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

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The Customer Voice Portal (CVP) Message Redesign Pilot built upon IRS experience using Behavioral Insights to redesign Collection notices

Automated Collection System (ACS) Notice Redesign

IRS conducted a series of pilot tests to measure the benefit of redesigning Collection notices. Pilot test results showed using Behavioral Insights to design notices can achieve Collection's top three goals:

1. Improve taxpayer experience and understanding
2. Reduce IRS costs
3. Increase taxpayer compliance actions

Her Majesty's Revenue and Customs (HMRC) Announcement Redesign

The United Kingdom's tax authority increased taxpayer self-service by applying Behavioral Insights to revise recorded voice messages and encourage customers who can self-serve to go online while they are on a call waiting for an advisor.

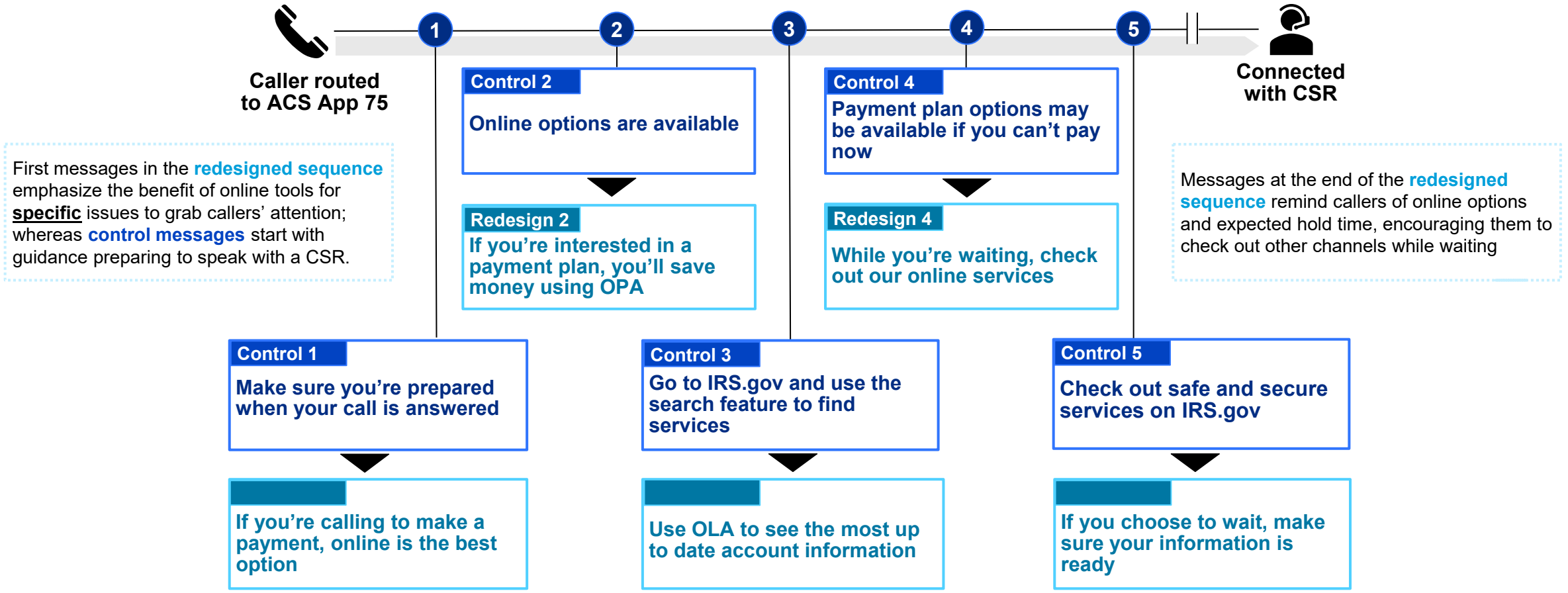
Customer Voice Portal Message Redesign

Callers routed to **ACS Applications 75 (IMF)** are played a **sequence of five message prompts** while waiting in queue to speak with a CSR. Some taxpayers call the IRS about issues which can be resolved using online self-service tools, saving them both time and money. IRS used Behavioral Insights to redesign CVP message sequences, informing callers of the benefit of online resources and freeing up phone resources for taxpayers with issues requiring CSR assistance.

IRS used Behavioral Insights to develop voice prompts that provide callers with information necessary to consider self-service channels to resolve issues

App 75 Queue Messages

Current Message Themes
Redesigned Prototype Message Themes

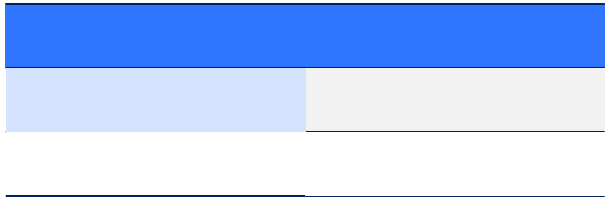
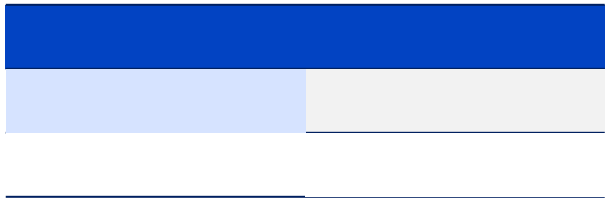
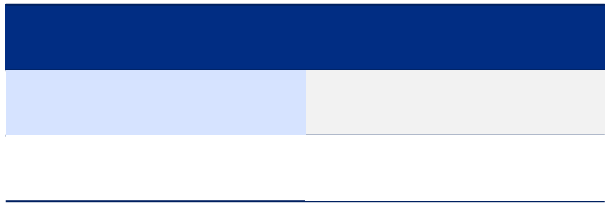


The pilot tested the effectiveness of redesigning voice prompts to nudge ACS callers to shift to IRS online services

CVP Message Redesign Pilot Goals

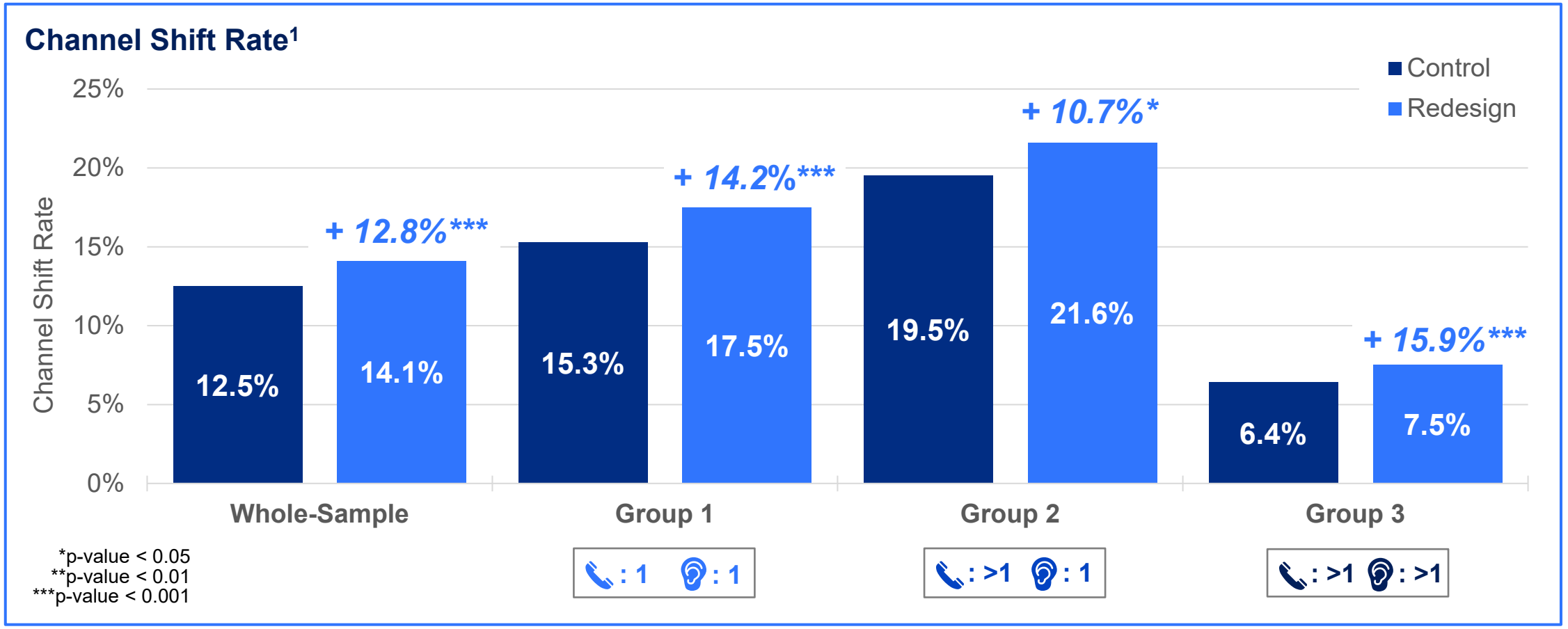
- **Increase Channel Shift**: Encourage taxpayers who can self-serve to hang up and use online resources than wait on hold for a CSR.
- **Increase Use of Online Services:** Enhance taxpayer experience by improving awareness and use of online resources relevant to their tax issue.
- **Improve Call Resource Allocation**: Reduce IRS costs by informing callers of online services and reducing CSR's phone time on issues that can be addressed online (e.g., obtain additional information) in favor of those requiring CSR support.

To analyze pilot results, callers were assigned to one of three groups based on the number of calls made during the test period

CVP Pilot Caller Group	Description	Pilot Callers
1 **Called once and heard at least one announcement in the message sequence** : 1 : 1	Group 1 callers were routed to App 75, remained on the line to hear at least the first announcement in the sequence, and did not call again during the pilot.	
2 **Called multiple times and heard announcement(s) once** : >1 : 1	Group 2 called the IRS more than once during the pilot, however during only one call attempt were they on the line to hear at least one message in the sequence.	
3 **Called multiple times and heard announcement(s) on more than one call** : >1 : >1	Group 3 callers heard at least one message in the sequence, called back at least once more and again heard at least one message in the sequence.	

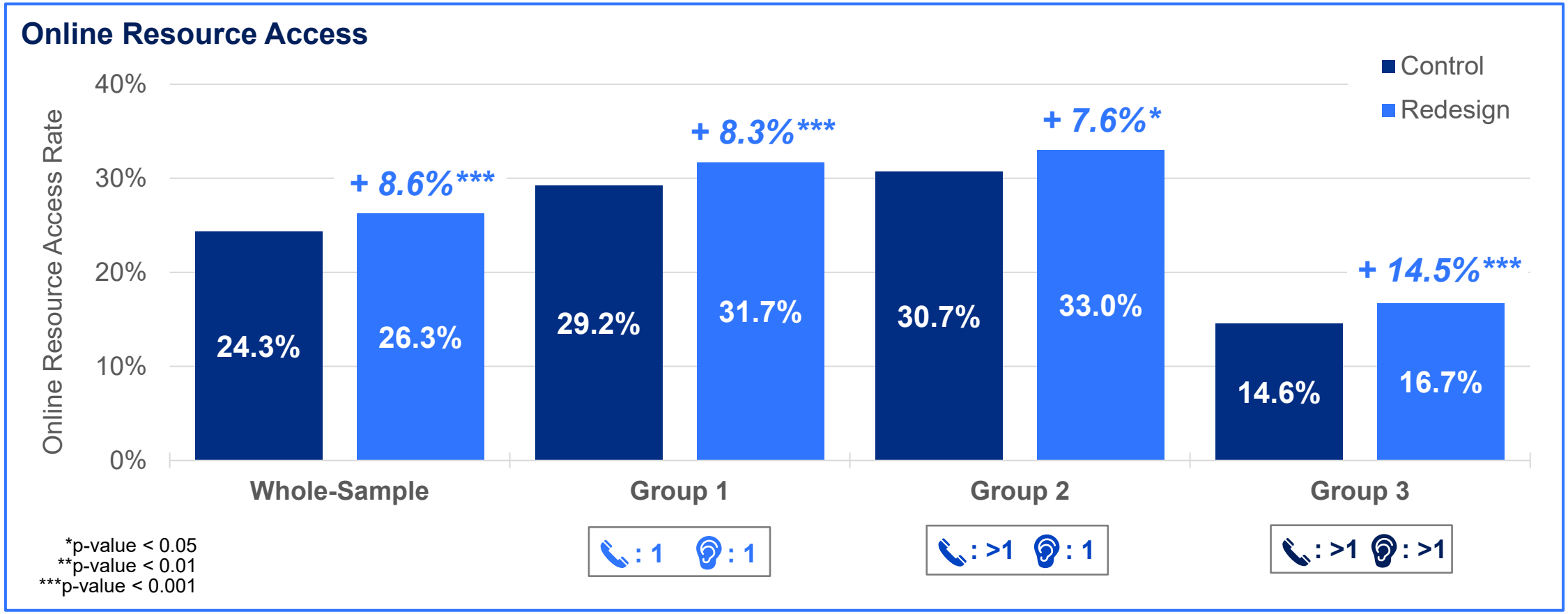
- **The total sample size consisted of 85,102 taxpayers and 103,512 calls**
- **Outcomes were compared between control and redesign groups and evaluated in the 30 days after the final pilot call**

Redesigned messages increased the channel shift rate relative to the existing message sequence for all caller groups

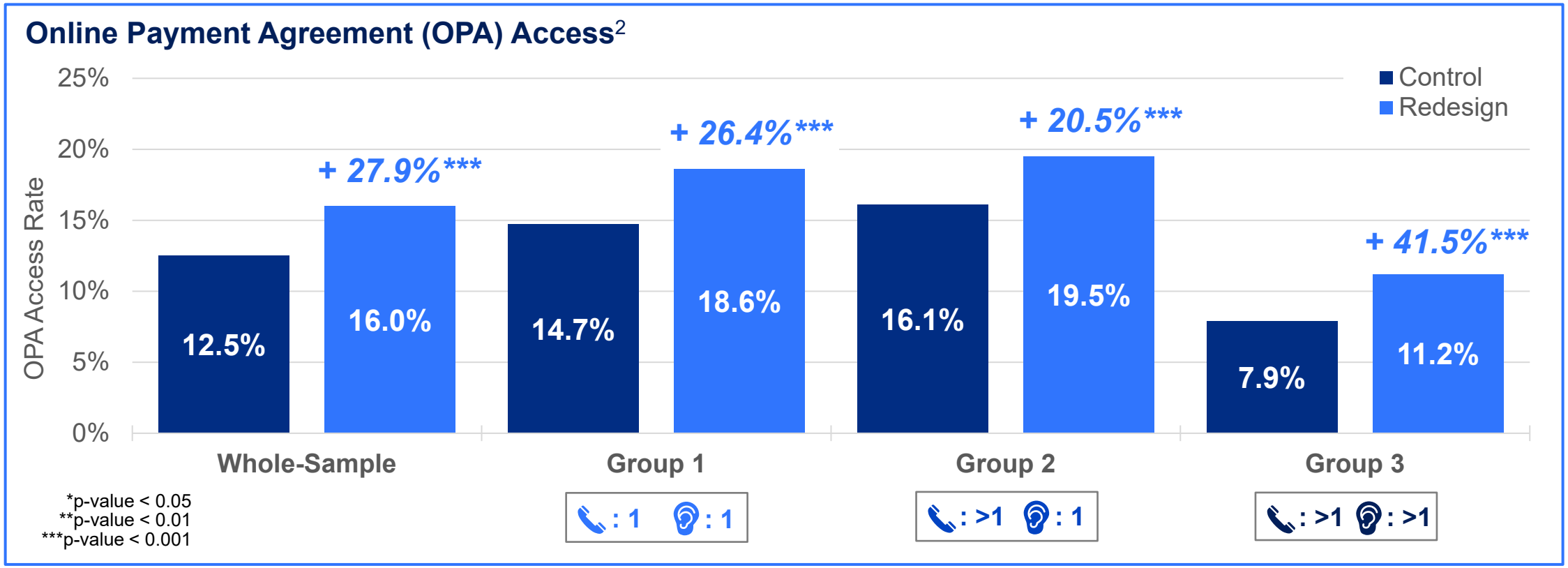


1. Among callers who channel shifted, roughly 59 – 70 percent channel shifted on the same day as their call

Redesigned messages increased online access among callers in all groups



The OPA access rate was significantly higher for callers who heard redesigned messages



If redesigned announcements were implemented at scale on App 75, monthly savings attributable to using OPA to set up a payment plan instead of over the phone would amount to $86,264 - $107,830.[1]

1. Taxpayers save between $76 - $95 by setting up or modifying a payment plan via OPA rather than over the phone.
2. OPA allows individuals and businesses with an outstanding balance in aggregate assessed tax, penalties, and interest, to request a payment plan. Eligibility for Short-Term Plan is balance less than $100K. Eligibility for Installment Agreement is balance less than $50K. 86,234 Calls from OPA-Eligible Taxpayers

Among callers abandoning in queue, a larger proportion of callers who heard redesigned messages abandoned after Message 2 than control callers

Proportion of Callers Who Abandon After Each Message in the Sequence
Pilot Callers who Abandoned in Queue

Group	Prototype	Last Message Heard				
		1	2	3	4	5
Group 1 (: 1 : 1)	Control	4.29%	9.32%	5.08%	2.81%	78.50%
	Redesign	6.36%	13.94%	4.19%	5.14%	70.37%
Group 2 (: >1 : 1)	Control	5.25%	10.23%	5.93%	2.57%	76.02%
	Redesign	6.45%	14.37%	4.81%	5.26%	69.10%
Group 3 (: >1 : >1)	Control	3.66%	8.15%	4.58%	2.77%	80.84%
	Redesign	5.70%	12.09%	4.26%	4.97%	72.99%

Most callers who abandoned before the final message in the sequence do so after the second message. However, a larger proportion of redesign callers abandoned after the second message compared to control callers.

The 2nd message in the redesign sequence informs taxpayers of **cost savings associated with establishing or modifying a payment plan online** rather than over the phone.
The second message in the control sequence informs taxpayers of **general** online payment options available at IRS.gov/payments

Callers who heard redesigned messages were more likely to abandon their call and spent less time waiting to connect with a CSR

Measures of Call Resource Allocation

Group	Prototype	Abandon Rate	Average Speed to Answer (ASA)
Group 1 : 1 : 1	Control	40.5%	88 mins
	Redesign	42.4%	85 mins 56 secs
	Relative Uplift	***+ 4.57%****	***- 2 mins 4 secs****
Group 2 : >1 : 1	Control	49.6%	89 mins 56 secs
	Redesign	51.4%	84 mins 31 secs
	Relative Uplift	***+ 3.63%***	***- 5 mins 27 secs****
Group 3 : >1 : >1	Control	50.9%	85 mins 34 secs
	Redesign	52.8%	85 mins 48 secs
	Relative Uplift	***+ 3.59%****	***+ 14 secs***

Abandon Rate: Callers in Groups 1 and 3 who heard the redesigned messages abandoned at a higher rate than those who heard control messages.

Average Speed to Answer: Callers in Groups 1 and 2 who heard redesigned messages waited, on average, 2 – 5.5 fewer minutes to connect with a CSR than callers who heard the control messages.

Understanding taxpayers' reasons for calling the IRS can inform further improvements to voice messages

- Understanding taxpayer motivations to speak with a CSR can allow for **tailoring of announcements to provide specific guidance for self-service resolution**
- Events occurring on taxpayer accounts (e.g., notice issued, phone call, online authentication, etc.) were evaluated in the 30 days leading up to a pilot call. This string of events is called a **taxpayer journey**.
- Taxpayer journeys were analyzed and segmented to **identify common events or combinations of events leading up to a phone call.**

Taxpayer Journey
Events occurring in 30 days leading up to Pilot call

Online Authentication + **Notice Issued** + **Payment**

Phone Call

Evaluating notice types issued to taxpayers suggests the type of notice issued could influence taxpayers' willingness to channel shift

- Over 60% of pilot taxpayers were sent at least one notice in the 30 days prior to their pilot call. CP504 was the most issued, followed by the CP14, CP90, LT11 and CP49.
- CP14 channel shift rates were highest among the five notices for both redesigned and control messages. CP49 channel shift was lowest for both redesigned and control messages.
- Taxpayers issued CP49 may prefer to connect with a CSR if the call queue messages did not reference the issue specific to the notice

Channel Shift Rate
Most Issued Notices Prior to Pilot Call

Notice Type	Prototype	Channel Shift Rate
CP504 *Final/3rd Balance Due*	Control	**14.8%**
	Redesign	**15.6%**
CP14 *Balance Due*	Control	**16.5%**
	Redesign	**20.1%**
CP90 *Final Notice – Levy, Right to CDP Hearing*	Control	**13.8%**
	Redesign	**15.5%**
LT11 *Final Notice – Notice of Intent to Levy*	Control	**13.1%**
	Redesign	**16.7%**
CP49 *Refund Applied to Other Tax Liability*	Control	**12.5%**
	Redesign	**14.1%**

Taxpayers sent multiple notices may face more complex issues and prefer to wait to speak with a CSR

- More than 50% of taxpayers issued multiple notices prior to calling remained in the queue to connect with a CSR
- Among taxpayers who received two notices, the most common were CP14 and CP504 balance due notices sent in the same 30-day window
- Notices containing conflicting information (e.g., different amount due or different due dates) may cause confusion or stress for taxpayers. Voice prompts could address issues of this nature by direct taxpayers to confirm how much they owe using Online Account.

Call Outcomes
Pilot Callers Issued More than 1 Notice 30 Days Prior to Call

# Notices Issued	Prototype	Call Outcome	
		Connected	Abandoned
Two Notices	Control	51.8%	47.0%
	Redesign	49.4%	48.7%
Three Notices	Control	55.6%	43.6%
	Redesign	54.2%	44.2%
Four or More Notices	Control	58.0%	40.2%
	Redesign	52.8%	45.1%

IRS uses LOS to evaluate its ability to answer taxpayer questions and assist taxpayers in meeting their tax obligations over the phone

$$Level\ of\ Service\ (LOS) = \frac{(CSR\ Answered + Automated\ Answered)}{(CSR\ Answered + Automated\ Answered + \mathbf{Abandoned} + Busy + Disconnected)}$$

Limitations

- LOS does not consider the quality of service provided. Aspects of caller experience, such as time to connect, utility of the call, or overall effort exerted in issue resolution, are not represented
- Redesigned CVP messages sought to improve awareness of available self-service tools for specific issues, empowering callers to decide whether to remain on hold to speak with a CSR or shift online. An increase in the number of callers who shift to self-service, increases the number of ***Abandoned calls***, which may reduce LOS.
- Increased rates of channel shift will negatively impact the LOS metric but will improve the taxpayer experience.

1. Congress requires IRS use LOS to evaluate call center performance – the metric is tied to IRS budget. TIGTA (June 12, 2019). Telephone Performance Measures Do Not Provide an Accurate Assessment of Service to Taxpayers. Page 29.

Incorporating additional measures of service may provide a more holistic view of the taxpayer experience

Level of Access (LOA) measures the proportion of calls received within business hours connected with a CSR.	$$LOA = \frac{(CSR\ Answered + Automated\ Answered)}{(CSR\ Answered + Automated\ Answered + Abandoned + Busy + Disconnected) - x}$$ *x = # calls received outside of business hours*
Average Speed to Answer (ASA) quantifies the amount of time spent waiting to connect with a CSR.	$$ASA = \frac{\sum(Time\ Spent\ in\ Queue\ for\ Connected\ Calls_i)}{Total\ Connected\ Calls}$$
First Contact Resolution (FCR) measures the proportion of taxpayer engagements resulting in resolution without high-touch follow-up events (e.g., phone calls, TAC visits).	$$FCR = \frac{\#\ Taxpayers\ with\ Issue\ Resolved\ on\ First\ Call}{Total\ Connected\ Calls}$$
Taxpayer Effort (TE) estimates effort required to resolve issues; considers all possible channels to engage IRS and assigns weights associated with perceived effort required	$$TE = (1 * OLS) + (2 * Mail) + (3 * Connected\ Calls) + (4 * TAC) + (4 * TAS)$$
Effort to Serve (ETS) evaluates IRS effort required to assist taxpayers with resolving issues	$$ETS = (17 * Mail) + (41 * Connected\ Calls) + (67 * TAC)$$

The effect of redesigned CVP messages is positively captured by measures like Taxpayer Effort and Effort to Serve

Estimated Taxpayer Effort (TE)
30 Days Following 1st Pilot Call

	Prototype	Average TE
Group 1 : 1 : 1	Control	3.35
	Redesign	3.27
	Relative Uplift	***- 2.34%*****
Group 2 : >1 : 1	Control	2.19
	Redesign	2.19
	Relative Uplift	***- 0.10%***
Group 3 : >1 : >1	Control	3.85
	Redesign	3.67
	Relative Uplift	***- 4.62%*****

Redesigned messages significantly decreased the estimated TE for Group 1 and 3 callers. Callers in the redesign group were more likely to abandon and self-serve online, requiring less effort than waiting to connect with a CSR.

Estimated Effort to Serve (ETS)
30 Days Following 1st Pilot Call

	Prototype	Average ETS
Group 1 : 1 : 1	Control	30.8
	Redesign	29.7
	Relative Uplift	***- 3.42%******
Group 2 : >1 : 1	Control	17.9
	Redesign	17.3
	Relative Uplift	***- 3.44%***
Group 3 : >1 : >1	Control	38.3
	Redesign	36.3
	Relative Uplift	***- 5.26%******

Redesigned messages significantly decreased IRS ETS for Group 1 and 3 callers. Callers in the redesign group were more likely to abandon and self-serve online, reducing CSR effort to serve these taxpayers

Conclusions

Applying Behavioral Insights principles to enhance IRS call queue voice prompts can benefit both taxpayers and the Service.

Continuing to develop understanding of taxpayer motivations for calling the IRS can inform further improvements to voice messages.

Using a combination of metrics can offer a more complete picture of the impact of IRS efforts to serve taxpayers and insight into the level of effort require to resolve certain issues.

