lastly, outcomes must account for the lack of nonfilers. For instance, a portion of the uninsured population does not have a filing requirement and will not file. Therefore, the model projects fewer returns relative to the number of individuals projected by CBO and OTA.

Figure 5 provides a notional comparison of the RAS-ACA Model outputs compared to model outputs from the Urban Institute (UI), the Lewin Group, CBO, and RAND. The RAS-ACA Model outputs (Return) are generally in line with other model outputs; however, the population choosing Public insurance is noticeably smaller in most scenario runs compared to other models. This is due to the RAS-ACA Model’s focus on filers as opposed to individuals. Also, this notional comparison highlights the impact of assumptions regarding the average tax unit size across insurance categories. Larger populations of uninsured and Exchange returns relative to the other models can be attributed to a smaller return to individual ratio.

**FIGURE 5. Notional Comparison of Outputs From Multiple Models**



Our baseline outcomes are driven by the most recent data available. Therefore, as CBO and OTA projections change, our Level 1 baseline outputs change as well. Also, as we obtain actual data and a better understanding of behavior we will continue to update our baseline and alternative scenarios. For instance, HHS recently reported that 8 million individuals have enrolled in the Exchanges, which exceeds the April CBO estimate by 2 million individuals. Moreover, HHS reported the distribution of ages for Exchange enrollees and provided the ratio of applicants to applications. These are important inputs since age is a primary factor in determining premium prices and the applicant to application ratio gives us insight into the individual to return ratio for Exchanges. Changes to Level 2 and 3 estimates will also change due to the dependent nature of these downstream estimates. Once we have actual tax data, the baseline will be updated again.

**Alternative Scenarios**

Our key assumptions focus on employer offer rates, behavioral transitions, premium amounts, and FPL dynamics. Available data provides insight and guidance to our assumptions and model inputs. Premium amounts are now set for 2014; we do not expect FPL dynamics to deviate drastically from current trends, and most models agree that employer

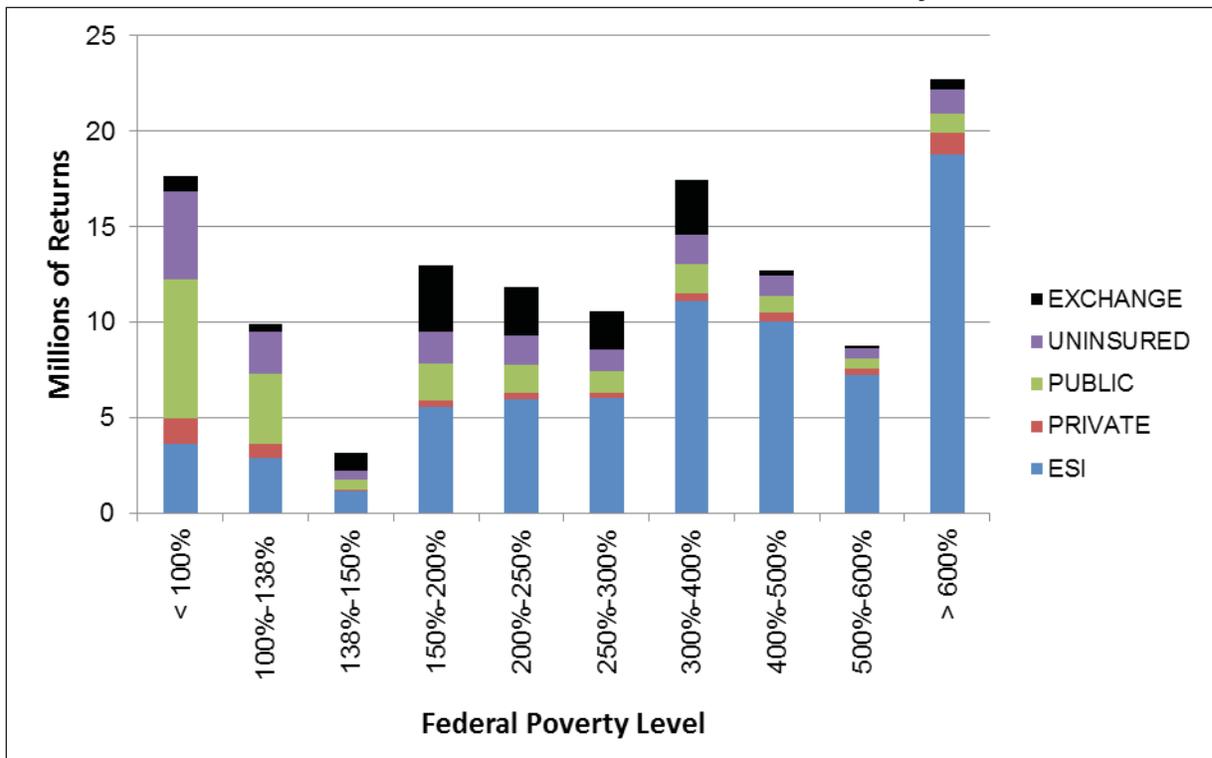
offer rates will experience little to no change in the early years of ACA implementation. Behavioral transitions, on the other hand, must account for so many factors that uncertainty is expected.