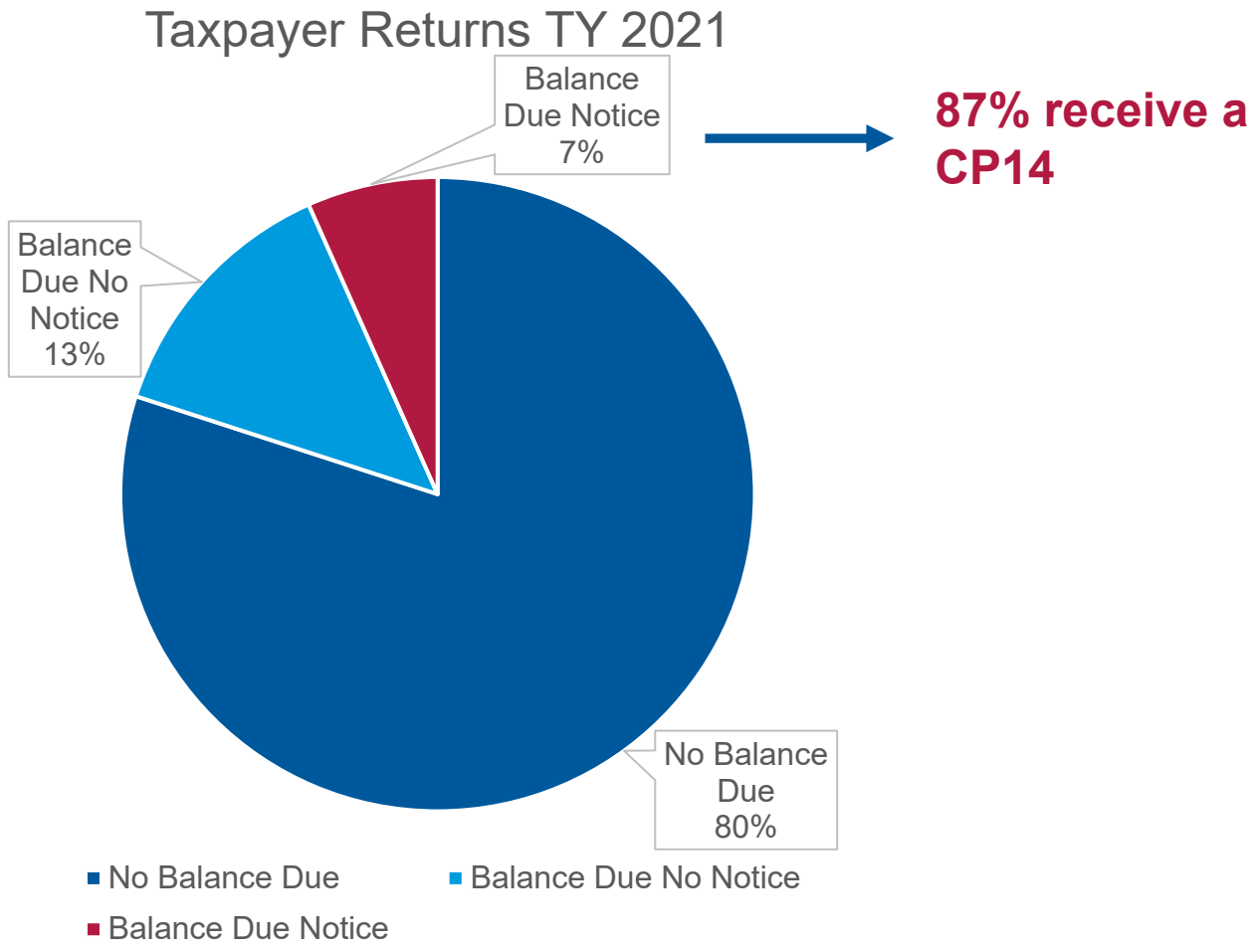
IRS-TPC Research Conference

The Balance Due Taxpayer: Reducing IRS Cost and Taxpayer Burden

June 22, 2023

Balance Due Returns and Notices

- **20% of all returns for TY2021 had a balance due**
- **7% received balance due notice OF SOME TYPE**
- **87% of those received a CP14 Balance Due Notice**
- **CP14 is sent to taxpayers who do not fully pay the amount due or set up an installment agreement by the filing deadline**



Cost to Resolve CP14

The IRS issues approximately 7.5 million CP14 notices per year resulting in multiple downstream costs to resolve.

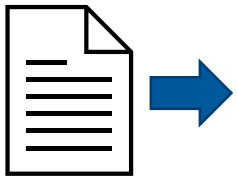
CP14 Issuance	Count	Cost (Per)	Total
CP14	7.5 M	$.51	$3,825,000

Outcome	Count	Cost (Per)	Total
Full Pay	1.2 M	-	-
Installment Agreement	3.3 M	$6.12	$20,196,000
Ignore (Receive CP501)	2.6 M	$0.51	$1,326,000
Call	900,000	$72.73	$65,457,000

Other Outcomes	Cost (Per)
Taxpayer Assistance Center	$251.38
Written Response	$95.47

Where do we want to intervene?

Current Process



Change the notice

- Change format
- Change fonts
- Change language
- Change tables
- Include web links

Improve outcomes

- Increase full pay rate
- Increase IA rate
- Decrease subsequent notices
- Decrease call volume
- Increase web-based tool use

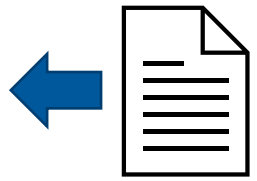
Common theme: The balance due has already occurred and we are remediating the issue.

Change where we focus

- Identify the causes of balance due returns
- Develop strategies to mitigate the causes

Improve outcomes

- Decrease balance due notices
- Decrease downstream cost
  - Calls
  - Notices
  - Other enforcement activity
- Decrease amount owed



Proposed Process

Common theme: Prevent the balance due from occurring through early intervention.

Identifying Balance Due Populations

Three balance due categories

Balance Due Change TY16 to TY17	Count	% of Total
No Change	**110,688,000**	**82.6%**
Refund/even to refund/even	97,512,000	72.8%
Balance due without a CP14 to balance due without a CP14	10,904,000	8.1%
Balance due with a CP14 to balance due with a CP14	2,272,000	1.7%
Favorable Shift	**10,718,000**	**8.0%**
Balance due without a CP14 to refund/even	7,619,000	5.7%
Balance due with a CP14 to refund/even	1,922,000	1.4%
Balance due with a CP14 to balance due without a CP14	1,177,000	0.9%
Unfavorable Shift	**12,539,000**	**9.4%**
Refund/even to balance due without a CP14	9,132,000	6.8%
Refund/even to balance due with a CP14	2,221,000	1.7%
Balance due without a CP14 to balance due with a CP14	1,186,000	0.9%
Total (excludes unknown who filed in TY16 but not in TY17)	**133,945,000**	

Percentages reported may not equal 100% due to rounding

Balance Due Category Changes

Using Chi Square tests of independence and Cramer's V to calculate effect sizes, key triggers for unfavorable balance due changes emerged.

1040 Characteristics	Balance Due Category Change
Filing Status	Marriage -> favorable balance due change
	Divorce -> unfavorable balance due change
Schedule A	Adding Schedule A -> favorable balance due change
	Removing Schedule A -> unfavorable balance due change
Schedule C	Removing Schedule C -> favorable balance due change
	Adding Schedule C -> unfavorable balance due change
Schedules B/D/H	No consistent relationships discovered
Age	Both unfavorable and favorable change increased as age increased
Total Positive Income	Both unfavorable and favorable change increased as total positive income increased

All Chi Square tests of independence were statistically significant, and we followed them with effect size calculations using Cramer's V. Using standard effect size classifications from social science, all effect sizes are categorized as small but noteworthy.

Schedule A : Itemized Deductions, **Schedule B**: Interest and Dividends, **Schedule C**: Profit or Loss from a Business, **Schedule D**: Capital Gains and Losses, **Schedule H**: Household Employees

Risk of Unfavorable Balance Due Changes

Holding age constant and adjusting for total positive income, risk of an unfavorable change was calculated using logistic regression.

Divorce	Removing Schedule A	Adding Schedule C
Dramatic and consistent	Not as dramatic as divorce but impacts more taxpayers	Not as dramatic as divorce but impacts many more taxpayers
Risk of unfavorable change: • Slightly more than **triple the risk of other taxpayers**	Risk of unfavorable change: • Slightly less than **double the risk of other taxpayers**	Risk of unfavorable change: • **Double the risk for taxpayers who had Schedule C in both years or added it in TY17**
Between TY16 and TY17: • 7.8% (45,000) had an unfavorable change and issued CP14	Between TY16 and TY17: • 5 million taxpayers removed Schedule A • 4.1% (205,000) had an unfavorable change and issued CP14	Between TY16 and TY17: • 23 million taxpayers added Schedule C in TY17 or had it in both TY16 and TY17 • 5.2% (1.2 million) had an unfavorable change and issued CP14

Debt Ratio

Median Debt Ratio and Median Debt Ratio Difference	TY 2016 (%)	TY 2017 (%)	Difference
No Change			
Refund/even to refund/even	-5.17%	-4.30%	+0.87
Balance due without a CP14 to balance due without a CP14	2.53%	2.63%	+0.10
Balance due with a CP14 to balance due with a CP14	4.91%	4.57%	-0.34
Favorable Shift			
Balance due without a CP14 to refund/even	1.75%	-2.11%	-3.85
Balance due with a CP14 to refund/even	2.97%	-2.62%	-5.59
Balance due with a CP14 to balance due without a CP14	4.72%	3.86%	-0.86
Unfavorable Shift			
Refund/even to balance due without a CP14	-2.29%	1.63%	+3.92
Refund/even to balance due with a CP14	-2.95%	2.72%	+5.67
Balance due without a CP14 to balance due with a CP14	3.93%	4.40%	+0.47

Note: Negative debt ratios indicate refunds and positive debt ratios indicate balance due

Preventing Unfavorable Balance Due Change

How do we prevent the balance due from occurring? We focus on side effects and activity.

Divorce	Removing Schedule A	Adding Schedule C
• Loss of dependents • 401K withdrawal • Loss of Sch A (mortgage deduction) • Add Sch C (started a side hustle)	• Mortgage deduction • Medical expenses	• Gig economy • Side hustle • Taxpayer fails to account for no withholding

Research, Applied Analytics and Statistics (RAAS) 2021 Comprehensive Taxpayer Attitude Survey finds

- 66% mostly or completely agree with the statement: “I trust the IRS to help me understand my tax obligation”
- 86% mostly or completely agree that “the more information and guidance the IRS provides, the more likely people are to correctly file their tax returns.”

Gap Analysis

Online and other searches on divorce, starting a business, and working in the gig economy provide limited or no guidance to taxpayers naïve of the tax implications of significant life events.

IRS.gov	Google	In-person Support
• Divorce • Starting a small business • Gig Economy	• Divorce • Getting divorced • Starting a new business • How to start a new business • Driving for Uber • Driving for Lyft • Independent contractor	• Divorce attorney organizations • Divorce support groups • Tax preparation organizations, CPAs, and accountants • Tax workshops
Several publications • Technical nature caters primarily to tax professionals and those with knowledge of filing taxes • IRS.gov front page does not specifically address the issue of avoiding a balance due.	• Minimal or no guidance to naïve taxpayers • Adding “and taxes” generates somewhat more helpful information • No “early intervention” guidance • Must know specific keywords to generate useful results	• Provide links for local support groups • Provide links for tax preparation workshops

Intervention

The Taxpayer Experience Office (TXO) is using the results of this study to develop data-driven interventions to help taxpayers avoid a shift to an unplanned balance due.

Develop IRS.gov/divorce

- A landing page for divorced taxpayers and one-stop shop where taxpayers and tax professionals access divorce related tax material.

Develop new material

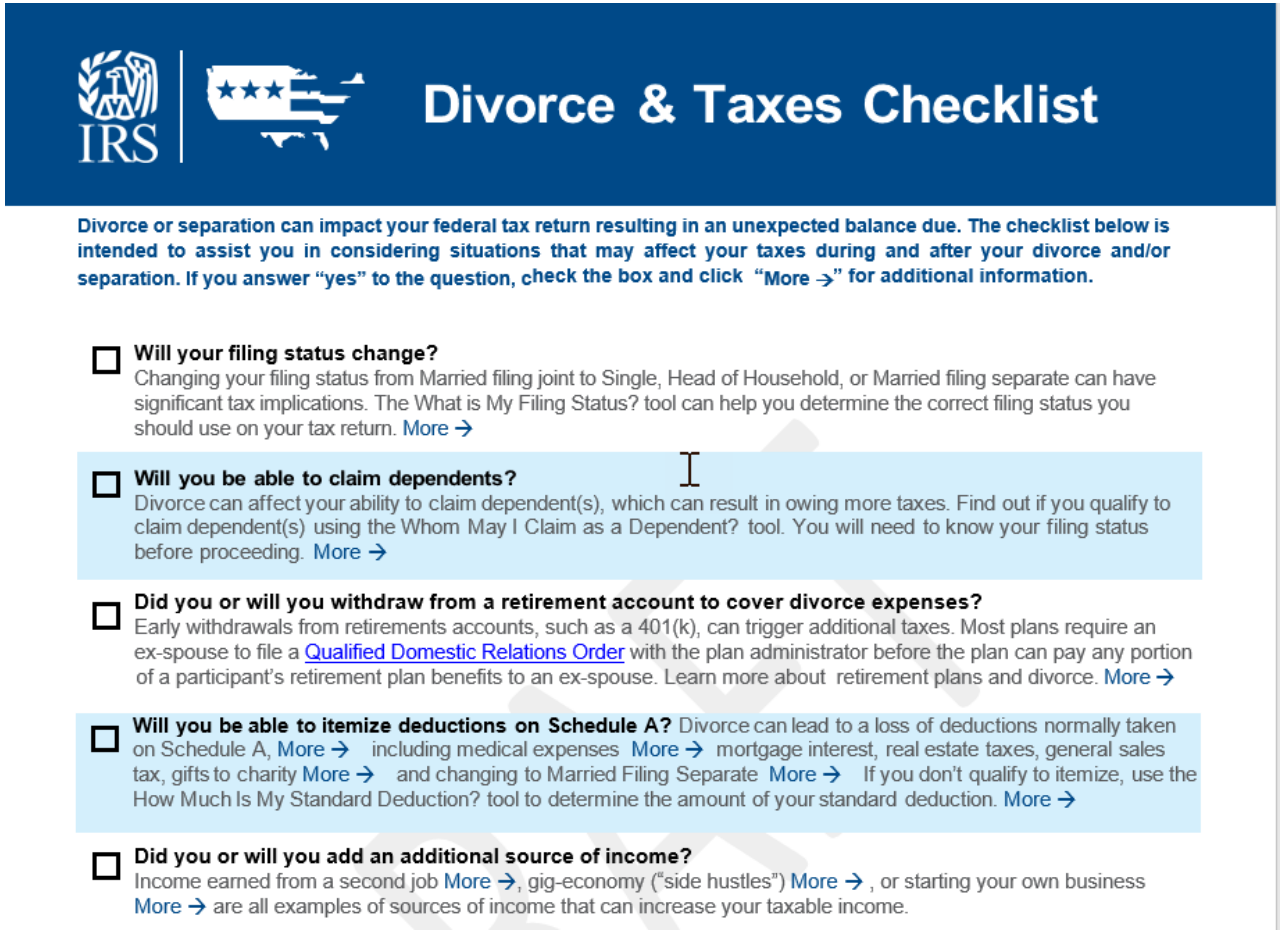
- One-page flyers such as “How to not owe taxes after a divorce” or “5 things to know about divorce and taxes” can grab attention avoid a balance due prior to filing.

Develop an external communication campaign

- Share content through social media, online (IRS.gov) and/or directly with partners.
- Leverage external networks and technology to develop an outreach campaign to drive traffic to IRS.gov/divorce.

Intervention

Divorce and taxes checklist



Divorce & Taxes Checklist

Divorce or separation can impact your federal tax return resulting in an unexpected balance due. The checklist below is intended to assist you in considering situations that may affect your taxes during and after your divorce and/or separation. If you answer "yes" to the question, check the box and click "More →" for additional information.

☐ **Will your filing status change?**
Changing your filing status from Married filing joint to Single, Head of Household, or Married filing separate can have significant tax implications. The What is My Filing Status? tool can help you determine the correct filing status you should use on your tax return. More →

☐ **Will you be able to claim dependents?**
Divorce can affect your ability to claim dependent(s), which can result in owing more taxes. Find out if you qualify to claim dependent(s) using the Whom May I Claim as a Dependent? tool. You will need to know your filing status before proceeding. More →

☐ **Did you or will you withdraw from a retirement account to cover divorce expenses?**
Early withdrawals from retirements accounts, such as a 401(k), can trigger additional taxes. Most plans require an ex-spouse to file a Qualified Domestic Relations Order with the plan administrator before the plan can pay any portion of a participant's retirement plan benefits to an ex-spouse. Learn more about retirement plans and divorce. More →

☐ **Will you be able to itemize deductions on Schedule A?** Divorce can lead to a loss of deductions normally taken on Schedule A, More → including medical expenses More → mortgage interest, real estate taxes, general sales tax, gifts to charity More → and changing to Married Filing Separate More → If you don't qualify to itemize, use the How Much Is My Standard Deduction? tool to determine the amount of your standard deduction. More →

☐ **Did you or will you add an additional source of income?**
Income earned from a second job More →, gig-economy ("side hustles") More → , or starting your own business More → are all examples of sources of income that can increase your taxable income.

Conclusion

Evidence-based intervention

- Identify area of concern
- Discover at-risk populations
- Partner with stakeholders to create and implement targeted solutions

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TAX POLICY CENTER
URBAN INSTITUTE & BROOKINGS INSTITUTION

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

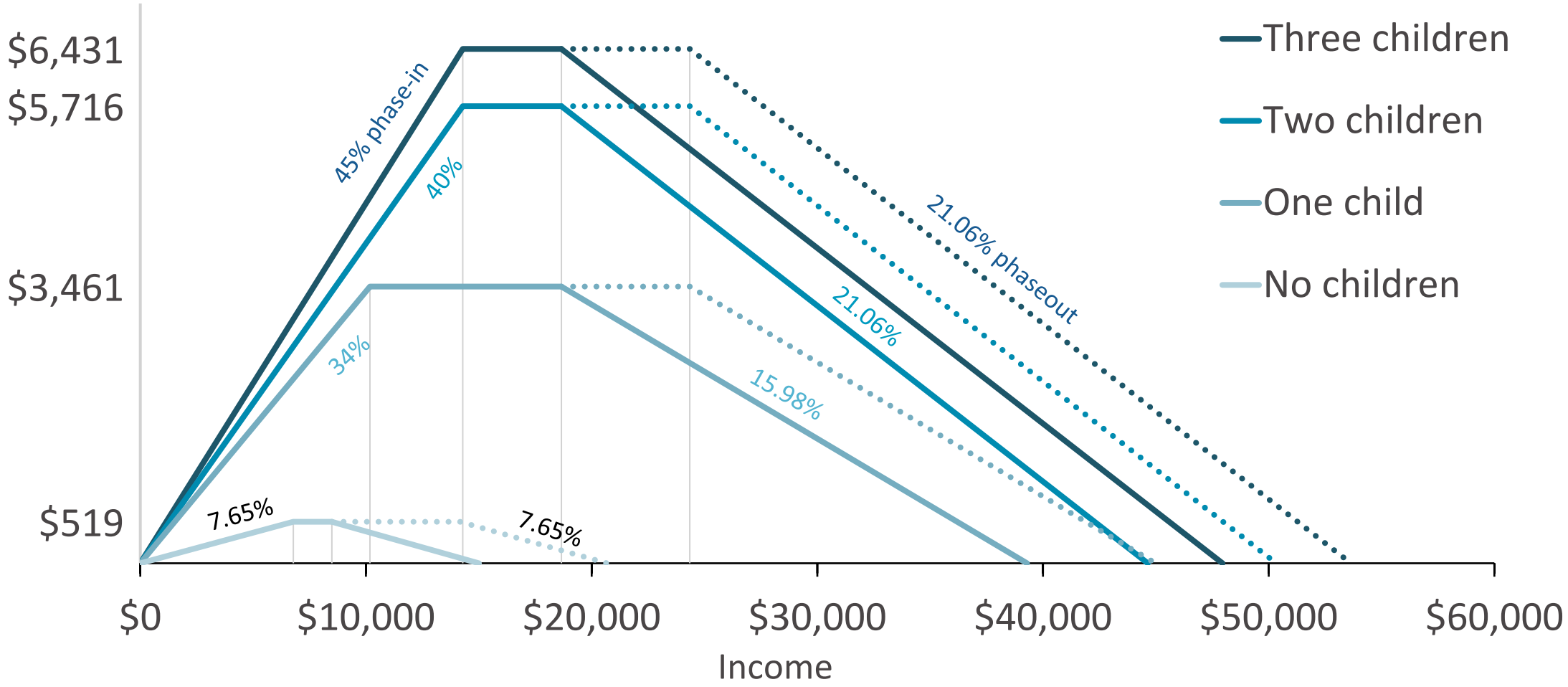
Considerations for Advancing Tax Credits

June 2023 | IRS-TPC Joint Research Conference on Tax Administration | Nikhita Airi | nairi@urban.org | @NikhitaAiri

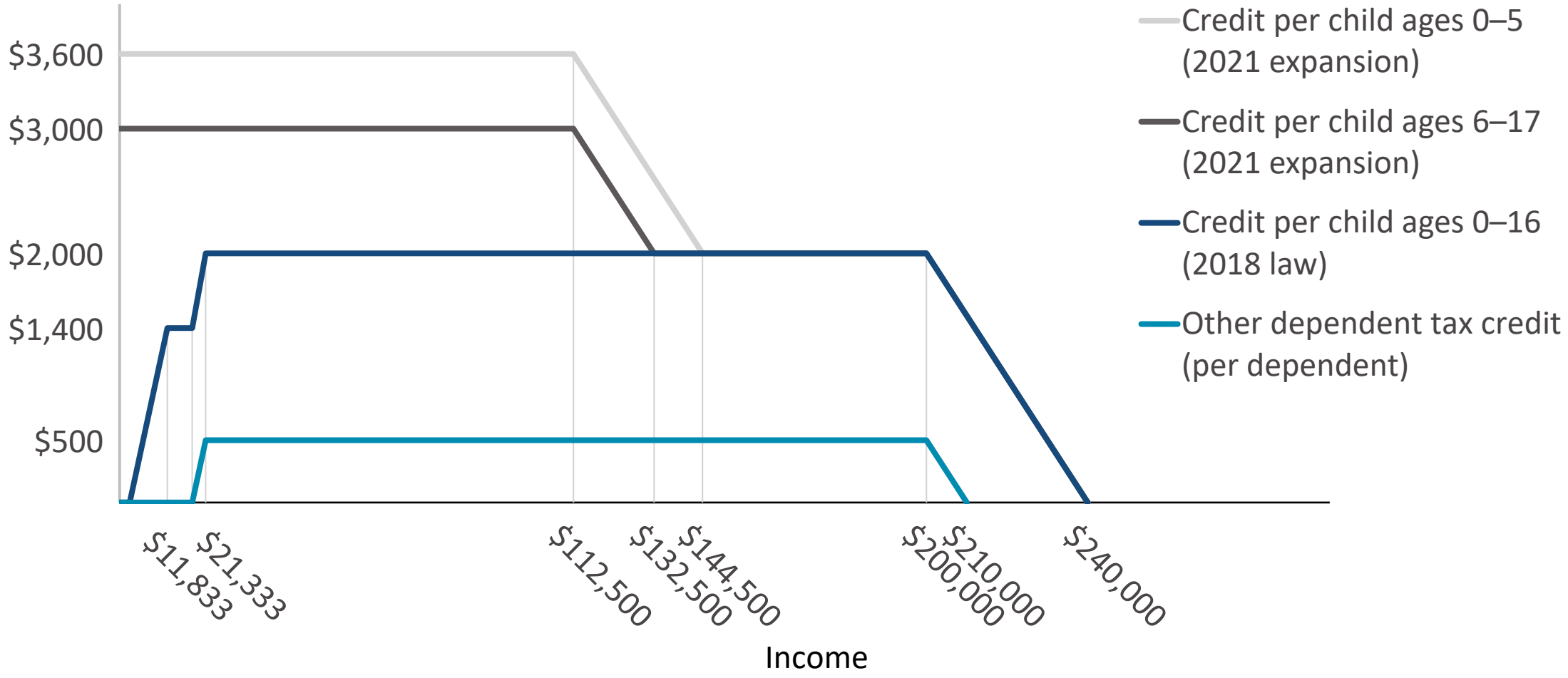
Refundable credits a larger source of income for low-income families

Source: Analysis of 2018 SIPP, Wave 1

Earned Income Tax Credit varies by number of kids, filing status, and income



Child Tax Credit varies by number of kids, filing status, and income



Refundable credits: a large, but unpredictable source of income

- Not all families understand tax system; feel **surprised by tax refund amounts**

- Low-income families have **more volatile incomes,** and increasingly, **complicated tax filing situations**
  - 64% of low-income adults' income spikes above or dips below their average at least one month a year (Maag et al 2017)
  - 60% of low-income families have tax filing ambiguities compared to 40% overall (Michelmore and Pilkauskas 2022)

Lump sum or advanced payments?

- Lump sum and advanced payments help with different forms of hardship (Parolin et al 2022)

- Receiving tax refunds associated with increased doctors' visits and college enrollment (Manoli 2018, Hamad 2019)

- Advanced payments can smooth income, cover day-to-day expenses
- **How accurately can we advance payments and how should overpayments of advance tax credits be resolved?**

Data

- **CPS-ASEC** collects income data from certain households in two consecutive years

- Subset: households with kids during at least one of two years from 2015-2016, 2016-2017, and 2017-2018 waves

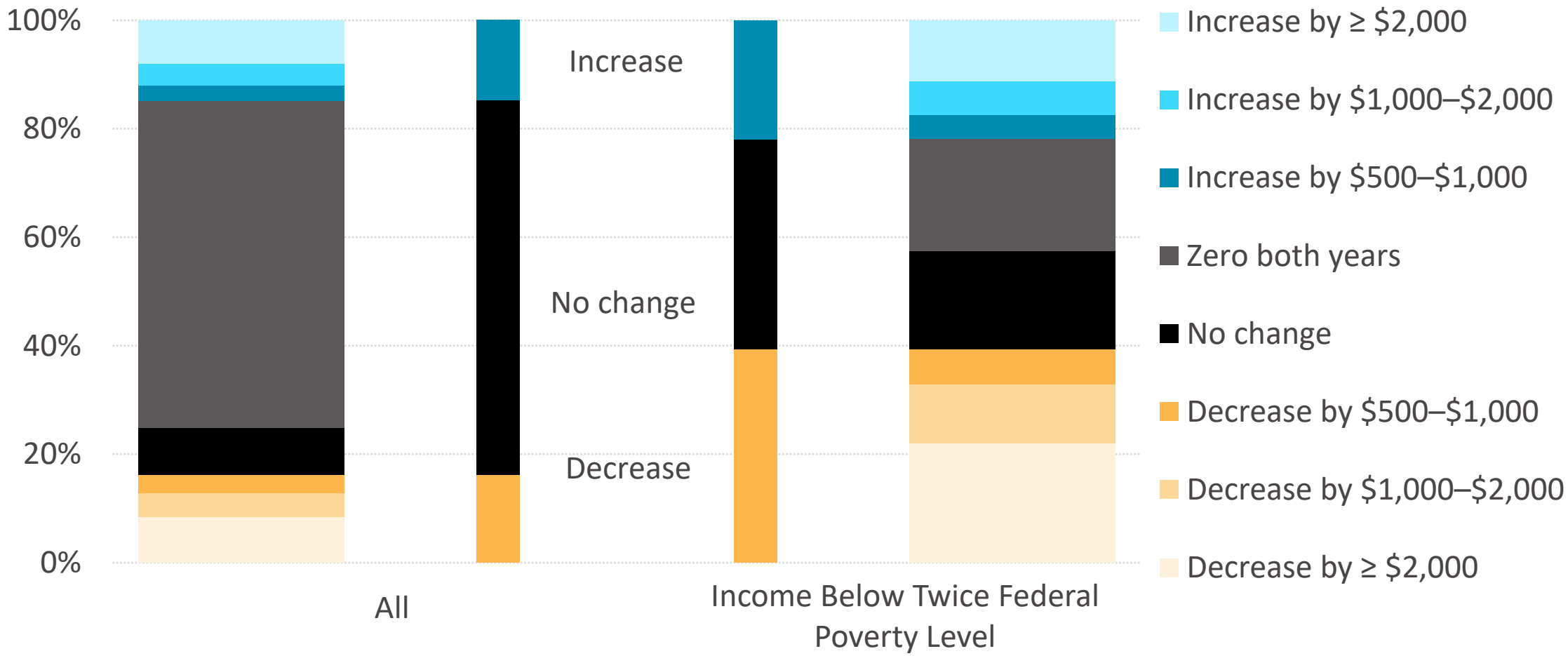
Methods

- Estimated EITC and CTC for households using TRIM3 microsimulation model
- Applied 2018 tax law to all years

- Counted changes in tax credits of at least $500
- Low-income = double federal poverty line

Results: Earned Income Tax Credit

Magnitude of EITC Changes by Income

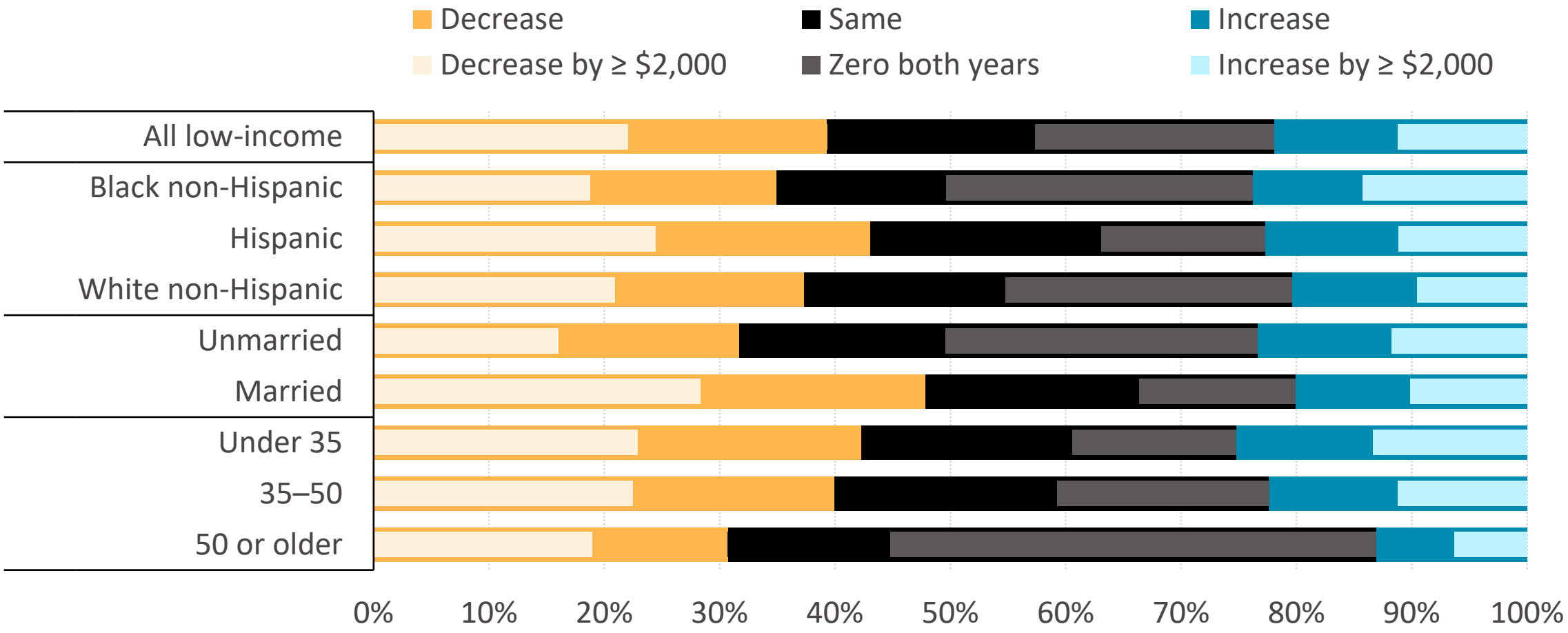


Source: Urban Institute TRIM3 model using data from Current Population Survey Outgoing Rotation Groups 2015–18.
Note: Sample includes households with one dependent child under age 18 in either year. No change is defined as a change of less than $500.

Income drives EITC changes for low-income families

- **Decreases (39%)**
  - **Increase in earnings (28%)**
  - Number of children decreased (5%)
  - Decrease in earnings (6%)
- Stays the same (39%)
- Increases (22%)
  - Income decreased (9%)
  - Income increased (8%)
  - Number of children increased (5%)

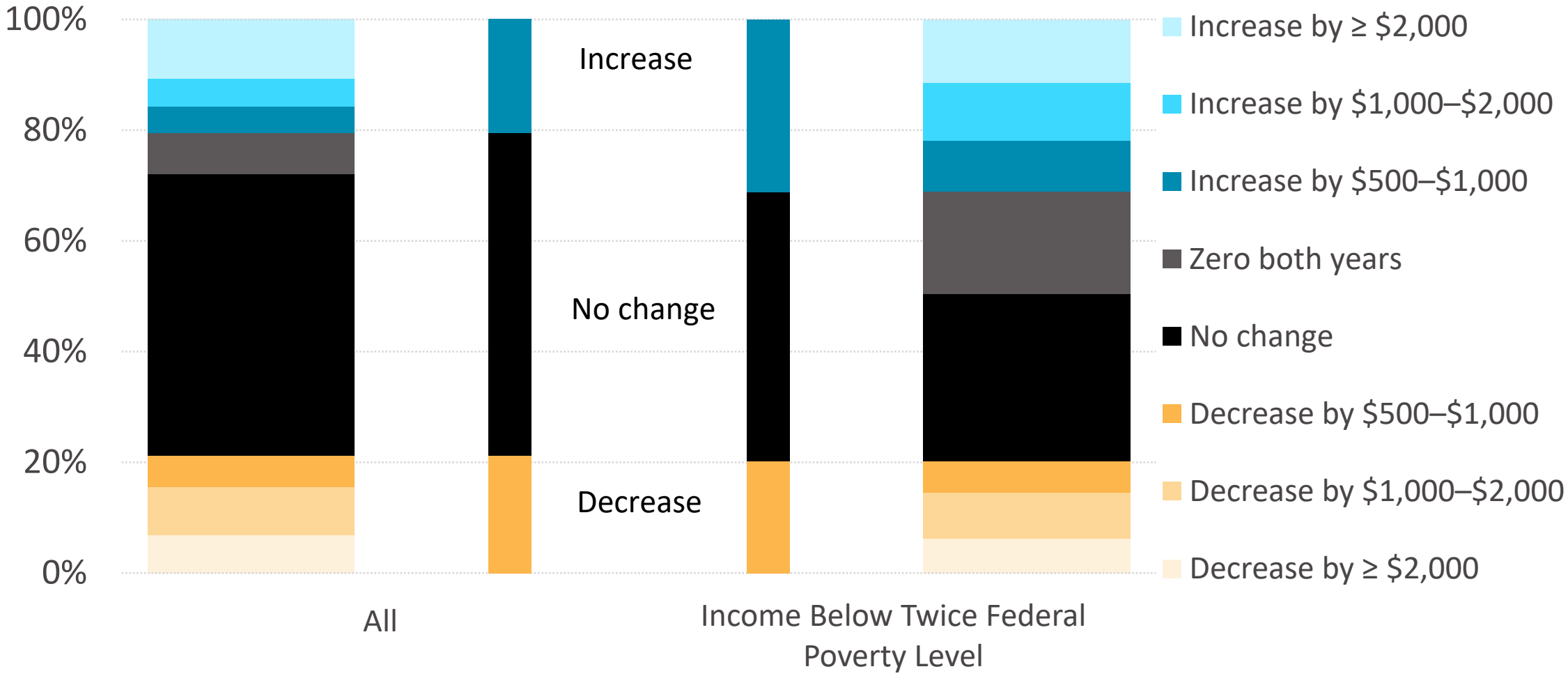
EITC Changes by Household Head Characteristics



Source: Urban Institute TRIM3 model using data from Current Population Survey Outgoing Rotation Groups 2015–18.
Note: Sample includes households with one dependent child under age 18 in either year with incomes below twice federal poverty level in the first year observed. No change is defined as a change of less than $500. Marital status only shown for those with same marital status in both years. Families with marital status changes excluded due to small sample size.

Results: Child Tax Credit

Magnitude of CTC Changes by Income

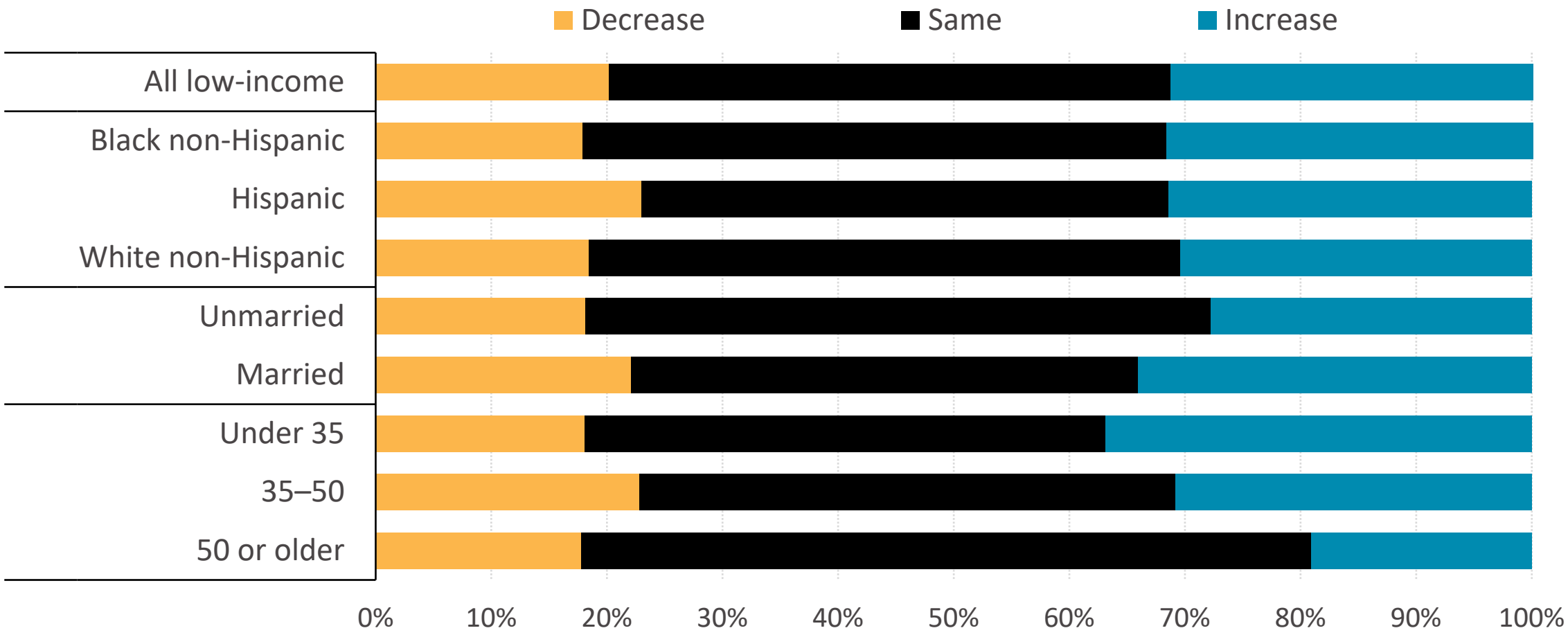


Source: Urban Institute TRIM3 model using data from Current Population Survey Outgoing Rotation Groups 2015–18.
Note: Sample includes households with one dependent child under age 18 in either year. No change is defined as a change of less than $500.

Income bigger driver of CTC changes than kids for low-income families

- Decreases (20%)
  - Income decreased (10%)
  - Number of children decreased (8%)
- Stays the same (49%)
- **Increases (31%)**
  - **Income increased (22%)**
  - Number of children increased (6%)

CTC Changes by Household Head Characteristics



Source: Urban Institute TRIM3 model using data from Current Population Survey Outgoing Rotation Groups 2015–18.
Note: Sample includes households with one dependent child under age 18 in either year with incomes below twice federal poverty level in the first year observed. No change is defined as a change of less than $500. Marital status only shown for those with same marital status in both years. Families with marital status changes excluded due to small sample size.

Implications for policymakers

- **Most but not all** families could accurately predict credits within $500 → A $500 safe harbor level can protect against income and family changes
- 39% of low-income families have EITC decreases and 20% have CTC decreases greater than $500 → Further safeguards like partial advances or higher thresholds might be needed
  - Outreach efforts can help families plan for foreseeable eligibility changes around kids entering/exiting tax unit

Research, Applied Analytics, and Statistics

This document and accompanying presentation is intended to summarize and extend research in the paper by Elzayn et al. (2023). It does not represent IRS or Treasury Department policy.

Differences in Audit Rates by Race

Tom Hertz (RAAS), Brian Sartain (RICS), Kara Leibel (RAAS), Mark Payne (RAAS)

Presented to 13th Annual IRS/TPC Joint Research Conference on Tax Administration

June 22, 2023

Please note:

This document reflects the views of the authors, one of whom (Hertz) is also an author of the paper by Elzayn *et al.* (2023). This work is preliminary and pre-decisional and is being shared in the interest of eliciting constructive feedback to improve our understanding of the issues. The perspectives and findings expressed herein should not be taken to represent IRS or Treasury Department policy.

The IRS does not collect data on taxpayer race. Instead, race was imputed using Bayesian Improved First Name Surname Geocoding (BIFSG), which assigns each taxpayer a probability of belonging to each race/ethnicity category by matching names and addresses to published race/ethnicity distributions. These estimated race data are used for research purposes only; the IRS does not and will not consider race as part of its case selection and audit processes.

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Outline

1. Key findings reported in Elzayn et al. (2023, Stanford U., SIEPR Working Paper)
2. Appraisal of key findings from Elzayn *et al*. (the "Stanford paper")
3. Potential sources of audit rate differences by race
4. Enforcement objectives matter
5. Evidence for algorithmic bias in EITC audit selection
6. Evidence that unscrupulous paid preparers contribute to audit rate gap
7. Conclusions and caveats

Key findings from Elzayn *et al.*

1. Using imputed race data, Elzayn *et al.* find that Black taxpayers were audited at between 2.9 and 4.7 times the rate of non-Black taxpayers in TY2014.

2. They find that the bulk of this gap reflects differences in audit rates by race among EITC claimants.

3. Looking at EITC claimants, they built alternative audit-selection models using representative audit data from the National Research Program (NRP) to try to infer what might be creating a race gap in the outcomes of the operational audit-selection models. They address the following questions:

   a) Which goal? Models that tried to find claimants with the highest *total tax understatements* picked non-Black taxpayers at higher rates; models that tried to find claimants with the *highest overclaimed refundable credits* picked Black taxpayers at higher rates.

   b) Which model? Selecting taxpayers with the highest *expected value* of tax understatements picked non-Black taxpayers at higher rates; selecting those with the highest *probability* of any understatement picked Black taxpayers at higher rates.

   c) Large Schedule Cs? Models that were constrained to audit limited numbers of EITC-claiming returns with large Schedule C enterprises audited Black taxpayers at higher rates than did unconstrained models.

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Appraisal of key findings from Elzayn *et al.*

1. **Subsequent research replicates the headline finding and documents that it is relatively stable over time**
   - This work also extends the analysis to cover Hispanic, Asian & Pacific Islander, White, and All Other/Multiple Race taxpayers, who were grouped together as "non-Black" in Elzayn *et al*.

2. **How much of the audit rate gap is due to…**
   (a) differences in audit rates by race among EITC claimants
   (b) differences in audit rates by race among non-EITC returns
   (c) differences in overall EITC versus non-EITC audit rates

   - Elzayn *et al.*: (a) 78% (b) 8% (c) 14%, which would seem to imply that to reduce the overall race gap we should focus on reducing the race gap in audit rates among EITC returns.

     ✓Other standard decomposition methods assign a larger share of the total to (c), thus placing more emphasis on the EITC/non-EITC audit rate differential.

     ✓Holding all else equal, equating the overall EITC and non-EITC audit rates would have about the same effect on the overall race gap as would equating Black and non-Black EITC audit rates: both would be expected to reduce the gap by about 60%.

3. How informative are the Stanford modeling exercises?

Among EITC returns, the choice of goal, or audit objective, does indeed matter.

Among EITC claimants, the demographics of the distribution of *total tax understatements* are different from the demographics of the distribution of *overclaimed refundable credits*. As a result, models pursuing these two different objectives will produce different audit rate gaps by race.

- Historically, the Refundable Credit audit program has focused on incorrect claims of refundable credits not on total tax understatements.
- The Stanford paper seems to suggest that a change in objective would reduce the race gap and raise total revenue. However, it is important to be clear that the Stanford revenue estimates only hold if all audits are NRP-style audits (full scope, average duration 18 hours), whereas the vast majority of EITC audits have traditionally been conducted as correspondence audits (limited scope, average duration 1.5 hours).

Expected values versus probabilities: Does not appear to be the problem

- Operational EITC audit selection models generally have the primary objective of minimizing the probability of selecting compliant taxpayers, with secondary consideration given to revenue
  - *Note*: Avoiding selecting compliant taxpayers is particularly important for pre-refund audits of low-income taxpayers, where the refund is frozen until the audit is completed.
- Subsequent analysis by the Stanford team has confirmed that when the objective is refundable credit overclaims, models of the probability of noncompliance select *fewer* Black taxpayers than do models of the expected value of noncompliance. (The opposite is true if the objective is total tax understatements.)
- This suggests that the use of probability-based models is not driving up the audit rate gap.

Under-representation of larger Schedule Cs

- Stanford found that EITC returns with larger Schedule C businesses are audited at lower rates than their models suggest is economically optimal, and that selecting more such returns would reduce the Black/non-Black audit rate gap.
- However, this conclusion applies to models that predict *total tax understatements* and *audit the full return*.

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Potential sources of audit rate differences by race

1. ***Eligibility criteria*: *Example:*** Married couples can claim stepchildren, but unmarried taxpayers cannot claim their partner's children, even if co-resident, and run the risk of being audited if they do. This could potentially have a disparate impact on Black taxpayers, who have lower marriage rates.

2. ***Unscrupulous preparers*:** Preparers who submit lots of false claims for EITC (and are spotted by IRS's Preparer Strategy program) draw clients disproportionately from minority communities.

3. ***Exam objectives:*** Minimize no-changes? Find largest credit overclaims? Find largest *total* tax changes? More single-issue audits or fewer, longer, multi-issue audits? These policy choices have demographic implications.

4. ***Actual algorithmic bias:*** Algorithmic bias occurs when a model for a particular audit selection workstream generates demographic differences in audit rates that cannot be explained by underlying differences in noncompliance (as defined in relation to the existing tax code, and in pursuit of chosen enforcement objectives).

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Enforcement objectives matter

- There are many plausible ways to measure and identify noncompliance with the tax code, which serve different enforcement objectives. Each will result in a different mix of returns selected for audit that may also be distributed differently among subgroups in the population. Enforcement objectives may include:

  ✓ Maximizing net enforcement revenue for a given enforcement budget: Audit according to marginal revenue/cost, subject to current staffing levels and skills constraints.

  ✓ "Proportionality:" The principle that audit risk should rise sharply with value of total tax understatement, even if that does not maximize enforcement revenue. (Note: not the same as vertical equity.)

  ✓ Minimize audits of compliant taxpayers (but sacrifice some revenue).

  ✓ Minimize improper payments of refundable credits: Leads to higher audit rates for Black taxpayers.

  ✓ Maintain minimum coverage across all types of returns and all types of noncompliance: Recognize variety of audit workstreams – there is no single model.

  ✓ Maximize total Federal revenue: Emphasize deterrent properties of enforcement.

- For any given set of objectives, it is possible to estimate the expected demographics of taxpayers who meet the corresponding audit criteria. Deviations from those targets are then diagnostic of algorithmic bias.

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Evidence for algorithmic bias in EITC audit selection

- Research suggests that the current Black/non-Black EITC audit rate ratio is higher than the Black/non-Black noncompliance rate ratio, no matter how noncompliance is defined.
- This suggests that algorithmic biases do contribute to the EITC audit rate gap.
- To date three mechanisms that contribute to algorithmic bias have been found:
  - ✓ The residency and relationship status of dependents must be imputed from incomplete information, and this process is not error-free. Imputation errors appear to raise the audit risk for Black EITC claimants relative to others. Modernizing models and supplementing existing data sources may be able to mitigate this problem.
  - ✓ Aging models: Updating the existing EITC scoring model could potentially increase exam revenue *and* reduce racial bias.
  - ✓ In the past, weekly audit selection targets led to over-selection in some weeks; this drove down audit quality and appears to have created racial bias. This problem has largely been resolved.

Evidence that unscrupulous paid preparers contribute to audit rate gap

- Since 2005 the IRS has monitored paid return preparers who submit large numbers of high-risk returns claiming refundable credits on behalf of their clients. Preparers are subject to civil and criminal penalties, which do have some effect on subsequent behaviors. Treasury has proposed expanded and increased penalties for unscrupulous preparers.

- In TY2019, 17 million returns (of which 5.8 million claimed EITC) were submitted by preparers known to this program on behalf of clients drawn disproportionately from minority communities.

- Calculating audit rates after *excluding* all returns from identified unscrupulous preparers, the overall Black/non-Black gap in audit rates falls by 21% (for TY2019).

Conclusions and caveats

- The emphasis on preventing overclaims of EITC credits is reflected in both the *number* of EITC audits conducted and in the way EITC claimants are selected for audit. In both cases, this emphasis serves to raise audit rates for Black taxpayers relative to others.
  - ✓Ongoing research is evaluating the hypothesis that a change in audit objectives, to focus on top-dollar tax understatements among claimants of refundable credits, is feasible in a pre-refund correspondence audit environment.
  - ✓This includes estimating outcomes in terms of differences in audit rates by race, burden on compliant taxpayers, and enforcement revenue.
- There is evidence of algorithmic bias. Preliminary research has identified potential updates to algorithms that may be able to lower the Black/non-Black audit rate gap while improving audit outcomes.
- Improvements to audit selection algorithms will take time to test and implement and are critically dependent on the funding made available through the IRA.

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

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

Discussant:

Emily Lin

U.S. Department of the Treasury

Balance Due Accounts

- Costly to the IRS; burdensome to taxpayers; emphasis on preventive measures
- More situations in general
  - income withholding, departure of a child, etc.
- Restrict the analysis to CP14 issuance
  - Majority of those with an unfavorable shift in balance due status did not involve a CP14; Effect of income
- Behavioral insights to create additional opportunities for communication, education during the tax year
  - Not only when a life event occurs
- Prevent costly downstream activities

Yearly Changes in Credits

- Large year-to-year swings in EITC and CTC; effects vary with demographics; important implications for the design of advance credits
- Child may be claimed by another taxpayer
  - Child well-being vs. credit a taxpayer is entitled to
- Marital status change: income and child residency changes
- Long-term trend in living situations: Connect to the paper's focus on yearly shifts; implications
- What would happen if advance credits were based solely on prior-year income and family structure?
  - Conditions: changes are predictable, reportable; credit designs matter
- Minimize the risk of unexpected and unfavorable yearly changes in the credit amount: communications and education

Changes to Voluntary Compliance Following Random Audits on Income Tax Returns

Murat Besnek & Allan Partington

Terminology

- **Compliant:** Taxpayers that didn't require any adjustments to their net tax amounts during the random enquiry program (REP).
- **Non-Compliant:** Taxpayers that had some adjustments made to their net tax amounts during the REP.
- **Individuals Not in Business (INIB):** Taxpayers that are a part of the individuals tax gap population.
- **Small Business – Individuals in Business (SB-IIB):** Individual taxpayers that are a part of the small business tax gap population.
- **Small Business – Small Company (SB-SC):** Company taxpayers that are a part of the small business tax gap population.

Types of Revenue Collected from Audits

AUDIT YIELD	DIRECT FLOW-ON	INDIRECT FLOW-ON
This is the revenue collected from the adjustments made during the audit process.	This is referred to as the **direct deterrent effect** and includes the revenue collected from the changes in future voluntary compliance of audited taxpayers.	This is referred to as the **indirect deterrent effect** and includes the revenue collected from the spill-over effects on non-audited taxpayers.