The flexible nature of the model allows IRS the opportunity to explore various “what-if” scenarios to better explore the inherent uncertainty of taxpayer behavior. Recent data from HHS shows about 85 percent of Exchange enrollees will receive the APTC. This indicates a higher concentration of Exchange enrollees in the 100 to 400 percent FPL group than we initially expected. The flexible nature of the model allows us to change this behavioral assumption easily and analyze the downstream impacts of this new scenario on taxpayers and the IRS. We can examine scenarios where large numbers employers drop coverage or premiums spike in future years. This provides us a tool to analyze the sensitivity of our assumptions, and provides us with a range of possible outcomes based on realistic scenarios.

### Model Outputs

Each model output for individual returns can be broken into FPL groups. Segmentation at this more refined level can inform taxpayer behavior in response to ACA tax provisions, potential outreach strategies, and more awareness of how ACA tax provisions are impacting different taxpayer groups. Figure 6 provides a more granular view of post-reform insurance decisions. As expected, Public insurance makes up a large portion of coverage among the lower FPL groups. Conversely, ESI is less popular at lower FPL levels but becomes more prominent as FPL increases.

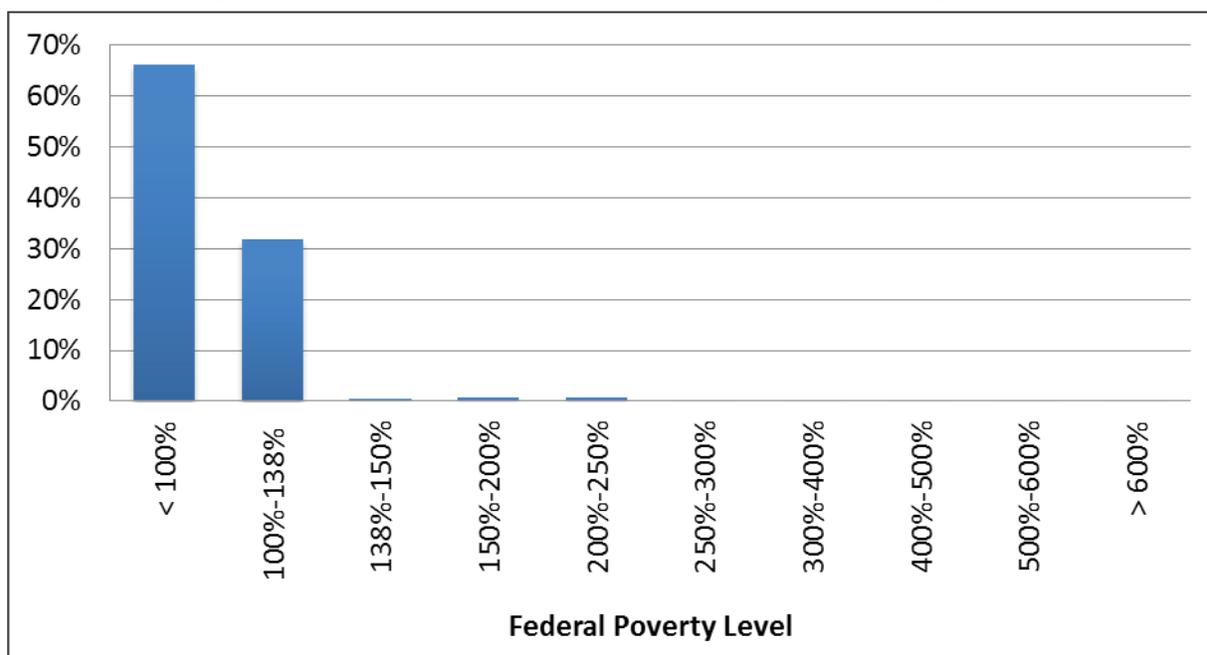
**FIGURE 6. Notional Distribution of Post-Reform Insurance Outcomes by FPL**



The model then applies taxpayer data to these Level 1 projections to estimate the impact of ACA tax provisions on taxpayer returns. Specifically, the model examines the implications of the ISRP and PTC for filers of Federal individual income tax returns. Some nonfilers, who fall outside of our model, will also have ACA-related reporting requirements. In particular, uninsured nonfilers are required to calculate and report their ISRP or claim an exemption unless they do not have a filing requirement. There are nine exemptions from the ISRP, and only a few are administered solely by IRS. The model projects volumes for two of the more prominent IRS-administered exemptions: no filing requirement and unaffordability.