Application to the ATO

- Activities like audits are the primary reason for compliance in the tax system.
- Without these strategies no rational taxpayer would comply, and instead prefer to free-ride.
- We know that it is not financially possible to pursue every taxpayer.
- So the payoffs for non-compliance is an expected value—the payoffs multiplied by the probability of not being caught.
- Taxpayer characteristics like being risk-averse could also impact these payoffs.
- The more credible the threat of an audit, the lower the payoffs for non-compliance, making it more beneficial to contribute rather than to free-ride.

REP Dataset

- The REP involves reviewing the returns of randomly selected taxpayers from the INIB, SB-IIB and SB-SC populations.
- At the commencement of this study, there were three years (2015, 2016 and 2017) of REP data available.
- The REP taxpayers of each year are analysed separately, but a joined estimate will also be provided.
- We only include REP taxpayers that have been contacted by the ATO, using the allocation date as a proxy for the date the taxpayer was contacted.

REP Dataset Cont.

- For each year of the REP, we also randomly select a control group that is approximately ten times larger in total numbers.
- We use net tax as our dependent variable (y_i).
- Once the dataset has been pulled together, we acquire all the net tax amounts for each taxpayer between the years of 2011-2020.
- We checked that the control group does not include any taxpayers that were contacted by the ATO during this period.
- A Wilcoxon rank-sum test is applied to confirm that the behaviours of the treated and control groups were similar in the pre-audit periods.

REP Dataset Cont.

- We remove all the net tax amounts that were part of the REP year, since we are only interested in voluntary compliance.
- For instance, for the taxpayers that were a part of the 2015 REP, we remove their 2015 returns from the dataset.
- This applies to both the treated and the control groups.

Audit Yield

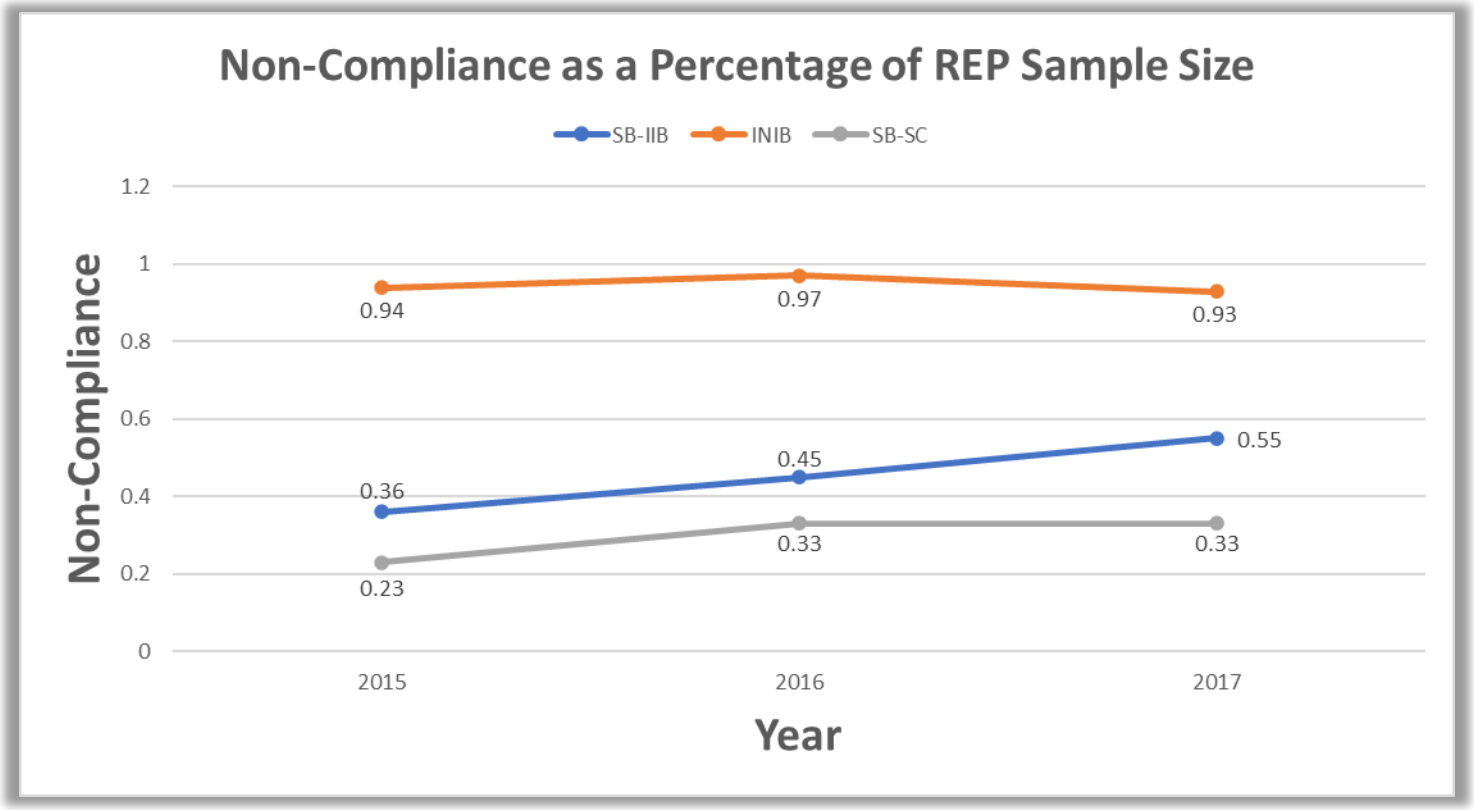
AVERAGE AUDIT YIELD

	2015	2016	2017	Joined
INIB	$1,071	$1,098	$881	$1,018
SB-IIB	$3,914	$2,001	$12,253	$6,936
SB-SC	$900	$2,705	$4,129	$2,433
REP Average	$1,962	$1,935	$5,754	$3,462

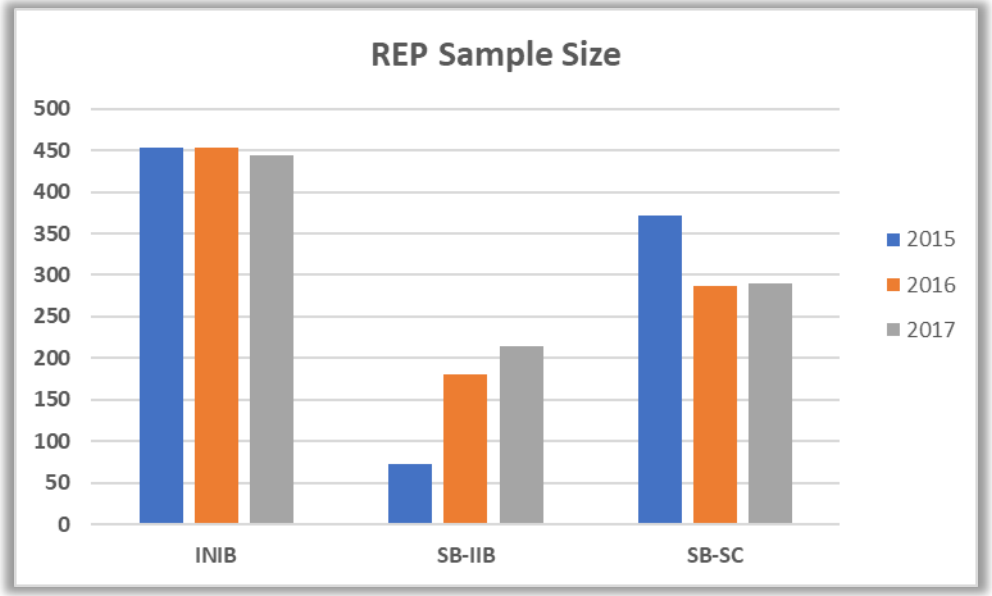
TOTAL AUDIT YIELD

	2015	2016	2017	Joined
INIB	$487,284	$497,386	$391,127	$1,375,797
SB-IIB	$301,397	$368,150	$2,658,827	$3,328,374
SB-SC	$334,933	$776,270	$1,197,467	$2,308,670
REP Total	$1,123,614	$1,641,806	$4,247,421	$7,012,841

Non-Compliance as a Percentage of REP Sample Size



REP Sample Size



Popular Fix: Using a Log-Linear Model

- Research in tax administration uses positively skewed datasets with $y_i = 0$ frequently.
- OLS estimators are not appropriate for statistical inference due to the violation of the normality assumption.
- The common approach is to estimate models using log-transformed dependent variables to deal with normality issues.
- The log-linear model is not suitable due to Jenny's inequality.
- Jenny's inequality implies that $E(\ln(y)) \neq \ln E(y)$, so retransforming coefficients from the log-linear model back to unlogged terms results in biased estimates (Motta, 2019).
- The retransformed estimates need to be adjusted for heteroscedasticity.
- If not, we can draw misleading conclusions about the parameters.

Adding a Positive Constant

- Another major issue with the popular fix is the inability to log zeros.
- So if we decide to use a log-log transformation to avoid un-logging the coefficient estimates, we still need to add a positive constant to all observations of y_i for the log-log transformation to be feasible.
- So deleting the zeros or giving them a small positive value can worsen the heteroscedasticity across the regressors (Motta, 2019).
- Moreover, the size of the positive constant needed will depend on the data at hand, so adding the smallest possible value (for example, the value of 1) is not the least harmful choice.
- In Bellégo et al. (2021), it is shown that the best value for the positive constant is not necessarily small nor equal to 1 contrary to common belief.

Estimating with PPML

- Instead of trying to correct for biasedness in log-linear or log-log models, the Poisson pseudo-maximum likelihood (PPML) is a robust substitute (Silva and Tenreyro, 2006; Correia, Guimarães and Zylkin, 2019).
- PPML is a method based on the Poisson regression with robust standard errors.
- The estimator is based on the conditional mean; therefore, the data does not have to have a Poisson distribution nor does y_i need to be an integer (Gourieroux, Monfort & Trognon, 1984).
- However with continuous data the assumption about the conditional mean equalling the conditional variance is unlikely to hold.
- For this reason the standard errors need to be based on the Eicker-Huber-White robust covariance estimator (Eicker, 1960; White, 1980).

Estimating with PPML Cont.

- The PPML model is becoming the industry standard in estimating multiplicative models for continuous data (following the advice of experts like Jeffery Wooldridge).
- The reason why the estimator is becoming popular is that the only condition required for consistency is the correct specification of the conditional mean.
- The estimator does not assume equality between the mean and the variance, nor does it require a constant variance.
- Poisson regression can also handle zeros in the dataset unlike the log-linear or log-log models that require the researcher to add a positive constant to all observations of y_i which may arbitrarily bias the estimates and their standard errors.

Difference in Differences Method

- Difference in differences (DID) method will be employed to measure the changes to voluntary compliance following the REP.
- D1 is the difference in net tax prior to the audit with those after the audit for the REP taxpayers .
- Any value in D1 can be a result of the REP, but also other possible events.
- To take into account some of these other possible events, we randomly select other taxpayers from the same population and year that were not a part of the REP.
- We also make sure that these taxpayers were not contacted by the ATO for other reasons during the period of interest, which is between 2011-2020.

DID Method Cont.

- D2 is the difference in net tax prior to the audit with those after the audit for these randomly selected taxpayers.
- Taking away D2 from D1 gives us the standard DID results.

$$\text{DID} = \text{D1} - \text{D2}$$

$$(\mu_{t,post} - \mu_{t,pre}) - (\mu_{c,post} - \mu_{c,pre})$$

DID Method Cont.

- The standard DID method in regression form:

$$\text{NET TAX} = \beta_0 + \beta_1 DUMMY_{POST\_AUDIT} + \beta_2 DUMMY_{TREATED} + \beta_3 DUMMY_{POST\_AUDIT} DUMMY_{TREATED} + e_t$$

$$\beta_0 = \mu_{c,pre}$$

$$\beta_0 + \beta_1 = \mu_{c,post}$$

$$\beta_0 + \beta_2 = \mu_{t,pre}$$

$$\beta_0 + \beta_1 + \beta_2 + \beta_3 = \mu_{c,post}$$

DID Method Employed in Gemmell and Ratto (2012)

- Gemmell and Ratto (2012) introduce a new variation of the DID method to account for the differences between the behaviour of compliant and non-compliant taxpayers.

$$\text{NET TAX} = \beta_0 + \beta_1 DUMMY_{POST\_AUDIT} + \beta_2 DUMMY_{POST\_AUDIT} DUMMY_{COMPLIANT} + \beta_3 DUMMY_{POST\_AUDIT} DUMMY_{NON\_COMPLIANT} + \delta_t + e_t$$

$$\beta_0 + \beta_1 = \mu_{control,post}$$

$$\beta_0 + \beta_1 + \beta_2 = \mu_{compliant,post}$$

$$\beta_0 + \beta_1 + \beta_3 = \mu_{non\_compliant,post}$$

$$\delta_t = Individual\ fixed\ effects$$

DIRECT FLOW-ON EFFECTS FOR INIB USING THE PPML ESTIMATION METHOD

The average audit yields were $1,071 in 2015, $1,098 in 2016 and $881 in 2017 for this population. If we use the joined results, the average audit yields equal $1,018.

The per year direct flow-on effects for non-compliant taxpayers were $1,043 in 2015, -$2,740 in 2016 and $542 in 2017. If we use the joined regression coefficients, the per year direct flow-on effects for non-compliant taxpayers equal -$475.

		WRE PPML	COEFFICIENTS	P-VALUE
2015	POST-AUDIT	-	0.287	0.000
	POST-AUDIT * COMPLIANT	-	0.050	0.792
	POST-AUDIT * NON-COMPLIANT	$1,043	0.079	0.008
2016	POST-AUDIT	-	0.309	0.000
	POST-AUDIT * COMPLIANT	-	0.177	0.249
	POST-AUDIT * NON-COMPLIANT	-$2,740	-0.189	0.000
2017	POST-AUDIT	-	0.322	0.000
	POST-AUDIT * COMPLIANT	-	-0.160	0.199
	POST-AUDIT * NON-COMPLIANT	$543	0.045	0.054
JOINED	POST-AUDIT	-	0.307	0.000
	POST-AUDIT * COMPLIANT	-	-0.006	0.942
	POST-AUDIT * NON-COMPLIANT	-$475	-0.036	0.073

DIRECT FLOW-ON EFFECTS FOR SB-IIB USING THE PPML ESTIMATION METHOD

The average audit yields were $3,914 in 2015, $2,001 in 2016 and $12,253 in 2017 for this population. If we use the joined results, the average audit yields equal $6,936.

The per year direct flow-on effects for compliant taxpayers were -$2,720 in 2016. As for non-compliant taxpayers they were $3,077 in 2015 and $5,554 in 2016. If we use the joined regression coefficients, the per year direct flow-on effects for compliant taxpayers equal -$1,898 and for non-compliant $2,616.

		WRE PPML	COEFFICIENTS	P-VALUE
2015	POST-AUDIT	-	0.264	0.000
	POST-AUDIT * COMPLIANT	-	-0.118	0.408
	POST-AUDIT * NON-COMPLIANT	$3,077	0.292	0.016
2016	POST-AUDIT	-	0.217	0.000
	POST-AUDIT * COMPLIANT	-$2,720	-0.193	0.019
	POST-AUDIT * NON-COMPLIANT	$5,554	0.394	0.000
2017	POST-AUDIT	-	0.269	0.000
	POST-AUDIT * COMPLIANT	-	-0.094	0.224
	POST-AUDIT * NON-COMPLIANT	-	0.032	0.723
JOINED	POST-AUDIT	-	0.248	0.000
	POST-AUDIT * COMPLIANT	-$1,898	-0.148	0.007
	POST-AUDIT * NON-COMPLIANT	$2,616	0.204	0.002

DIRECT FLOW-ON EFFECTS FOR SB-SC USING THE PPML ESTIMATION METHOD

The average audit yields were $900 in 2015, $2,705 in 2016 and $4,129 in 2017 for this population. If we use the joined results, the average audit yields equal $2,433.

The per year direct flow-on effects for compliant taxpayers were $3,742 in 2015, $4,981 in 2016 and $5,529 in 2017. As for non-compliant taxpayers they were $18,130 in 2016. If we use the joined regression coefficients, the per year direct flow-on effects for compliant taxpayers equal $4,848 and for non-compliant $5,955.

		WRE PPML	COEFFICIENTS	P-VALUE
2015	POST-AUDIT	-	0.164	0.000
	POST-AUDIT * COMPLIANT	$3,742	0.189	0.100
	POST-AUDIT * NON-COMPLIANT	-	0.001	0.995
2016	POST-AUDIT	-	0.120	0.000
	POST-AUDIT * COMPLIANT	$4,981	0.200	0.023
	POST-AUDIT * NON-COMPLIANT	$18,130	0.728	0.004
2017	POST-AUDIT	-	0.185	0
	POST-AUDIT * COMPLIANT	$5,529	0.195	0.008
	POST-AUDIT * NON-COMPLIANT	-	0.056	0.651
JOINED	POST-AUDIT	-	0.154	0.000
	POST-AUDIT * COMPLIANT	$4,848	0.197	0.000
	POST-AUDIT * NON-COMPLIANT	$5,955	0.242	0.039

Conclusions

- We used a random dataset to improve the accuracy of the estimates.
- We employed the industry standard when it came to the modelling phase, that being the PPML method (following the advice of Jeffery Wooldridge and many other academic papers).
- Our approach/model does not deviate from what the raw data suggests (other than making the estimates more precise), which can be confirmed by comparing it to the standard DID estimates which only require algebra to compute.
- The direct flow-on effect for non-compliant taxpayers in the INIB population is negative.
- The direct flow-on effect for compliant taxpayers in the SB-IIB population is negative.
- The direct flow-on effect for non-compliant taxpayers in the SB-IIB population is positive.

Conclusions Cont.

- The direct flow-on effect for both compliant and non-compliant taxpayers in the SB-SC population is positive, but larger for non-compliant taxpayers.
- Yearly treatment effects seem to remain steady, lasting multiple years following the audit allocation date.

What's Next?

- Extend the analysis using 2018 REP data.
- Incorporate the operational audit data to see if it suggests that risk based audited taxpayers behave differently to the taxpayers in the REP.
- Attempt to estimate the indirect flow-on effect using ATO data.

The Long-Term Impacts of Audits on Nonfiling Taxpayers

IRS-TPC Research Conference on Tax Administration

June 22, 2023

India Lindsay and Jess Grana (The MITRE Corporation)
Alan Plumley (IRS)

Research, Applied Analytics & Statistics
KNOWLEDGE DEVELOPMENT & APPLICATION

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Background: Nonfiling Taxpayers

- Nonfilers are responsible for $32 billion (9%) of the individual income tax gap[1]
  - Population of interest: nonfilers with at least $100k income
    - Income determined from 3rd party reported income
  - Higher earning nonfilers owe greater than 73% of the nonfiling gap[2]

TY 2014-2016 Estimates of Tax Gap

Total True Tax Liability	Tax Paid Voluntarily & Timely	Gross Tax Gap				Enforced & Other Late Payments	Net Tax Gap (Tax Not Collected)
		Nonfiling	Underreporting	Under-payment	Gross Tax Gap		
$3,307	$2,811	$39	+ $398	+ $59	= $496	− $68	= $428
By Type of Tax							
Individual Income Tax	Individual Income Tax	Individual Income Tax	Individual Income Tax	Individual Income Tax	Individual Income Tax	Individual Income Tax	Individual Income Tax
$1,740	$1,383	$32	+ $278	+ $47	= $357	− $51	= $306

Source: https://www.irs.gov/pub/irs-pdf/p1415.pdf

1. https://www.irs.gov/pub/irs-pdf/p1415.pdf
2. TIGTA 2020

Background: Decline in Audit Resources

- Increase in the number of nonfilers identified every year
  - 7.5 million in 2010 → 10.7 million in 2016
- Decrease in resources to audit these individuals
  - 3.5 million cases started in 2010 → 0.8 million cases started in 2018
- IRS 2020 Nonfiler Enforcement Initiative[1] promises stronger pursuit of nonfilers, specifically higher earning individuals
- IRS Inflation Reduction Act Strategic Operating Plan[2] to "address high-dollar compliance issues"
- ROI metrics needed to evaluate indirect impact of audits

Research Question:

What is the effect of an audit on the long-term filing behavior of a nonfiling taxpayer?

1. https://www.irs.gov/newsroom/irs-increasing-focus-on-taxpayers-who-have-not-filed-tax-return
2. IRS 2023

Relevant Literature

- Conflicting theory on how enforcement affects future filing behavior:
  - Deterrence effect: audits deter future noncompliance
  - Bomb crater effect: individuals are more likely to be noncompliant following an audit
- Literature on nonfilers suggest factors influencing filing behavior include income visibility, persistence of filing behavior, and taxpayer's perception of government and sense of moral duty
  - Erard et al. (2022) is one of the first papers to consider higher earning nonfilers
- Limited studies on indirect effects of enforcement on nonfilers
  - Taglakis (2014) studied effect of audits in Greece; a 1% increase in number of audits leads to a 0.4% increase in direct revenue and 0.1% increase in indirect revenue for high wealth individuals and nonfilers
  - Datta et al. (2015) found Automated Substitute for Return activities increased likelihood of filing by 11, 21, and 27 percentage points in 2-4 years post treatment
- **Gap in literature analyzing both the behavior of higher earning nonfilers and role of IRS enforcement on future filing behavior**

Nonfiler Field Audit Selection Process

01

Third Party Reporting
Employers, entities, and financial institutions report taxpayer compensation to IRS; compiled with prior year return information

02

Case Creation Nonfiler Identification Process (CCNIP)
Individuals that have not filed but have reported income or a prior year return are identified by CCNIP

03

Nonfiler Audit Selection
Selection filters are applied and nonfilers may be distributed to one of three enforcement functions: ASFR, Collection, or Field Exam

04

SBSE Field Audit Assignment
IRS estimates tax liability, assigns priority score, and assigns eligible nonfilers to Field personnel based upon available resources

Selection process details primary procedure for identifying nonfilers for in-person field audits; nonfilers are identified for field audits via alternate processes

Sample Design

- Taxpayer data obtained from the IRS Compliance Data Warehouse (CDW)
- *Baseline year* = Tax Year (TY) the taxpayer entered the sample, due to audit or eligibility, between TY 2009-2014

Treatment Group

- Nonfilers **audited** under Field exam identified from examination records
- Excludes pickups

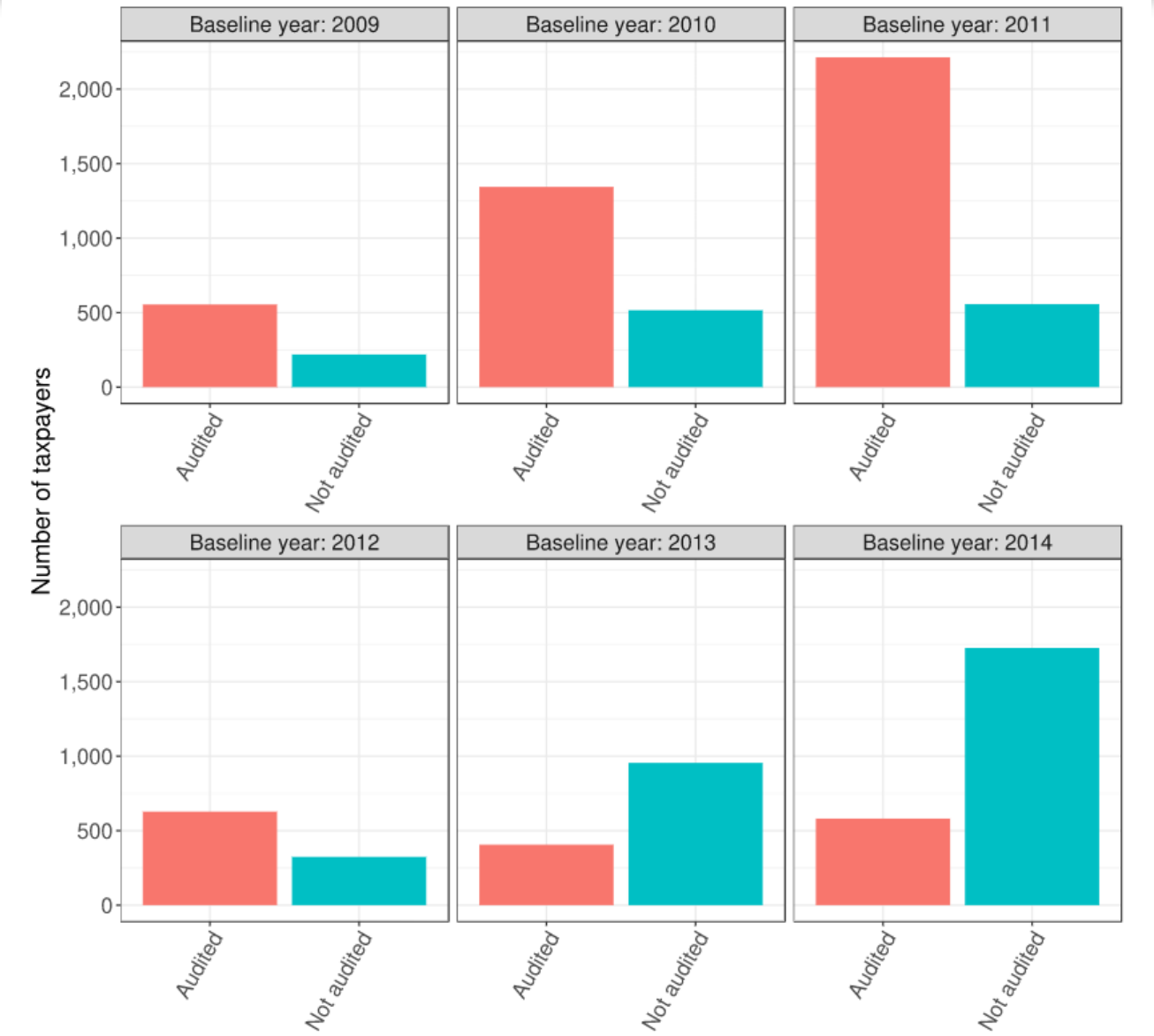
Control Group

- Nonfilers **eligible but unaudited** for Field exam
- Identified by replicating audit selection process
- Excludes late filers, secondary filers, and individuals filing in response to notices

Sample Design

Sample Size by Baseline Year

- Treatment group: 5,727
- Control Group: 4,297
- Fewer audits conducted after 2011 potentially due to changes in audit resources
- Dropped from sample if:
  - Deceased
  - Identified for audit via alternate procedure
  - In treatment group and missing examination record data
  - In control group and audited in 6 years surrounding baseline

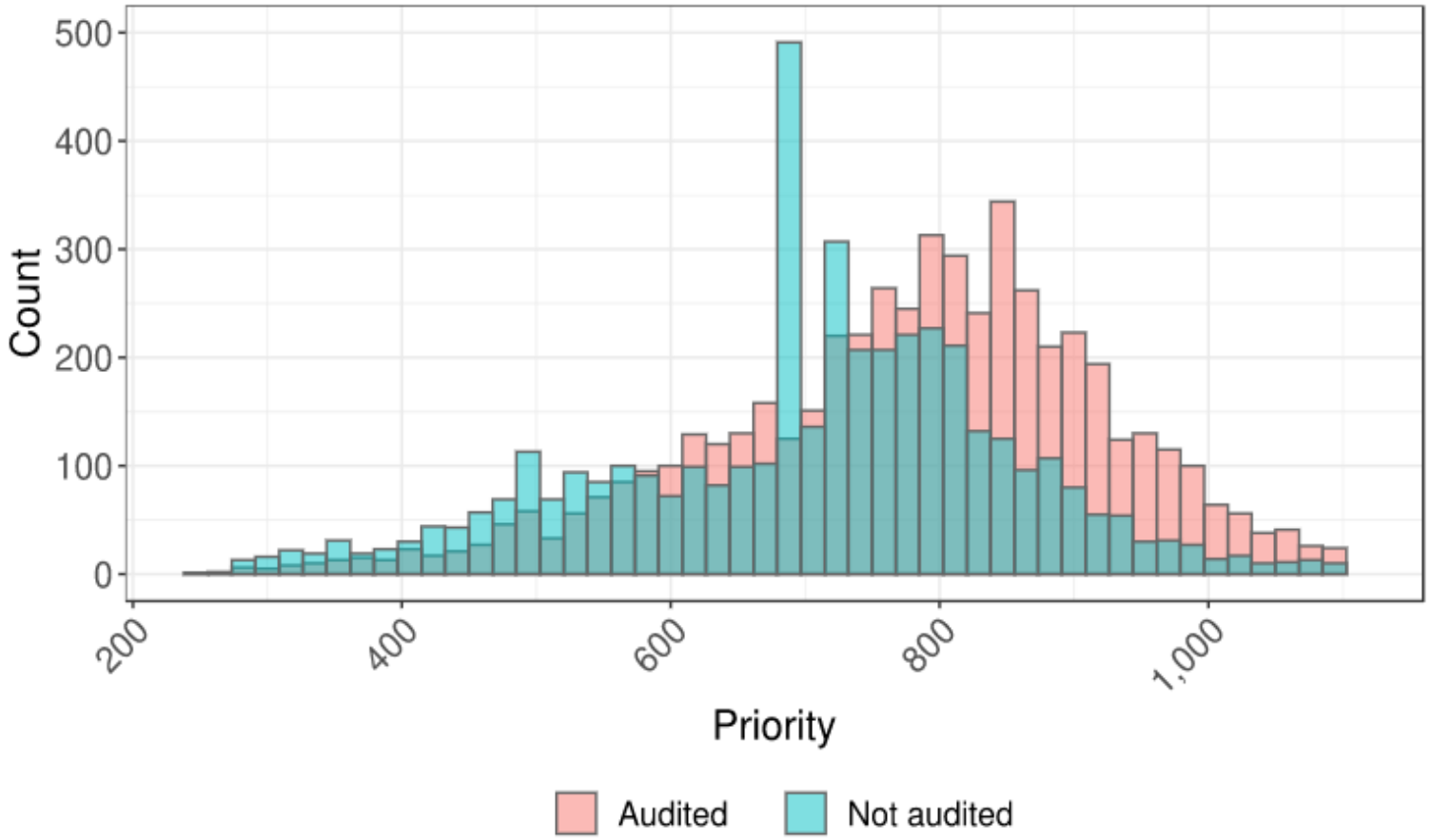


Source: MITRE analysis of CDW data

Sample Design

Overlap in distribution of priority, across groups

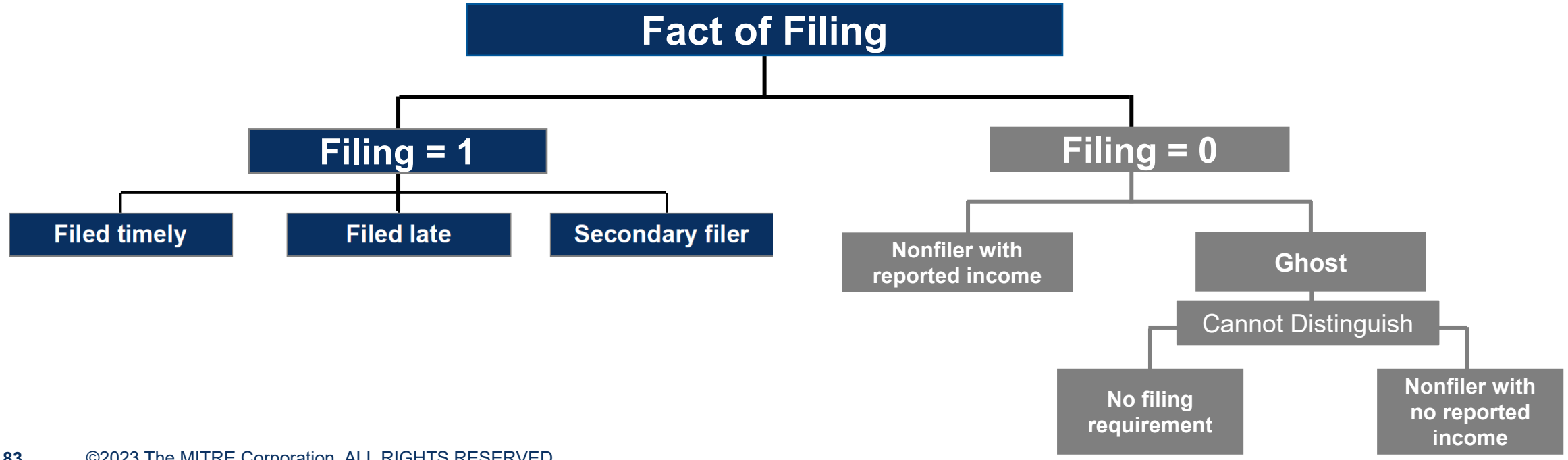
- Priority is an IRS-internal metric ranking taxpayers for audit selection based upon balance due and likelihood of securing balance due



Source: MITRE analysis of CDW data

Dependent Variable

- Filing behavior for 5 TYs prior to and 8 TYs post baseline year
- Fact of Filing $= \{^{1,}$ $0,$ $otherwi$ $^{turn}_{hh}$



Dependent Variable

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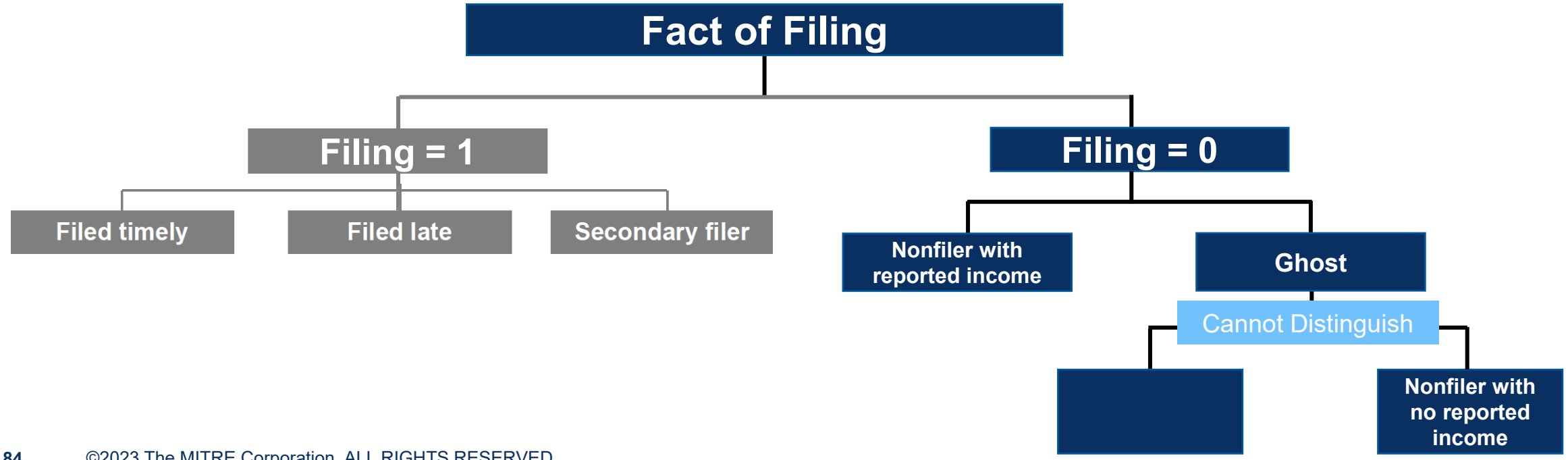
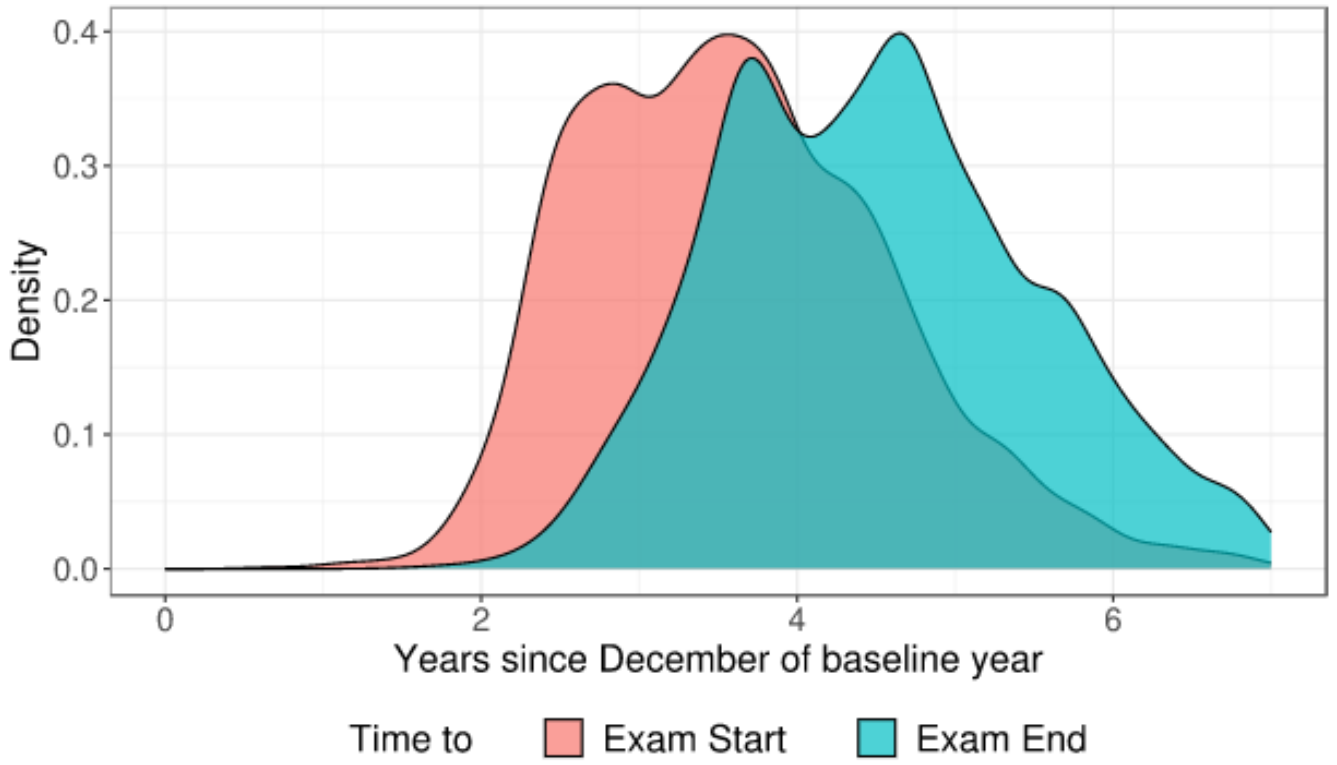


Audit Timing

- Audits begin 2-5 years after baseline year
- Audits end 3-6 years after baseline year
- We hypothesize an indirect effect will not be observed until at least two years after baseline year

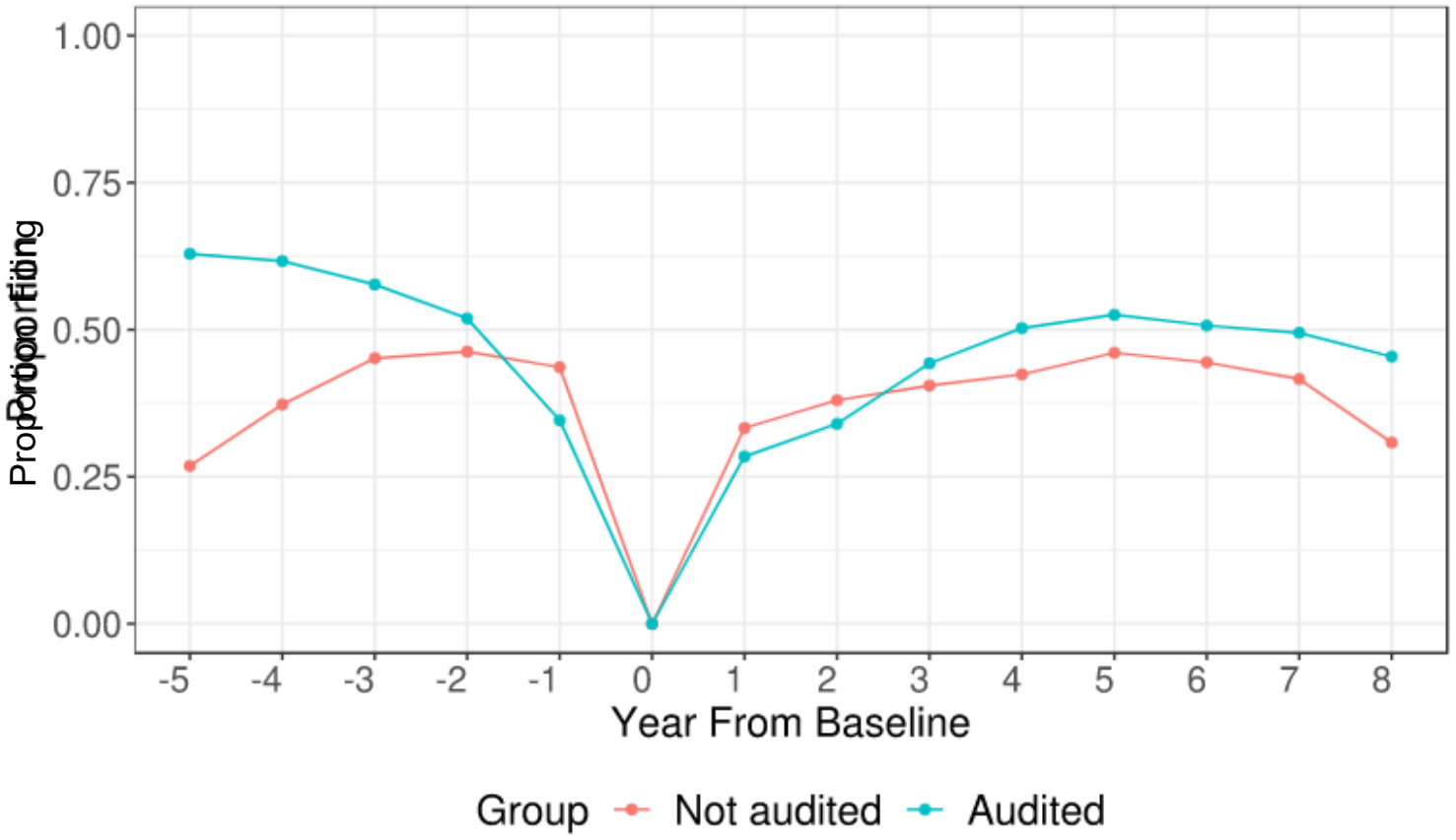


Source: MITRE analysis of CDW data

Exploratory Analysis

Filing over Time: Control vs Treatment

- All individuals are nonfilers in baseline year
- Baseline year interrupts patterns of filing behavior
- Audited taxpayers more likely to file post audit



Source: MITRE analysis of CDW data

Linear Probability Model

$$Fact\ of\ Filing_{it} = \beta_0 + \beta_1 Audit_i + \beta_{2-14} Year\ from\ Baseline_{it} + \beta_{15-27} Audit_i * Year\ from\ Baseline_{it} + \boldsymbol{\alpha Taxpayer\ Controls_i} + \boldsymbol{\tau Tax\ Year_t} + \epsilon_{ij}$$

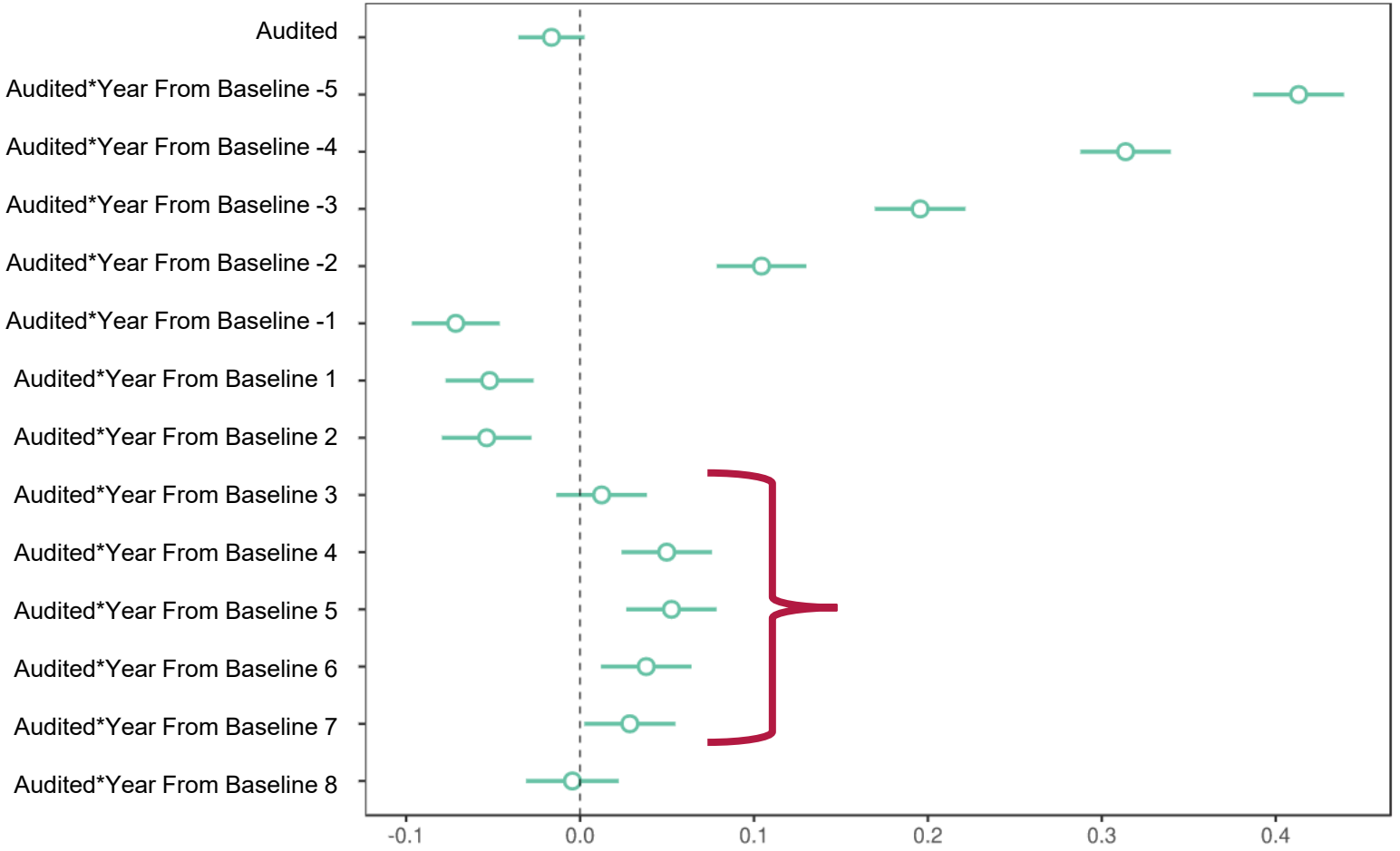
Where:

- ***Audit*** captures difference in average filing behavior across groups for all years
- ***Year from Baseline*** captures filing behavior for each of the 13 years surrounding baseline
- ***Audit * Year from Baseline*** captures indirect effects of an audit on filing behavior
- ***Taxpayer Controls*** are time-invariant, capturing demographic characteristics, financial characteristics, and past filing behavior in baseline year
- ***Tax Year*** is a set of fixed effects capturing yearly fluctuations across all taxpayers

Model Results: Indirect Effects

Indirect effect on filing behavior observed 4-7 years post baseline

- Audited group is 2.9-5.3% more likely to file in the 4-7 years from treatment
- Negative effect in years from baseline -1 through 2 suggest persistence of filing behavior for audited individuals surrounding year of noncompliance



Source: MITRE analysis of CDW data

Model Results: Control Variables

- Presence of visible income sources increases likelihood of filing (investment income has strongest effect at 9.6%)
- Residing in a state taxing individual income increases likelihood of filing by 17.9%
- Persistence of filing behavior
  - Taxpayers filing a return in prior year are 20.3% more likely to file
  - Taxpayers not present in IRS records in prior year are 10.7% less likely to file

Discussion

- Results support value of audits as a tool to encourage future filing in nonfilers
  - Audited taxpayers are 2.9-5.3% more likely to file in 4-7 years post treatment
  - Impact of an audit on future filing peaks 5 years after an audit, fades 7 years after

- Compared to estimated indirect effect of an ASFR on future compliance (Datta et al., 2015), indirect effect of a Field audit is smaller
  - ASFR increased likelihood of filing by 11%, 21%, and 27% in 2-4 years post treatment
  - Difference in estimates may be indicative of higher compliance rates in lower income populations

Limitations & Future Research

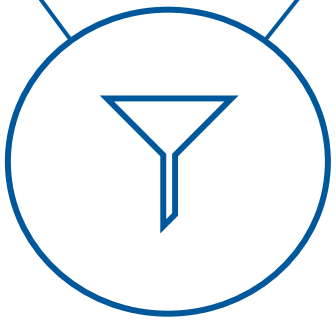
Indirect effects in terms of **revenue**?	Estimation of **total tax model** to obtain dollar-valued estimates
72% of audited group experienced **multiple** audits	Analysis of indirect effect on **single vs. multiple-audited taxpayers**
Assumption that **ghost taxpayers** have a filing obligation	**Sensitivity analysis** on ghost assumption; verification of tax liability in off-baseline years
Analysis **constrained by third-party reported data** only available for baseline year	Richer set of **time-varying control variables** (received notices, type of nonfilers); identifying data for ghosts

Thank you

Field Audit Selection Process

06

Audit Inventory
TDI inventory of nonfilers consists of individuals identified by CCNIP plus various referral programs

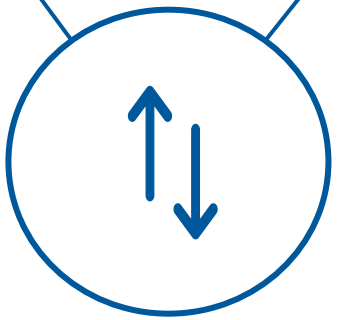


07

Audit Selection
Selection filters are applied and nonfilers may be distributed to one of three enforcement functions: ASFR, Collections, or **Field Exam**

08

Audit Allocation
Individuals identified for Field are sorted by region and Field offices, based upon available resources



09

Audit Prioritization
Individuals are prioritized based upon various factors, such as a function of the likelihood of securing a return and amount of balance due

10

Audit Assignment
Individual selected for field audit are assigned to field personnel based upon priority

Sample Cleaning

Dropped taxpayers that died within 8 years of baseline year (1,519)

Dropped taxpayers selected for audit by alternate procedures and not in CCNIP (1,811)

Dropped audited taxpayers in treatment group if:

Missing or unmatched examination data (677)	Filed F1040 late but prior to exam start (161)

Dropped eligible-but-unaudited taxpayers in control group if:

Audited 6 years prior to baseline (114)	Audited 6 years post baseline (95)

Deduplication rules (690):

If audited multiple times, first audit year assigned as baseline	If eligible-but-unaudited multiple times, first eligible year assigned as baseline	If audited and eligible, first audit year assigned as baseline

Independent Variables

Demographic Control Variables

- PY Filing status collapsed into two categories
- Majority of taxpayers between 30-65, have a single/other filing status, and reside in a state taxing individual income

Variable	Treatment Group	Control Group
Census Region		
East North Central	11%	8%
East South Central	7%	4%
Mid Atlantic	13%	13%
Mountain	7%	7%
New England	5%	4%
Pacific	15%	15%
South Atlantic	17%	22%
West North Central	5%	3%
West South Central	20%	15%
Not Available	1%	9%
Income Tax State	74%	74%
Over 65	4%	7%
Under 30	7%	12%
PY Filing Status		
Single/other	71%	88%
Married filing jointly	29%	12%
PY EITC	9%	3%

PY: Prior Year

Independent Variables

Financial Control Variables

- Total IRP income: sum of all reported income
- $100k threshold not enforced for treatment group (see appendix)
- Income difference: difference in income reported for current year from prior year
- Majority of treatment group have SE income
- Majority of control group have investment and/or other income

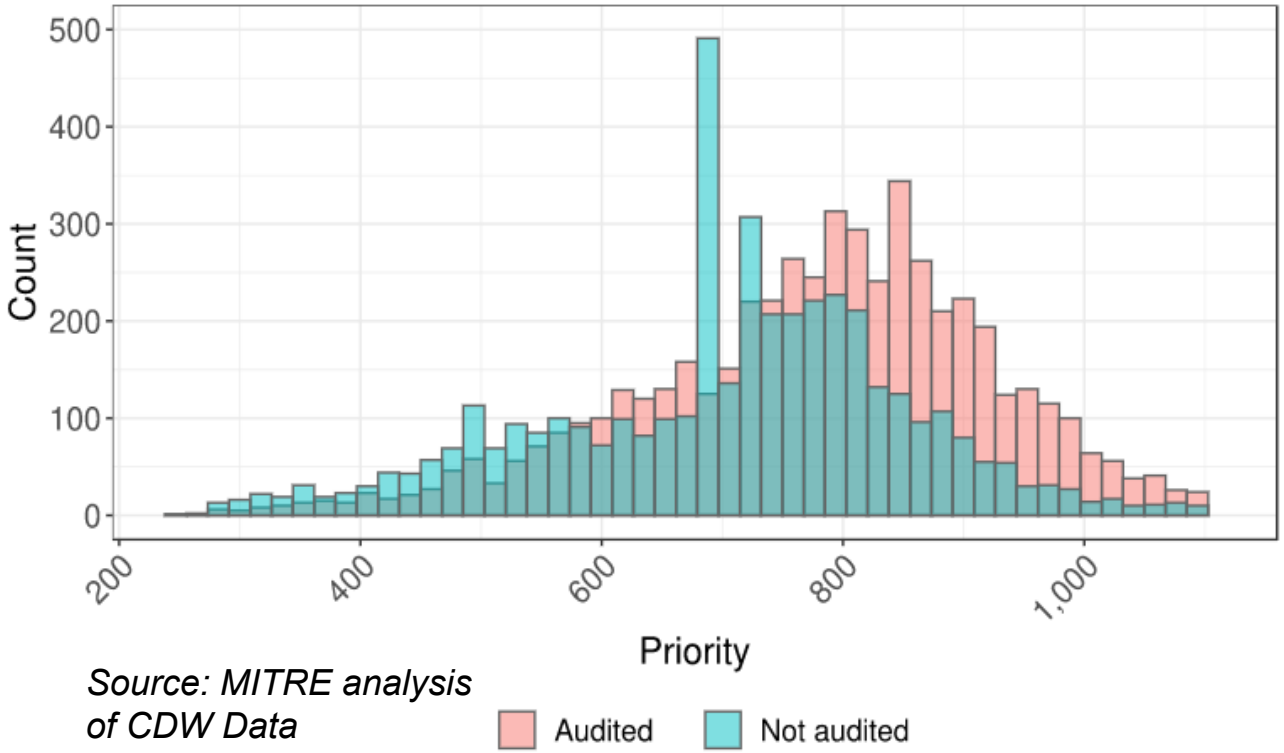
Variable	Treatment Group	Control Group
Total IRP Income	$551,114	$581,269
$100k Threshold Indicator	54%	100%
Number of IRP Forms	35	43
Income Difference from PY	$478,408	$533,118
SE Income	69%	46%
Investment Income	44%	69%
Retirement Income	20%	21%
Broker Transaction Income	19%	32%
Other Income	29%	59%

Dollar-denominated variables (Total IRP Income and Income Difference from PY) are expressed in terms of 2018 dollars. Other than Baseline Priority and Number of IRP forms, all other variables reflect percentages.