The model uses current income and projected income changes to estimate income at filing for sampled returns. The income and other return characteristics allow the model to determine whether a given taxpayer has a legal filing obligation. Taxpayers who are not required to file are exempt from the ISRP. Furthermore, age-weighted premium rates by State provided by HHS allow the model to roughly estimate the lowest cost Bronze plan for a given return. The model uses this information to determine which returns qualify for the unaffordability exemption. If 8 percent of household income is less than the lowest cost Bronze plan, the return is exempt. Figure 7 shows the distribution of Filing Requirement and Unaffordability exemptions by FPL. As expected, a large majority of these exemptions are available to the lowest FPL brackets, but some taxpayers in higher FPL brackets may be eligible for an unaffordability exemption, especially if Bronze premiums in their rating area are high.

**FIGURE 7. Filing Requirement and Unaffordability Exemptions to ISRP by FPL**

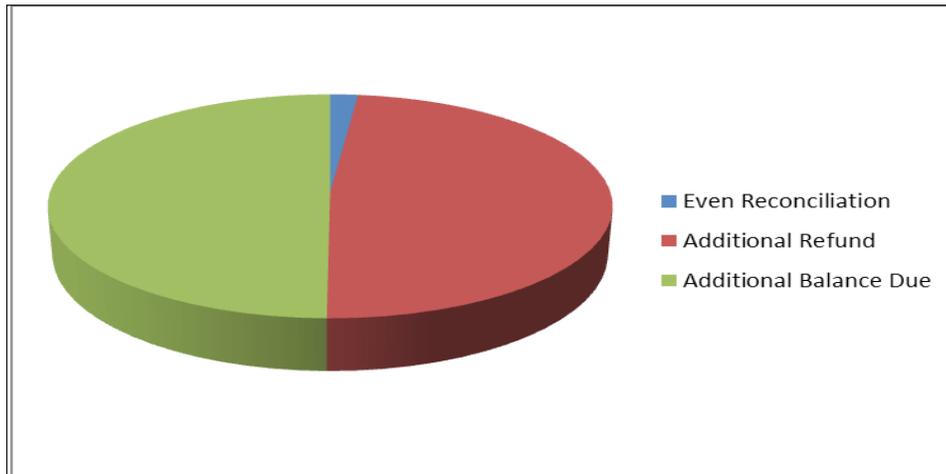


Additionally, the model projects the liability for those subject to the ISRP. Using income data from the tax return, the model determines whether a taxpayer pays the flat-rate payment or percent payment. These penalties are set for 2014, 2015, and 2016 and tied to inflation for 2017 and beyond. The payment is compared to the national average Bronze plan offered through the Health Insurance Marketplaces for the coverage year of 2014 and adjusted using the CPI inflator for Tax Years 2015 and beyond. Payment amounts exceeding the national average Bronze plan are capped at the annual Bronze-premium amount.

The model addresses multiple aspects of the PTC and reconciliation. Reconciliation could have significant impacts on a taxpayer's refund, especially in rating areas with high premiums (i.e. the more expensive the second lowest cost Silver plan, the larger the PTC and the more potential for volatile reconciliation outcomes). Figure 8 provides a notional projection of the impacts of reconciliation on taxpayer refunds or balances due. The figure shows about half of PTC recipients will experience an FPL increase and about half will experience an FPL decrease. Very few are expected to have an even reconciliation because small changes in income or family size should result in at least a marginal change in PTC at reconciliation. This outcome is the result of one possible FPL change scenario. For instance, FPL change estimates in a recession year would likely result in fewer repayments and higher tax credits.

The model's access to taxpayer data gives us the ability to explore outcomes relevant to taxpayers and the IRS in more detail. In addition to the high-level outcomes provided by Figure 8, we can identify the actual additional credit or repayment required, whether the repayment amount is limited by statutory caps, whether the taxpayer currently has refund or balance due (not considering ACA), and whether reconciliation changes their refund or balance due status. This adds considerable value to the IRS as it identifies potential increases in collection cases, notice volumes and demand for live assistance.