Prior Filing Behavior Control Variables

- Priority is an IRS-internal metric ranking taxpayers for audit selection based upon balance due and likelihood of securing balance due
- Common support in priority scores across groups
- Majority of audited taxpayers experienced some type of audit in last 6 years

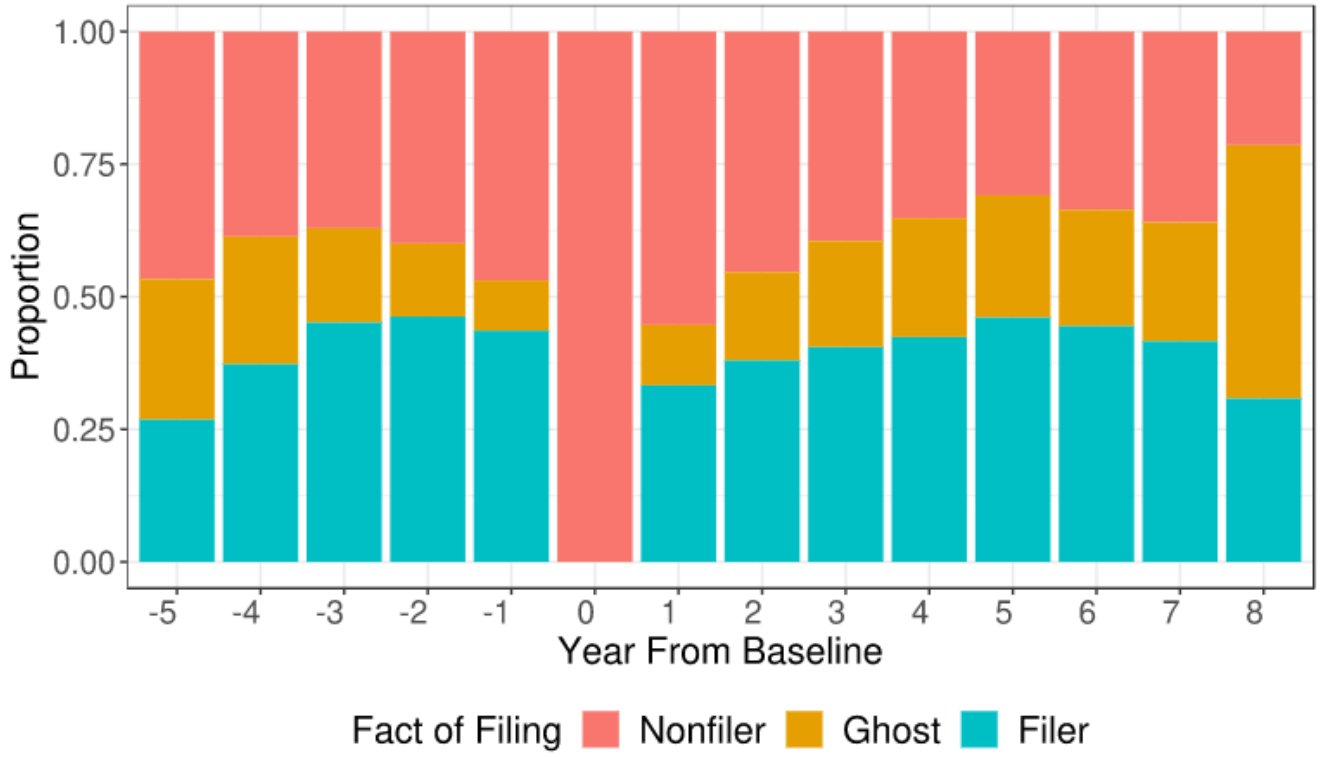
Variable	Treatment Group	Control Group
Filed in PY	78%	47%
Ghost in PY	0%	9%
Any Audit Last 6 TYs	53%	3%
Baseline Priority	813	712



Source: MITRE analysis of CDW Data

Distribution of Ghosts in Control Group

- Proportion of ghosts ranges from 9.5 to 47.7%
- All taxpayers in treatment group present in IRS records for years of interest

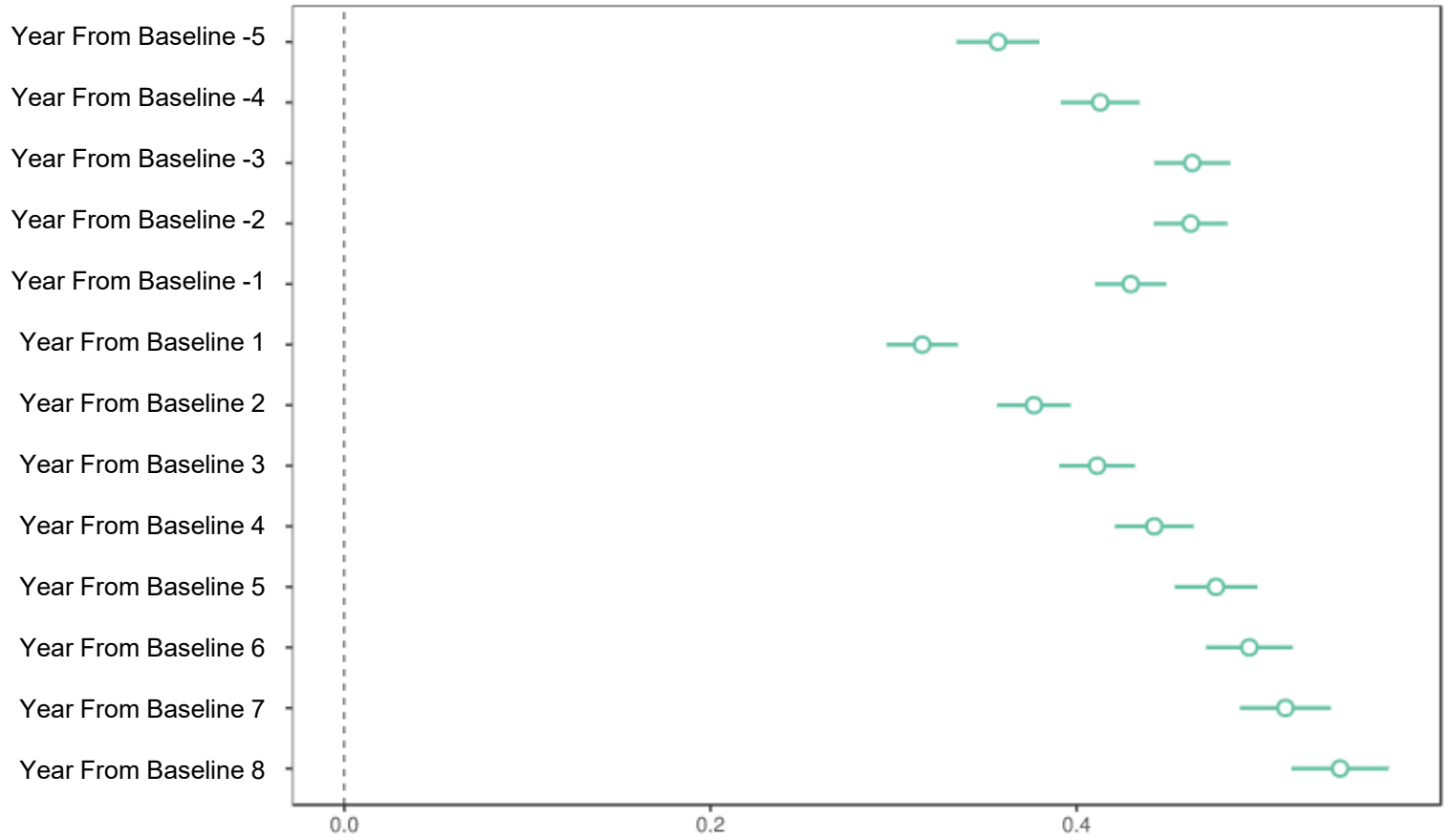


Source: MITRE analysis of CDW data

Model Results: Year From Baseline

All taxpayers more likely to file a return in off-baseline years

- In general, baseline year is an outlier year
- Pattern of decreased filing behavior leading up to baseline
- Patter of increased filing behavior after baseline

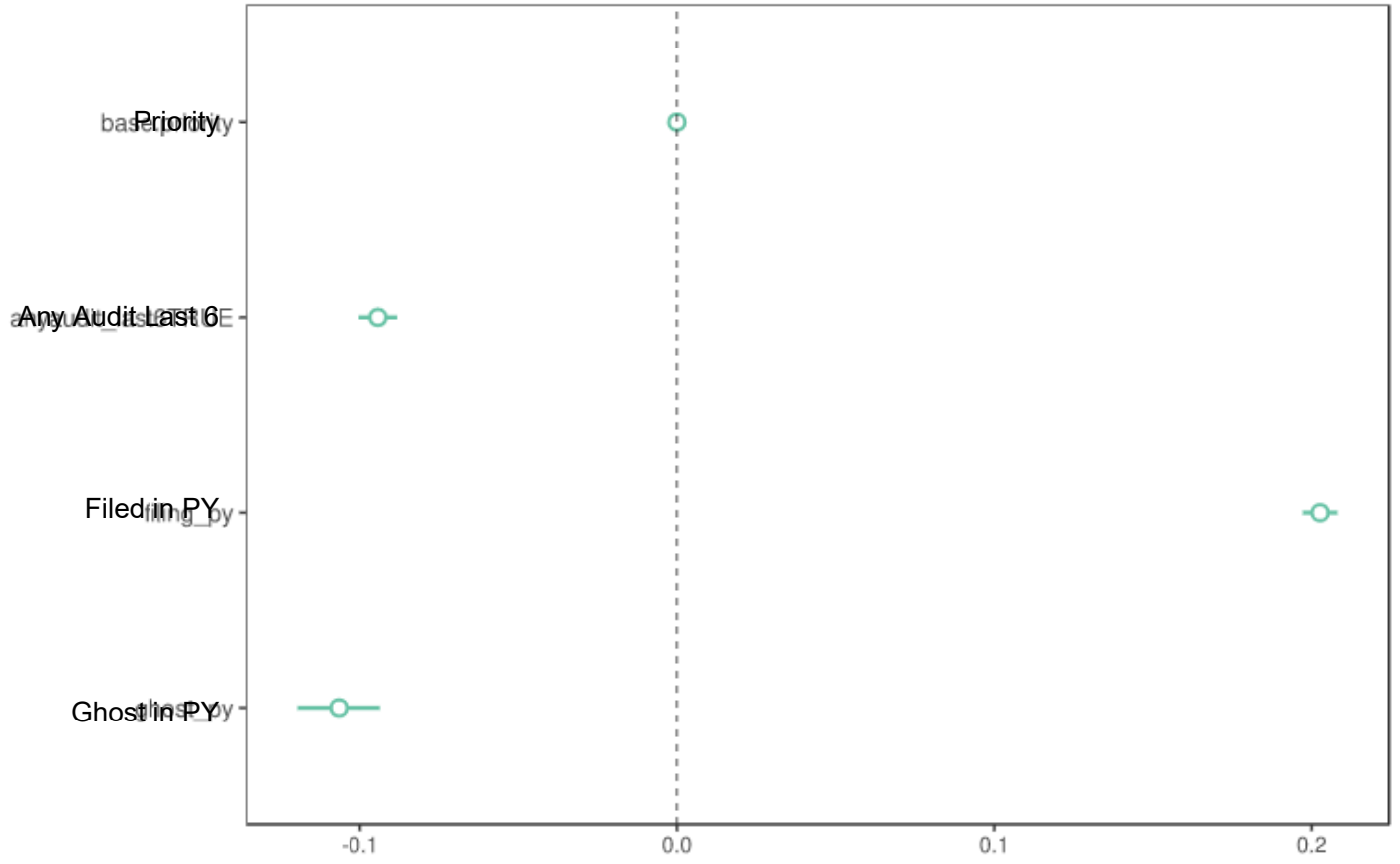


Source: MITRE analysis of CDW data

Model Results: Past Filing Behavior

Observed persistence in an individual's filing behavior

- Taxpayers filing a return in prior year are 20.3% more likely to file
- Taxpayers not present in IRS records in prior year are 10.7% less likely to file
- Any audit in 6 years prior to baseline reduces likelihood of filing by 9.4%
- Priority does not have a significant effect on probability of filing

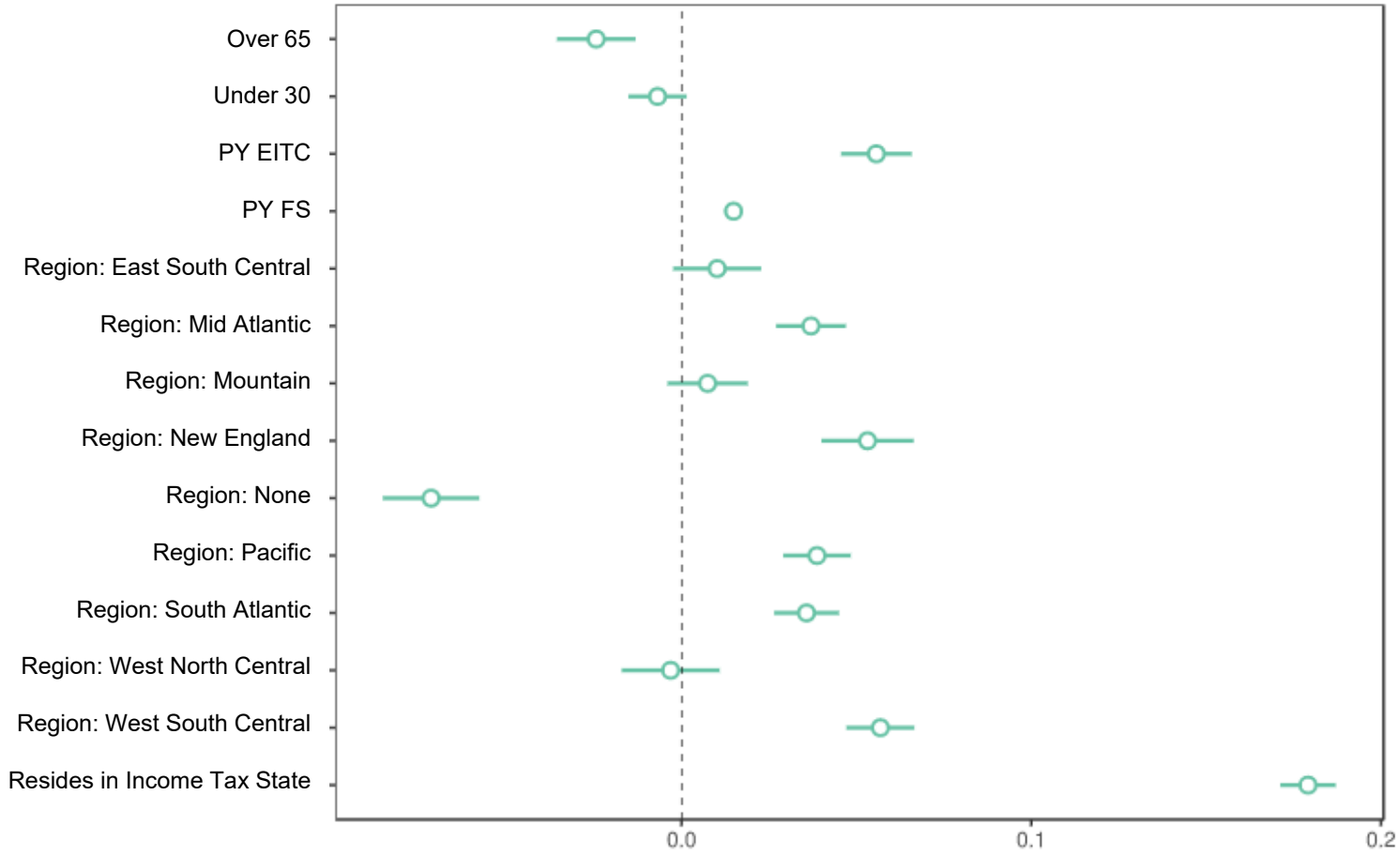


Source: MITRE analysis of CDW data

Model Results: Demographic Characteristics

Residence in a state taxing income has strongest influence

- Residing in a state taxing individual income increases likelihood of filing by 17.9%
- Otherwise filing behavior varies with geography
- Taxpayers over 65 are 2.4% less likely to file
- Taxpayers married filing jointly are 1.5% more likely to file

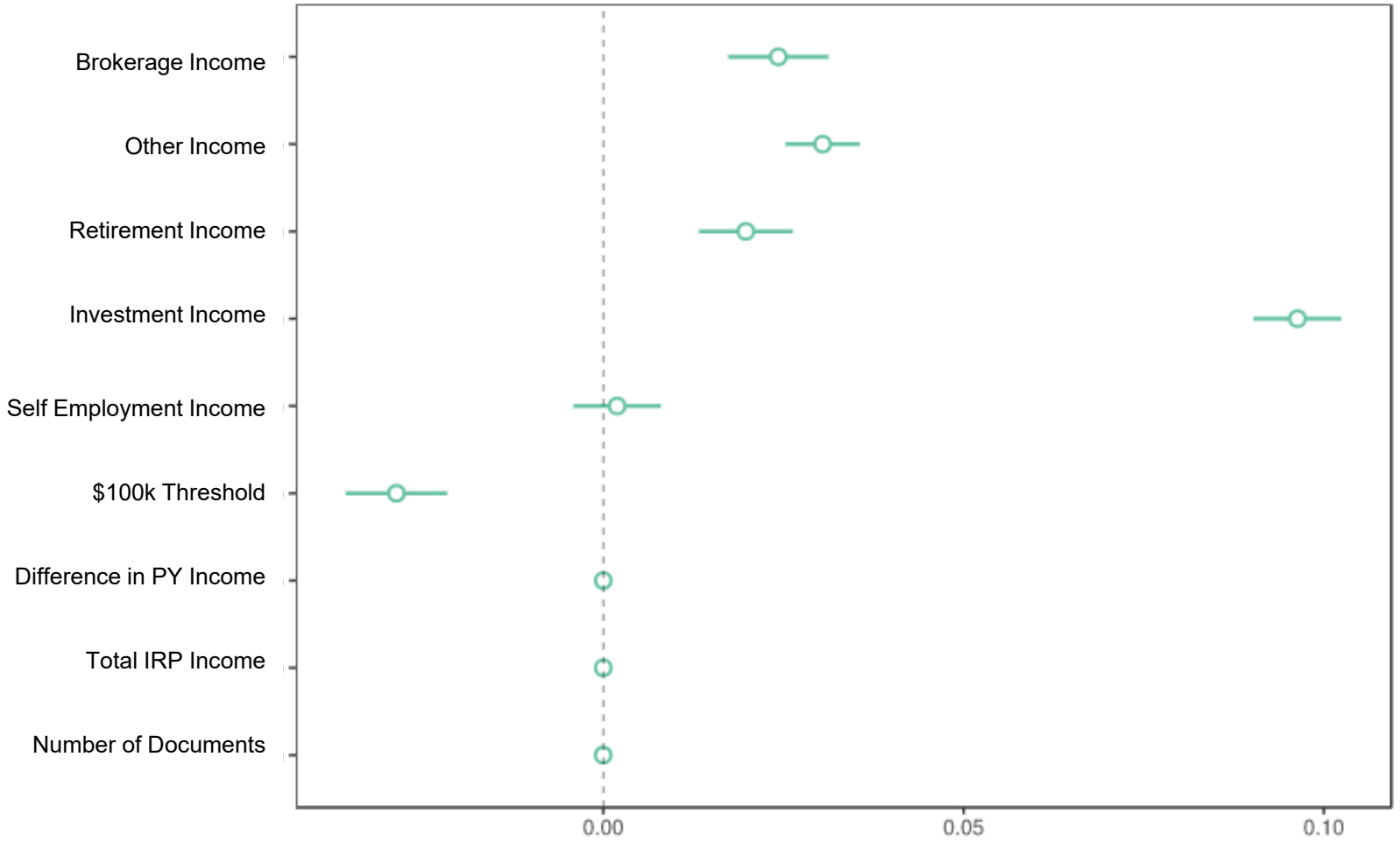


Source: MITRE analysis of CDW data. Region of comparison is East North Central

Model Results: Financial Characteristics

Presence of visible income sources increases likelihood of filing

- Investment income has strongest effect (9.6%)
- Significance of SE income may be obscured by measurement error
- Individuals earning greater than $100k are 2.9% less likely to file
- Actual amount of income insignificant
- For each additional document reported to the IRS, a taxpayer is 0.002% less likely to file

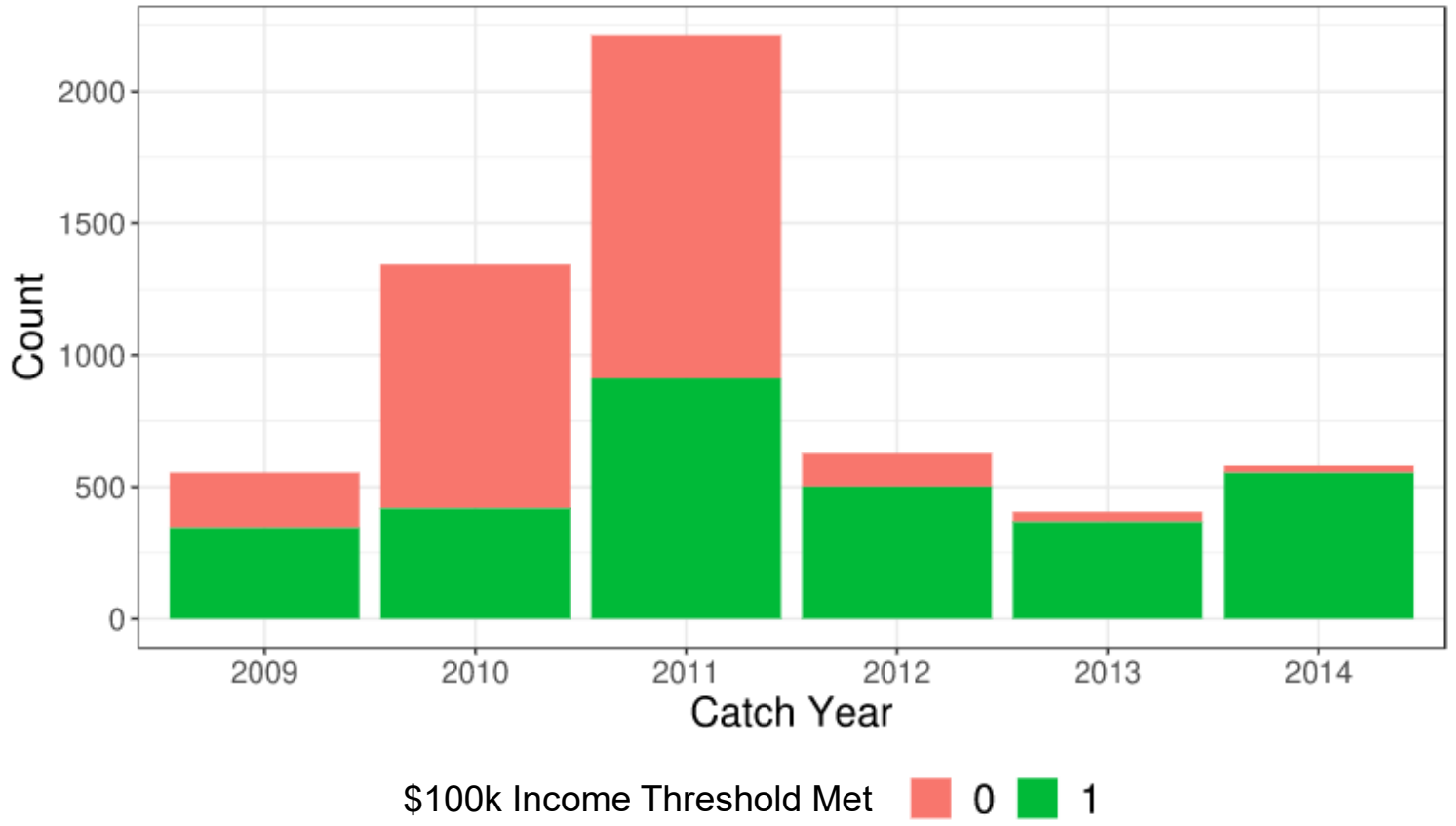


Source: MITRE analysis of CDW data

Control Variable Definitions

- We define taxpayers as ghosts if they did not appear in any of the following inventories:
  - IRMF database containing third-party reported forms,
  - IRTF database containing voluntary reported income tax return forms,
  - IMF database containing records of any activity applied to a taxpayers account,
  - CCNIP database identifying nonfiling taxpayers, and
  - Examination database containing any audit-related interactions with taxpayers.
- Census region of residence was determined from the state derived from the taxpayer's address line or zip code, listed on third-party forms. If census region of residence was not present, region was set to "None".
- Self-employment income is restricted to the types of self-employment income required to be reported to the IRS by third parties: barter income, crop insurance, attorney fees, fishing income, medical payments, non-employee compensation, and patronage income.
- Investment income includes income from distribution shares (Schedule K1), dividends (Schedule 1099-DIV), interest income (Schedule 1099-INT), and passive income (Schedule K1).
- Retirement income includes pension and social security payments.
- Broker transaction income is defined as income from mediating the sale or purchase of property, services, or investments (Schedule 1099-B).
- Other income is defined as income reported on Schedule 1099-MISC, real estate and rental income, lottery income, and business income.

$100k Income Threshold Not Enforced in Baseline Year



Source: MITRE analysis of CDW data

Silver Lining: Estimating the Compliance Response to Declining Audit Coverage

IRS-TPC Research Conference on Tax Administration

June 22, 2023

Alan Plumley and Daniel Rodriguez (IRS),
Jess Grana and Alexander McGlothlin (The MITRE Corporation)

Research, Applied Analytics & Statistics
KNOWLEDGE DEVELOPMENT & APPLICATION

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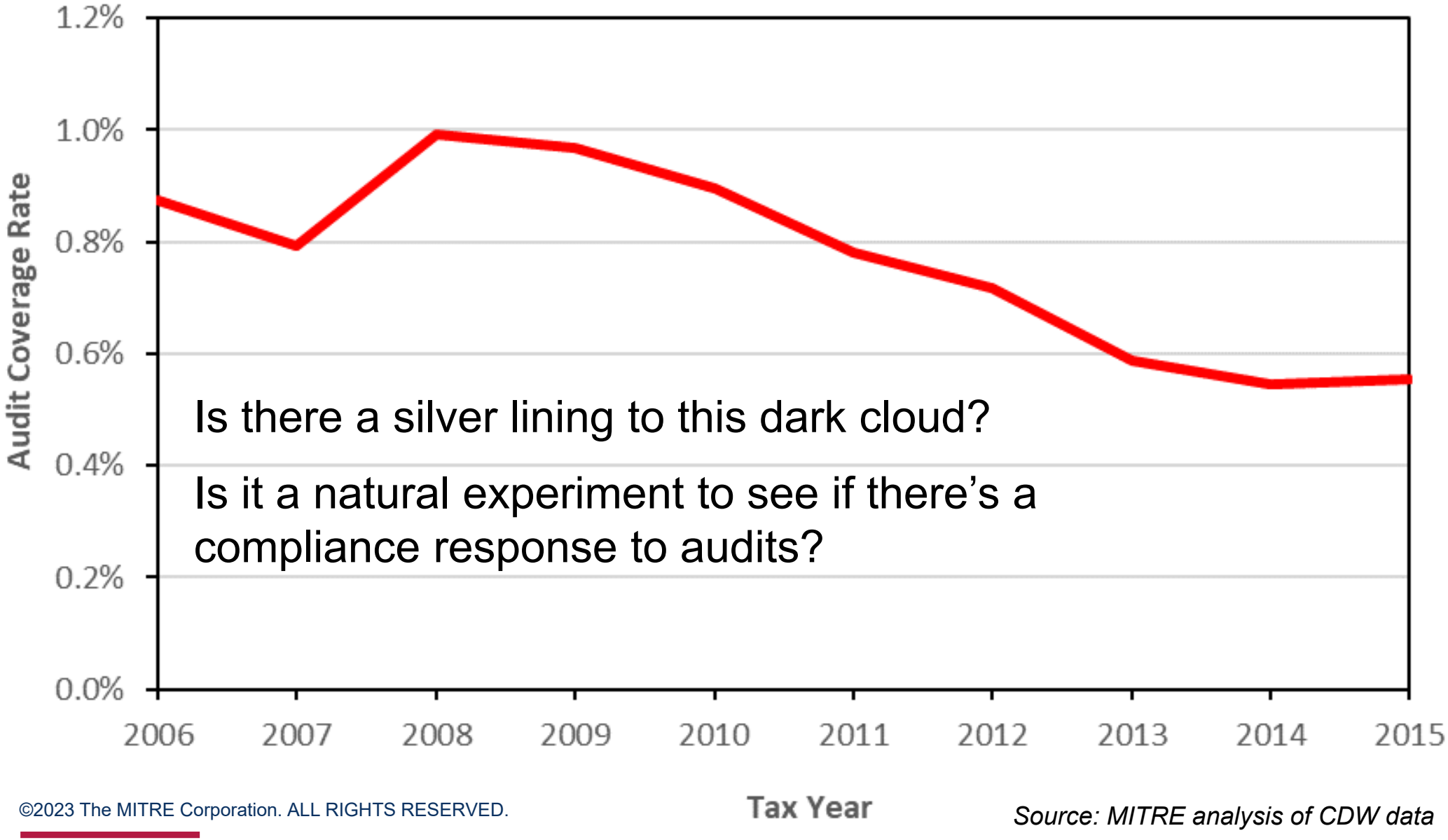
Problem: Audit Rate Steadily Declined



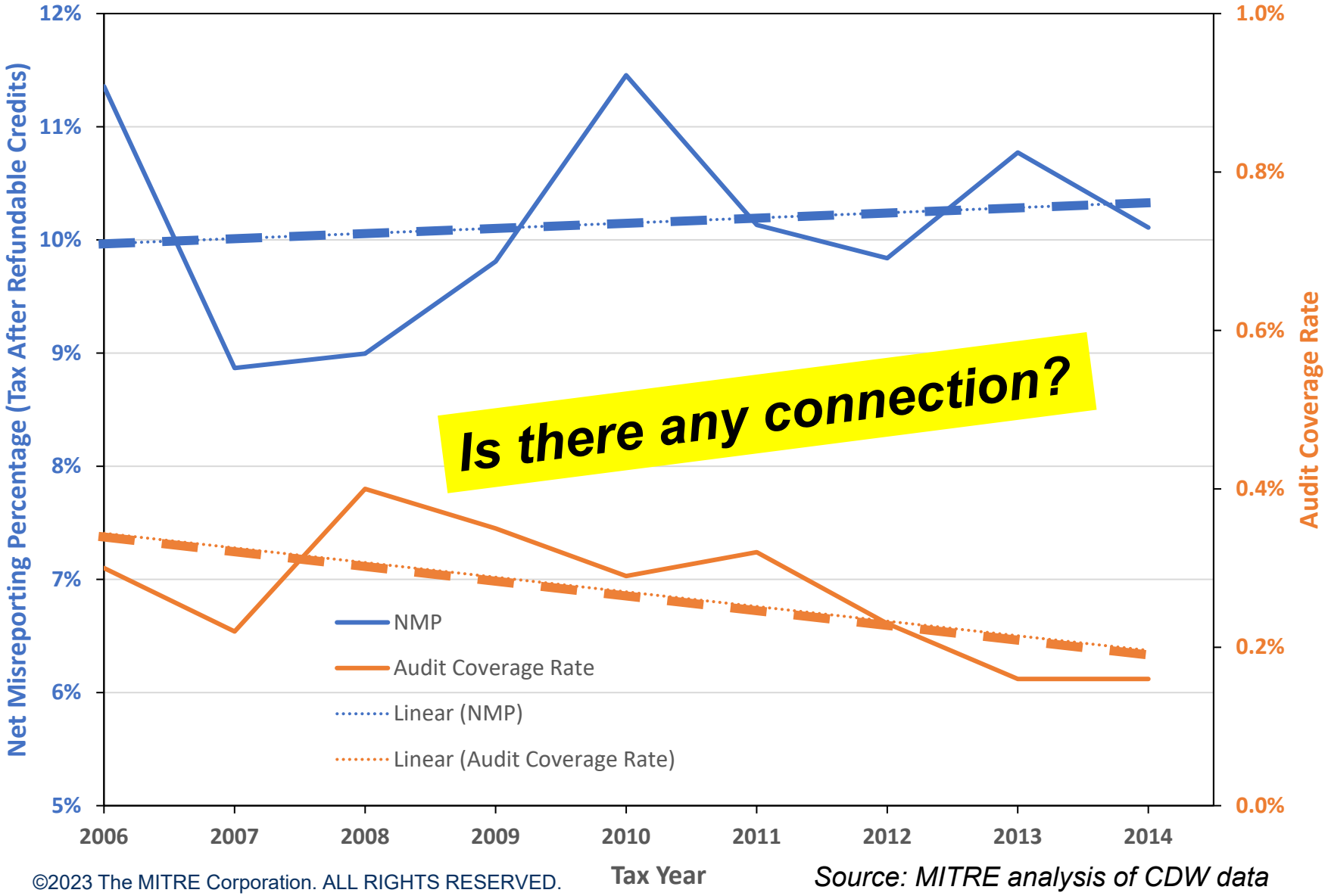
Is there a silver lining to this dark cloud?

Is it a natural experiment to see if there's a compliance response to audits?

Source: MITRE analysis of CDW data

Largest Category (56%) of Form 1040s

Total Positive Income < $200K; no Business Income/Expenses or EITC



An upward trend in **non**compliance

A downward trend in audit rate

Source: MITRE analysis of CDW data

Maybe… Maybe not

- Not clear for many **other segments** of the population
- Taxpayers likely do not react to (or even know about) contemporaneous trends in audit coverage; their **perceptions may form over time**.
- **Correlation ≠ causation**
  - Other IRS actions?
  - Tax policy changes?
  - Societal trends?

Related Research

- **Definitions:**
  - **Specific** indirect effect: Effect of audit on the *audited* taxpayer's future compliance
  - **General** indirect effect: Effect of audit on *unaudited* taxpayers' future compliance
- **Different levels of "general" indirect effect:**

Demonstration of a "General" Indirect Effect
Demonstrate that a certain type of audit affects the compliance behavior of unaudited taxpayers
Evaluate a given subpopulation (e.g., EITC claimants)
Restrict to a defined network (mechanism)
• ***Tax preparer networks*:** Boning *et al.* (2020); Bohne and Nimczik (2018) • ***Supply chain networks*:** Pomeranz (2015) • ***Geographic networks*:** Chetty *et al.* (2013); Drago, Mengel, and Traxler (2020); Alstadsæter, Kopczuk, and Telle (2019); Meiselman (2018); Perez-Truglia and Troiano (2018)

Related Research

- **Definitions:**
  - **Specific** indirect effect: Effect of audit on the *audited* taxpayer's future compliance
  - **General** indirect effect: Effect of audit on *unaudited* taxpayers' future compliance
- **Different levels of "general" indirect effect:**

Demonstration of a "General" Indirect Effect	"Comprehensive" Indirect Effect
Demonstrate that a certain type of audit affects the compliance behavior of unaudited taxpayers	Estimate the overall effect of audit rates on the general population
Evaluate a given subpopulation (e.g., EITC claimants)	Evaluate effects across the taxpayer population
Restrict to a defined network (mechanism)	Agnostic to mechanisms
• ***Tax preparer networks*:** Boning *et al.* (2020); Bohne and Nimczik (2018); Furlong, *et al.* (2021) • ***Supply chain networks*:** Pomeranz (2015) • ***Geographic networks*:** Chetty *et al.* (2013); Drago, Mengel, and Traxler (2020); Alstadsæter, Kopczuk, and Telle (2019); Meiselman (2018); Perez-Truglia and Troiano (2018)	• ***State panel data*:** Dubin, Graetz and Wilde (1990); Plumley (1996); Dubin (2007) • ***Zip code panel data*:** Dubin and Wilde (1988); Grana *et al.* (2022) • ***Microdata (e.g., TCMP)*:** Tauchen, Witte, and Beron (1993); Hoopes, Mescall and Pitman (2012)

This Paper

- **Purpose:** Isolate the indirect effects of audits on the compliance of people not audited (comprehensive indirect effect)
- **Data:** All NRP returns
  - Sample of audits representative of individual taxpayer population
  - Tax Years 2006-2014
- **Method:** Apply econometric techniques to the micro NRP data
  - $ Misreported = f(True $, **Audit Rate**, other factors)
  - Misreported and True amounts from the **audit**
  - **Audit rate** is **average** for the return **category**
  - Use **lagged** audit rates due to delay in taxpayer knowledge of IRS enforcement

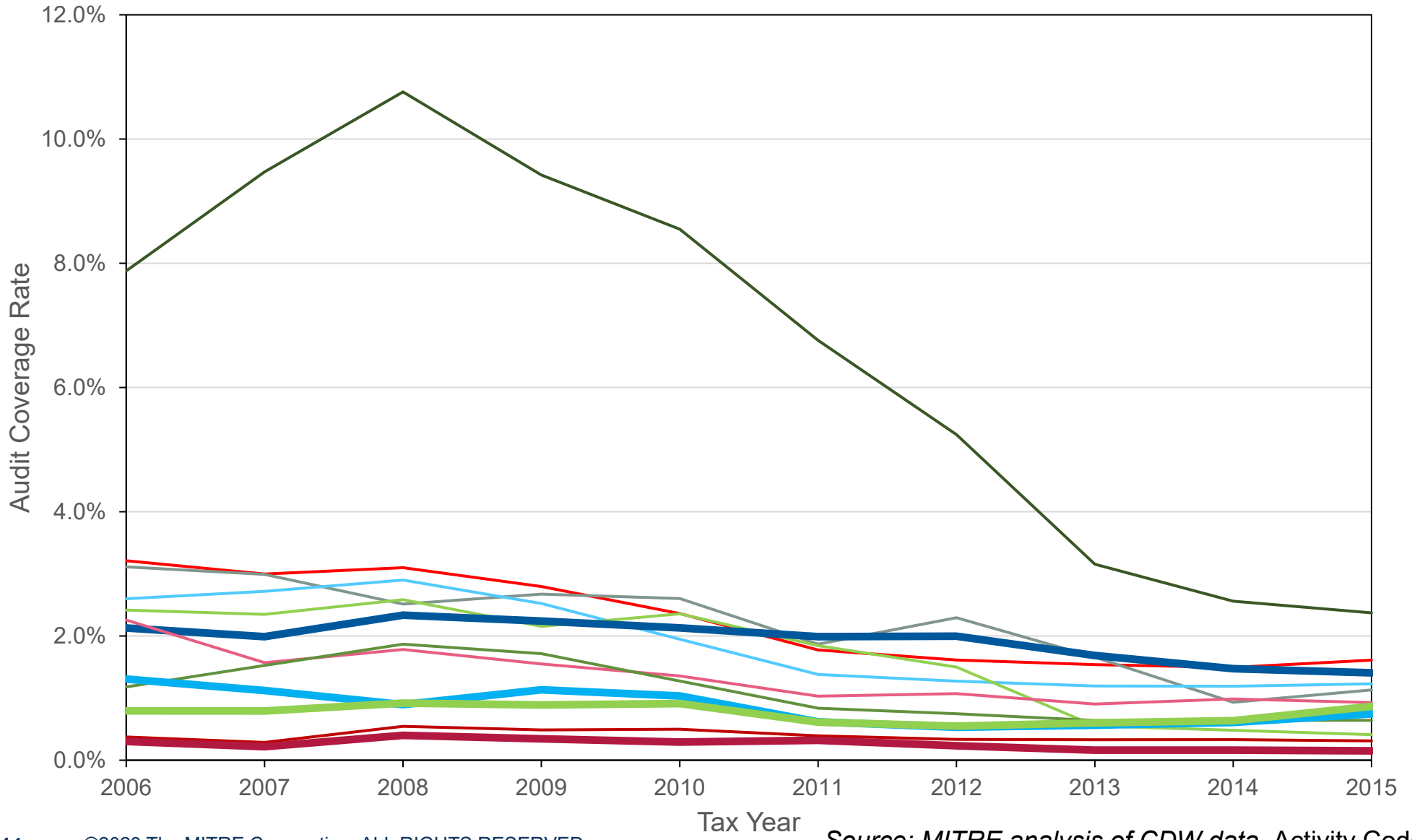
Noncompliance Measure (Dependent Variable)

- **Net Misreported Amount (NMA)** (in taxpayer's favor)
  - Can be derived for any line item or group of line items
  - For income and tax line items:

    NMA = $ should have reported - $ reported
  - For offsets to income or to tax:

    NMA = $ reported - $ should have reported
- **Baseline NMA** for Tax After Refundable Credits (TARC)
- **"Visibility Group" NMA** on subsets of line items by visibility of income/offsets

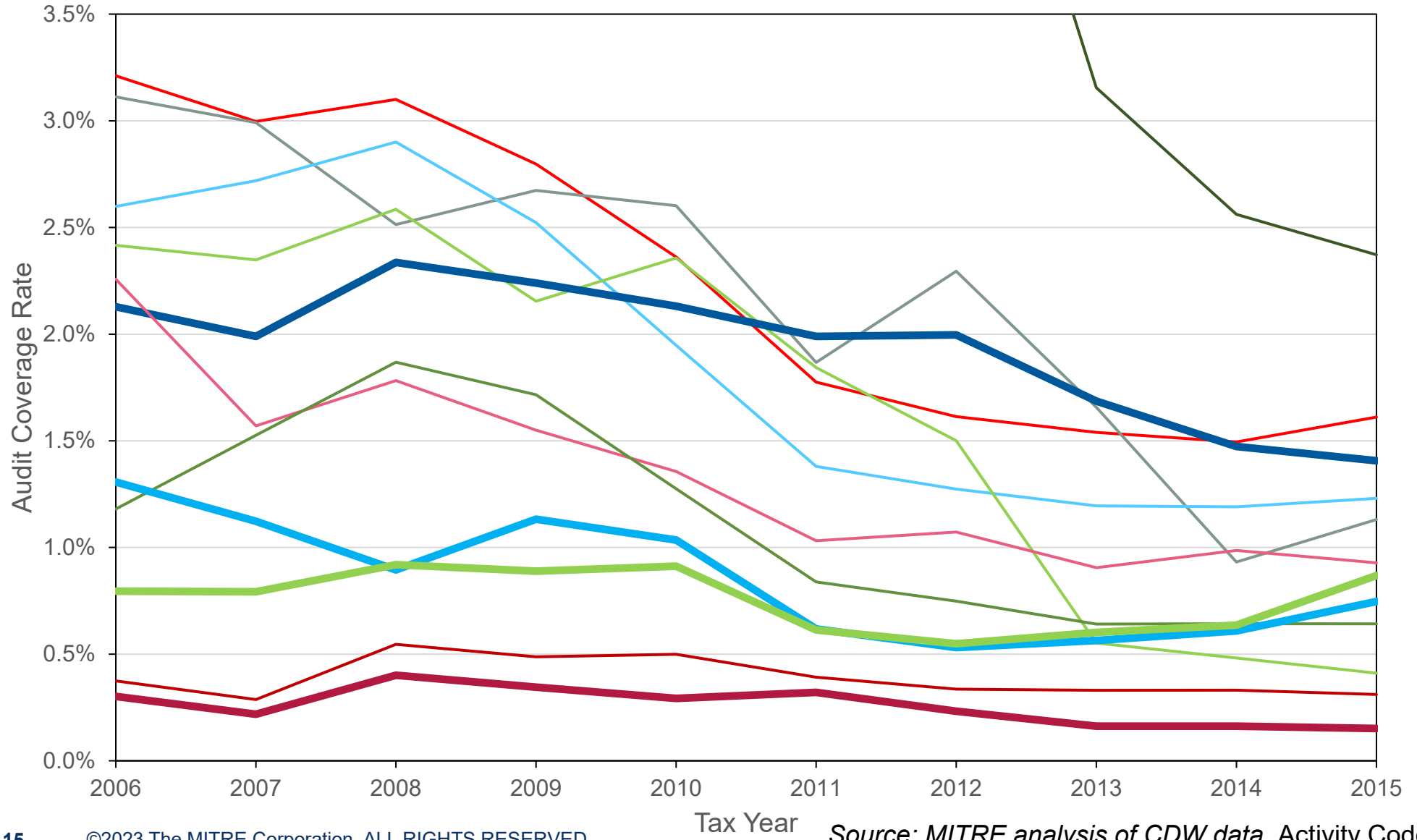
Audit Rates by Return Category (Activity Code)



Activity Code	% of Population
281	0.3%
277	0.5%
280	1.0%
276	0.6%
279	2.4%
270	**17.0%**
271	1.2%
275	2.2%
273	**10.8%**
274	**7.4%**
278	1.0%
272	**55.7%**
	100.0%

Source: MITRE analysis of CDW data. Activity Codes including more than 5% of the population highlighted with bold lines

Audit Rates by Activity Code (All but 281)



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Source: MITRE analysis of CDW data. Activity Codes including more than 5% of the population highlighted with bold lines

Baseline Specification: NMA for TARC

For taxpayer *i* in Activity Code *g* and Tax Year *t:*

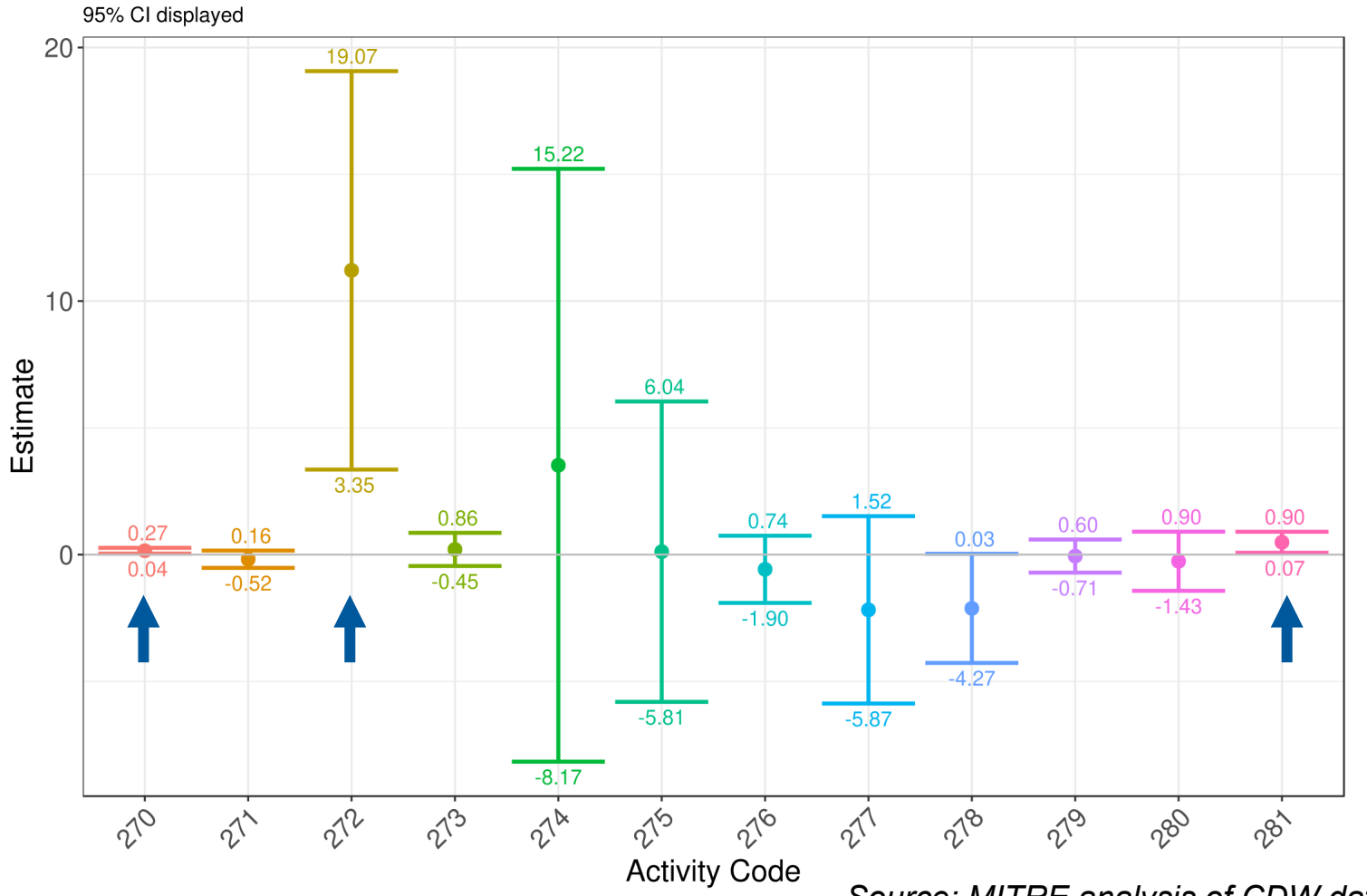
$$\log(NMA\ for\ TARC_{it} + 1)$$
$$= \beta_0 + \boldsymbol{\beta_1 Audit\ Rate_{g,t-2}} + \beta_2 Correct\ Amount\ of\ TARC_{it}$$
$$+ \beta Taxpayer\ Controls_{it} + \alpha Tax\ Year_t + \delta Activity\ Code_g + \varepsilon_{it}$$