**FIGURE 8. Notional PTC Reconciliation Implications**



For employers, the model outputs the number and percentage of employers offering insurance and the number not offering insurance after ACA implementation. Figure 9 shows offer rates by employer size (number of employees). The figure mirrors current-day offer behavior. Small firms are less likely to offer, most firms larger than 50 are likely to offer, while almost 100 percent of the largest firms offer. Analysts can manipulate scenarios to change ESI offer outcomes and observe the downstream impact on taxpayers and the IRS. Moreover, the model sums the number of employers with an ESRP. For the first 2 years of ACA, RAS analysts will make off-model adjustments to consider implementation delays for employers.

**FIGURE 9. Notional ESI Offer Rates by Employer Size**



Finally, the model uses historical data from the CDW and survey data from the Taxpayer Experience Survey to output results on service and compliance behavior. Using a combination of CDW and TES data, the model develops a customer service profile. The model outputs by FPL range and by post-reform insurance status, counts of returns and their IRS service channel preference of phone, Taxpayer Assistance Center, mail, and email. Moreover, the model uses CDW data to determine characteristics of returns that currently experience compliance actions to identify existing and potential new compliance cases as a result of ACA. The compliance actions include Math Error, Automated Under-reporter, and Collection.

## Future Development and Model Maintenance

In the future, RAS plans to expand the model to include additional capabilities and update the model as more information surrounding the assumptions becomes available. New developments will include additional functionality and capabilities regarding service and compliance as well as an updated approach to modeling FPL dynamics. Additionally, RAS will maintain the model by updating the input data as internal administrative data and new external research data become available.

Currently, the model assigns Customer Service and Compliance outcomes to emulate current taxpayer behavior. In the future, RAS plans to model the impact of ACA on Service Demand and Compliance and observe the impacts on IRS workstreams. New data from TES must be incorporated to capture additional digital channels, such as social media or smart phone applications, and how preferences may have shifted from live service channels to lower cost digital service channels. Moreover, expanded capabilities will allow RAS to shift preferences among different channels and determine the impact to IRS workload.

The model currently uses changes in FPL from Tax Year 2010 to Tax Year 2011. The change represents a recovering and growing economy. RAS will include multiple years of changes in income and family size: Tax Years 2008 to 2009, 2009 to 2010, 2011 to 2012, and 2012 to 2013. RAS will run the model on different scenarios to determine the sensitivity of reconciliation outcomes to changes in FPL.

RAS will continue to monitor external models and new data that impact ESI offerings, transition rates to new insurance, the average individual/family premium cost by State, changes in compliance, services, and paid preparer and software use. Less frequent updates include adjusting age or return demographics for future years, adding new variables from administrative data as they becomes available and adjusting weights in the sample.

RAS will incorporate statistics or calibrate the model to align with updates as external research data become available. Health and Human Services (HHS) released a final enrollment report in May 2014 that summarizes enrollment at the Health Insurance Marketplaces and provides statistics by Marketplace and age. The model will be calibrated to ensure returns selected for Health Insurance Marketplace coverage follow the same State and age distributions reported by HHS. The National Health Interview Survey, Current Population Survey, Kaiser Family Foundation, American Community Survey, and Medical Expenditure Panel Survey are additional resources that provide useful insights to health insurance in the United States and as these surveys are updated, the model will calibrate to known behaviors.

## Current and Future Applications

The primary use for the RAS-ACA Model is to inform the IRS of impacts from the legislation on workload volumes. RAS generates a high-level summary report derived from outputs of the model to inform IRS executives of key volumes critical for resource planning. These volumes include the number of returns claiming the PTC, reporting the ISRP, and receiving ISRP exemptions; the number of ALEs subject to the ESRP; and the number of ACA-related information returns filed, for Tax Years 2014 through 2017. The model is used to run various scenarios and output the same estimates using internally consistent assumptions.

The model results inform various IRS operational questions on compliance and service. Specifically, IRS analysts used model outputs and applied historical notice rates to predict the volume of additional notices sent out for the first tax year of ACA implementation. The projections include both new and existing notices as a result of ACA. Moreover, PTC reconciliation outcomes were used by the IRS ACA Customer Service and Stakeholder Relations team to inform external messaging strategies for both the taxpayer population and government partners.

Level 1 and 2 estimates provide an understanding of the number of people impacted by ACA. These high-level counts are used to scope potential customer service demand. The model is being enhanced to provide insight into the types of questions taxpayers may need to resolve, whether it be form-related, account information, tax law, or payments. The results of this analysis will be used to determine any potential increases in demand for live assistance. This will inform risk analysis, potential mitigation strategies, and workforce plans.

The RAS-ACA Model is also being enhanced to estimate the impact on compliance activities. Some examples include notice projections, collection workload, math error, and impacts to Automated Underreporter (AUR). The IRS is able to use the information to make decisions about resource allocation, including print capabilities, reprogramming AUR, and sampling for the National Research Program.

5



**Appendix**

**Conference Program**

**An IRS-TPC Research Conference: Advancing Tax Administration**  
**Urban Institute, 2100 M Street, N.W., Washington, DC • June 19, 2014**

**Program**

8:30 – 9:00 Check-in

9:00 – 9:10 Openings

Welcome **Eric Toder** (Co-Director, Tax Policy Center) and  
**Rosemary Marcuss** (Director, IRS Office of Research, Analysis, and Statistics)

Opening Remarks **John Koskinen** (Commissioner, IRS) [recorded video]

9:15 – 10:45 **Session 1: Taxpayer Compliance Costs and Tax Administration**

Moderator: **Melissa Vigil** (IRS, RAS, Office of Research)

- Improving Form 1098T: How a Revised Form Could Increase Take-Up, Improve Compliance and Lower Taxpayer Burden  
**Deena Ackerman, Julie-Anne Cronin, and Nicholas Turner** (Office of Tax Analysis, US Treasury)
- Convenience Is Necessary for Pension Participation by the Poor  
**Valrie Chambers** (Texas A & M University—Corpus Christi)
- The Compliance Costs of IRS Post-Filing Processes  
**John Guyton and Ronald Hodge** (IRS, RAS, Office of Research)

Discussant: **Robert Weinberger** (Aspen Institute Initiative on Financial Security)

10:45 – 11:00 Break

11:00 – 12:30 **Session 2: Innovative Enforcement Strategies**

Moderator: **Drew Johns** (IRS, RAS, Office of Research)

- Incentivized Offshore Voluntary Disclosure Schemes: An Analysis  
**Matthew Gould and Matthew D. Rablen** (Brunel University, UK)
- Uncollectible versus Unproductive: Compliance Impact of Working Collection Cases that are Ultimately Not Fully Collectible  
**Erik Miller, Stacy Orlett, and Alex Turk** (IRS, SB/SE)
- A Plan for Turning “Worst-First” into “Best-Case” Tax Enforcement  
**Leigh Osofsky** (University of Miami School of Law)

Discussant: **Mark Phillips** (University of Southern California)

12:30 – 1:30 **Keynote Speaker**

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1:30-3:00	<b>Session 3: Tax Uncertainty and Corporation Compliance</b> <u>Moderator:</u> <b>John Guyton</b> ( <i>IRS, RAS, Office of Research</i> ) <ul style="list-style-type: none"><li>• Large Corporation Schedule M-3 Book-to-Tax Profiles of Schedule UTP (Uncertain Tax Position) Filers and Non-Filers: 2010–2011 <i>Charles Boynton, Portia DeFilippes, Ellen Legel, and Lisa Rupert (IRS, LB&amp;I)</i></li><li>• Unintended Consequences of Linking Tax Return Disclosures of Tax Uncertainty to Financial Reporting for Tax Uncertainty <i>Erin M. Towery (University of Georgia)</i></li><li>• The Effect of CAP on Tax Aggressiveness <i>Amy Dunbar and Andrew Duxbury (University of Connecticut)</i></li></ul> <u>Discussant:</u> <b>Matt Smith</b> ( <i>Department of the Treasury, Office of Tax Analysis</i> )
3:00 – 3:15	Break
3:15 – 4:45	<b>Session 4: Understanding Taxpayer Behavior</b> <u>Moderator:</u> <b>Kevin Pierce</b> ( <i>IRS, RAS, Statistics of Income</i> ) <ul style="list-style-type: none"><li>• Tax Evasion and Self-employment in the US: A Look at the Alternative Minimum Tax <i>Donald Bruce and Xiaowen Liu (University of Tennessee)</i></li><li>• Do Doubled-Up Families Minimize Household-Level Tax Burden? <i>Amy B. O’Hara and Maggie R. Jones (U.S. Census Bureau)</i></li><li>• RAS Affordable Care Act Microsimulation Model <i>Brian Erard (Brian Erard and Associates), Emily Heys and Brock Ramos (IRS, RAS), Layne Morrison, Robert Mueller (IBM)</i></li></ul> <u>Discussant:</u> <b>Len Burman</b> ( <i>Tax Policy Center</i> )
4:45 – 5:00	<b>Wrap-up</b> <i>Janice Hedemann (Conference Chair, IRS:RAS)</i>

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