$\boldsymbol{\beta_1}$	Statistical Significance Level	Taxpayer Controls	
		Positive and Statistically Significant	Negative and Statistically Significant
+0.094	1%	Correct TARC, exemptions, had wages, itemized	Claimed Child Tax Credit (CTC), deducted mortgage interest, over 65, married, filed electronically (ELF)

Unexpected positive effect of audit rate: Perhaps certain subpopulations or noncompliance on certain line items are more sensitive to audit rates…

Subsample Analysis by Activity Code

Effect of Lagged Audit Rate on **NMA for TARC**



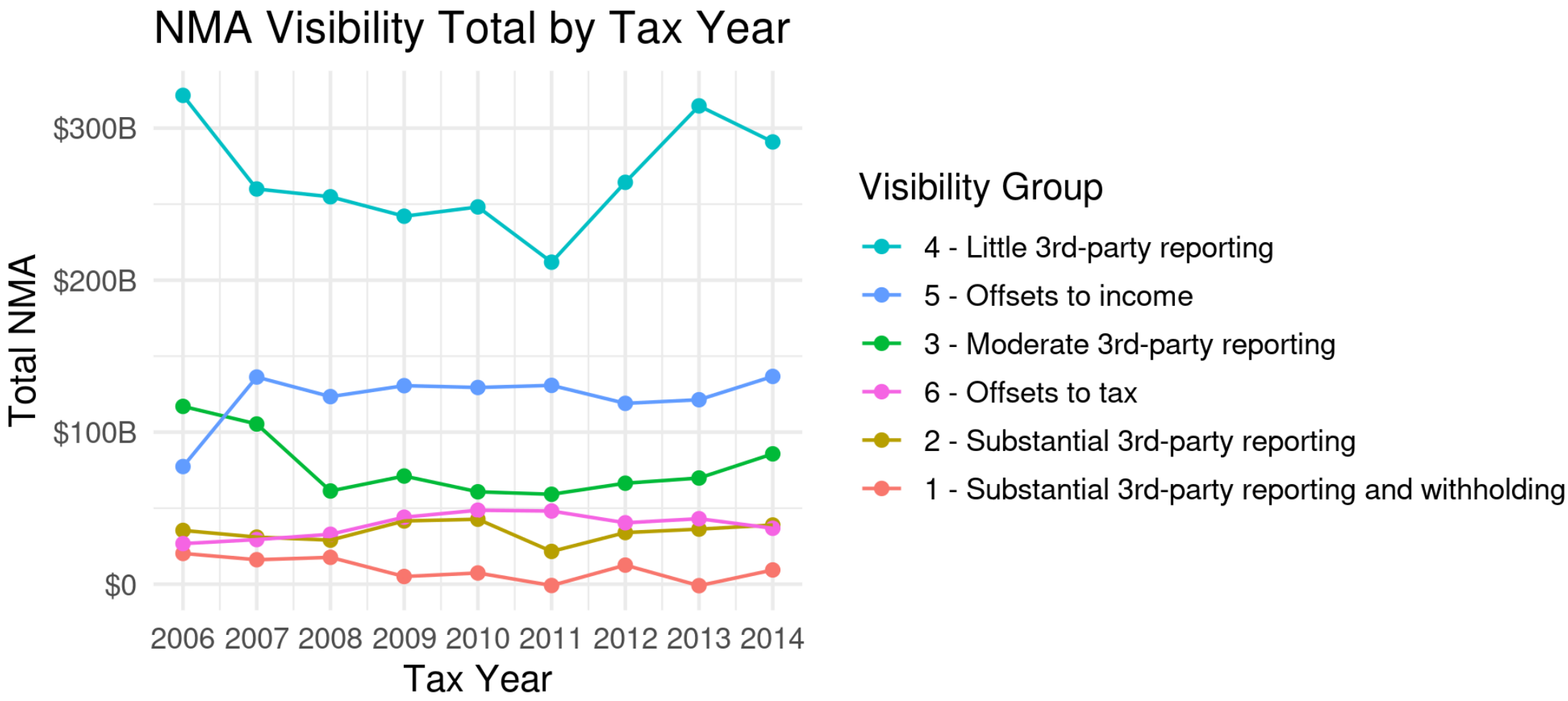
Source: MITRE analysis of CDW data

Activity code defined by:

- Income range
- EITC claiming
- Business, Non-business

- Unexpected positive effect of audit rates on 270, 272 and 281
- Negative effect on 278 is significant at 10% level

What About Different Line Items?



Source: MITRE analysis of CDW data

Dependent Variable: NMA by Visibility Group (VG)

$$\log(NMA\ for\ VG_{it} + 1)$$
$$= \beta_0 + \boldsymbol{\beta_1 Audit\ Rate_{g,t-2}} + \beta_2 Correct\ Amount\ for\ VG_{it} + \boldsymbol{\beta} Taxpayer\ Controls_{it}$$
$$+ \alpha Tax\ Year_t + \delta Activity\ Code_g + \varepsilon_{it}$$

Visibility Group	β_1	Taxpayer Controls	
		Positive and Significant	Negative and Significant
1	**-0.036 *** **	Had wages, married, ELF	Correct amount, exemptions, CTC, itemized, >65, paid prep
2	0.001	Correct amount, exemptions, had wages, itemized, >65, married	CTC, paid prep, ELF
3	0.003 **(-0.030 * w/o TY FE)**	Correct amount, mortgage, >65, paid prep, married	Exemptions, had wages, CTC, itemized
4	**+0.057 ****	Correct amount, exemptions, mortgage, paid prep, married	Had wages, CTC, itemized, >65, ELF
5	-0.040	Exemptions, had wages, itemized	Correct amount, CTC, mortgage, >65, paid prep, ELF, married
6	0.021	Exemptions	Correct amount, itemized, mortgage, >65, married

*** 1%, ** 5%, * 10% level of significance

Sensitivity Analyses

- Do taxpayers respond to a ***3-year lag*** of audit rate? Or ***4***?
  - NMA for TARC: Unexpected positive effect of 2-year lag **reverses** when using 4-year lag (not significant)
- Do only ***certain taxpayers*** adjust ***certain line items***?
  - NMA for lower visibility line items: Expected **negative** effect for higher income taxpayers
- Do taxpayers respond to a more ***aggregate audit rate***, such as across similar Activity Codes?
  - NMA for TARC: Unexpected positive effect for some Activity Codes **reverses** when using more aggregated audit rates
- Do taxpayers respond to ***spending on audits*** rather than rates?
  - NMA for TARC: Expected negative effect for **more** activity codes

Discussion

- Very few estimates of how enforcement affects overall compliance of the general population
- **Findings**:
  - Misreporting on high visibility income (wage and salaries) drops by 3.6 to 6.1 percent with a one percentage point increase in audit rates.
  - For other line items, indirect effect detected for only certain taxpayers. Some unexpected positive effects reverse in sensitivity analyses.
  - Results are mixed on misreporting by taxpayers earning above $200,000 who earn business income – *but difficult to validate true income at the high end*.
- **Next steps**:
  - Disaggregate some Visibility Groups, convert estimates to dollar values, econometric extensions

COMMENTS ON "CHANGES TO VOLUNTARY COMPLIANCE FOLLOWING RANDOM TAXPAYER AUDITS", "THE LONG-TERM IMPACT OF AUDITS ON NONFILERS' TAX COMPLIANCE", AND "SILVER LINING: ESTIMATING THE COMPLIANCE RESPONSE TO DECLINING AUDIT COVERAGE"

William Boning, U.S. Department of the Treasury

IRS-TPC Conference, June 2023

NEAT EXPERIMENTS, SOME SHARED CHALLENGES

- Not always clear what the bottom line is
  - On the road from “what we tried” to “what you need to know”
- Statistical power
  - We would expect similar results for similar subgroups
    - Except for noise from low power
  - Are tests over-rejecting? Maybe bootstrap SE
  - Consider Buonferroni correction when running several tests

And failing to reject the null of no effect doesn’t mean the effect is zero.

COMMENTS ON BESNEK AND PARTINGTON I

First, a clarification question about selection:

1. The REP is randomly selected
2. Then returns are profiled and income is matched
3. Then issues are reviewed
4. Finally, some returns are audited

Is the analysis sample the whole REP (1) or only audited returns (4)?

- (1) is more comparable to controls and the overall population

COMMENTS ON BESNEK AND PARTINGTON II

Focus on novel contributions:

- Specific deterrence for small corporations
- Questions the Australian tax system is especially good for answering
  - E.g. Is compliance even more closely related to information returns when tax returns are pre-filled?

COMMENTS ON BESNEK AND PARTINGTON III

Simple is powerful. Use the whole sample - don't split by year or audit outcome.

- Differences across years are probably noise
- The cost-benefit analysis for the audits depends on the overall average.
- The split by audit outcomes mostly confirms that the audits drive the differences
- Instead: most common kinds of non-compliance detected

COMMENTS ON BESNEK AND PARTINGTON IV

Estimate effects by years since (or before) audit

$$y_{it} = \sum_j a_j D_j + \beta_j D_j D_{treated} + \sum_t \sigma_t D_t + e_{it}$$

where j is years since (or before) selection for audit or as a control and t is calendar years.

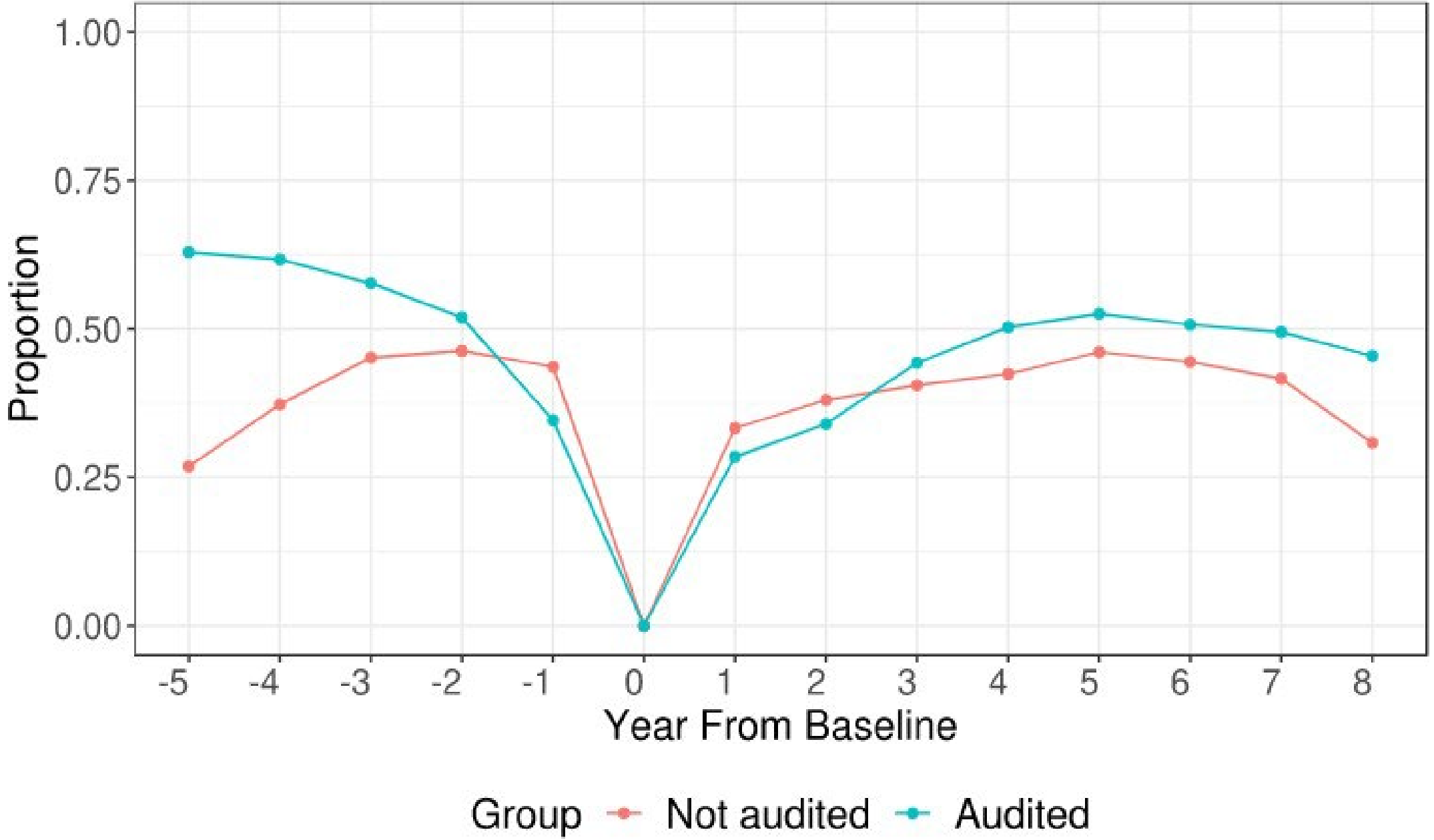
- Years before audit are a placebo test
- Trends over time stand out on a graph
  - How quickly does the effect fade?
- What's the total (present-discounted) return summed over all the post-audit years?

COMMENTS ON LINDSAY, GRANA, & PLUMLEY NONFILERS I

Nice clear question and bottom line. Can you expand on your contributions relative to Datta et al. (2015)?

- Audits are a more intense treatment than automated substitutes for returns.
- Are your methods an improvement?
- Which population contributes more to the filing part of the tax gap?

IDENTIFICATION CONCERNS



IDENTIFICATION SUGGESTIONS

This is a good context for matching

1. Audits could only have been selected based on things you observe.
2. Use the baseline and year-prior characteristics to predict audit within your treatment and control groups.
3. Use the generated propensity scores for propensity score matching or inverse probability weighting.
4. Check that baseline characteristics and prior year trends are similar for control and treatment.

COMMENTS ON PGRM SILVER LINING I

Lean on theory for guidance.

- It's all about perceived p of detection
- Competing hypotheses about how perceptions change when audit rates change:
  1. Total ignorance
  2. Hazy, lagged idea about the change
  3. Perfect information
- Doesn't p of detection for wages and salaries depend on document matching rather than audit rates?

COMMENTS ON PGRM SILVER LINING II

The big picture under the hazy perceptions hypothesis:

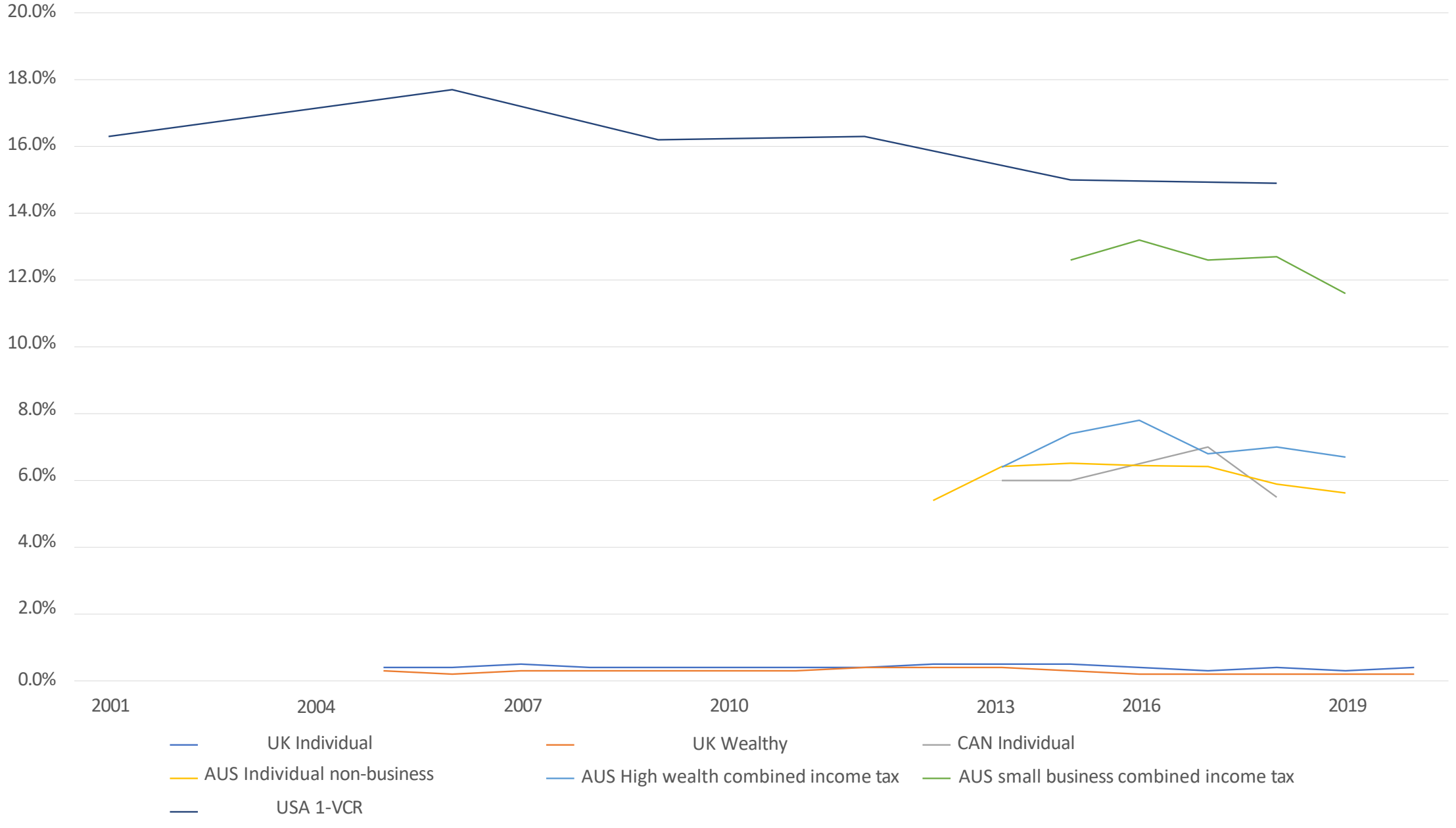
- Audit rates have fallen a lot, especially at the top
- Aggregate noncompliance (NMA) has been pretty much flat
  - But we would expect aggregates grow over time
  - Has noncompliance as a percentage (NMP) fallen despite lower audit rates?

COMMENTS ON PGRM SILVER LINING III

Use the bigger decline in audit rates for high income:

- Split into fewer, more meaningful groups than activity codes
  - For maximum power: high income vs. the rest
  - Another option: business/EITC/high income/other
- What is NMP over time for each grouping?

TAX GAPS TRENDING FLAT OR DOWN AROUND THE WORLD



WHERE DO WE GO FROM HERE?

Directions for future research:

- What can we learn by comparing countries?
  - How much do technologies like e-filing and document matching matter?
- Surveys or lab experiments on the non-monetary costs (hassle/psychological) costs of being audited
- Surveys on perceptions of audit rates, perceived changes over time, perceived differences across groups

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

Emily Y. Lin and Navodhya Samarakoon
Office of Tax Analysis, U.S. Treasury Department

Prepared for
IRS/TPC Joint Research Conference on Tax Administration
June 22, 2023

Motivation

- Little is known about the married-filing-separately (MFS) status and the taxpayers– when to use it? who uses it, and for how long?
- What is known?
  - -- Married individuals can choose between filing jointly (married-filing-jointly or MFJ status) or separately (married-filing-separately or MFS status)
  - -- MFS *generally* results in a higher federal income tax liability than MFJ
    - Extent and magnitude?
  - -- There is no single formula or condition to apply; Plenty of online articles on how to choose the "better' filing status or when it makes sense to file separately
  - -- IRS publications advise taxpayers to calculate tax both ways
  - -- Few returns are filed as MFS (2.4% of returns or 3.4% of married filers for TY20)
- Complexity, equity, and compliance issues

Examples of Online Articles

Investopedia
https://www.investopedia.com › ... › Marriage & Union

Happily Married? You May Still Want to File Taxes Separately

This means that filing separately is a good idea from a tax-savings standpoint **only when one spouse's deductions are large enough to make up for the second** ...
Earned Income Tax Credit · Child Tax Credit · The Tax Benefits of Having a...

CNBC
https://www.cnbc.com › 2022/02/24 › heres-when-marri...

Here's when married filing separately makes sense, tax ...

Feb 24, 2022 — Married couples have the choice to file taxes jointly or separately **every season**. While filing together generally pays off, splitting returns ...

H&R Block
https://www.hrblock.com › personal-tax-planning › m...

Filing Taxes Jointly Vs. Separately

Married Filing Separately might benefit you **if you have to use the Alternative Minimum Tax (AMT) on a joint return** (Only true if only one spouse is liable on a ...

NerdWallet
https://www.nerdwallet.com › Taxes

Married Filing Separately: How It Works, When to Do It

Feb 9, 2023 — Under the married filing separately status, **each spouse files their own tax return instead of one return jointly**. Instead of combining income, ...

Intuit
https://turbotax.intuit.com › tax-tips › marriage › whe...

When Married Filing Separately Will Save You Taxes - TurboTax

Mar 30, 2023 — **If one spouse has a large tax bill and the other is due a tax refund, filing separately will protect the refund**. The IRS won't apply it to the ...

https://turbotax.intuit.com › tax-tips › marriage › shou...

Should You and Your Spouse File Taxes Jointly or Separately?

May 25, 2023 — On the other hand, couples who file **separately typically receive fewer tax**

Empower
https://www.empower.com › the-currency › life › whe...

How married filing separately works & when to do it

Married filing separately is one of five different tax-filing statuses that you can choose from. It means that **you and your spouse each report income**, ...

SmartAsset.com
https://smartasset.com › taxes › 3-reasons-married-cou...

3 Reasons Married Couples Should Consider Filing Taxes ...

Apr 26, 2023 — When you file separately, **only your income is taken into account to determine what kind of payments you qualify for**. Again, you're sacrificing ...

U.S. News & World Report
https://money.usnews.com › ... › Taxes

Married Couples: Is It Better to File Taxes Jointly or ...

Most married couples will come out ahead by **filing jointly**, but filing separately may be the better choice for some.

Tax Rules for MFS: Marital Status

- Marital status is determined based on the taxpayer's status on the last day of the tax year.
- Legally separated persons according to the state law, under the decree of divorce or of separate maintenance, are considered as unmarried.
    - Some taxpayers may be in a prolonged separation, but not legally separated, from their spouse.
- Exception: A married person is considered as unmarried if the "abandoned spouse" rules are met.
    - The person furnishes over half of the cost of maintaining the household that constitutes the principal place of abode of the taxpayer and a qualifying child for more than half of the tax year, and the spouse is not a member of the household during the last six months of the tax year.
    - Head-of-household status may be used.

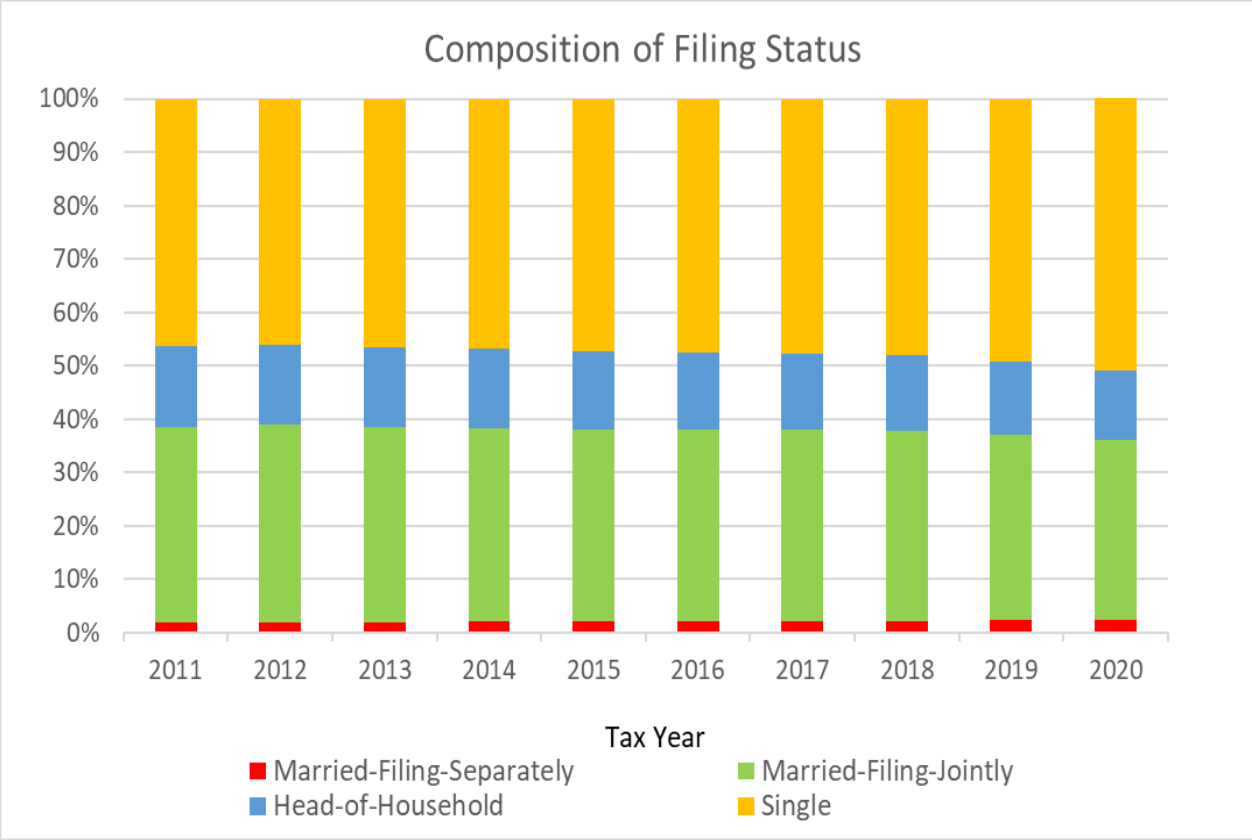
Tax Rules for MFS: Tax Penalty

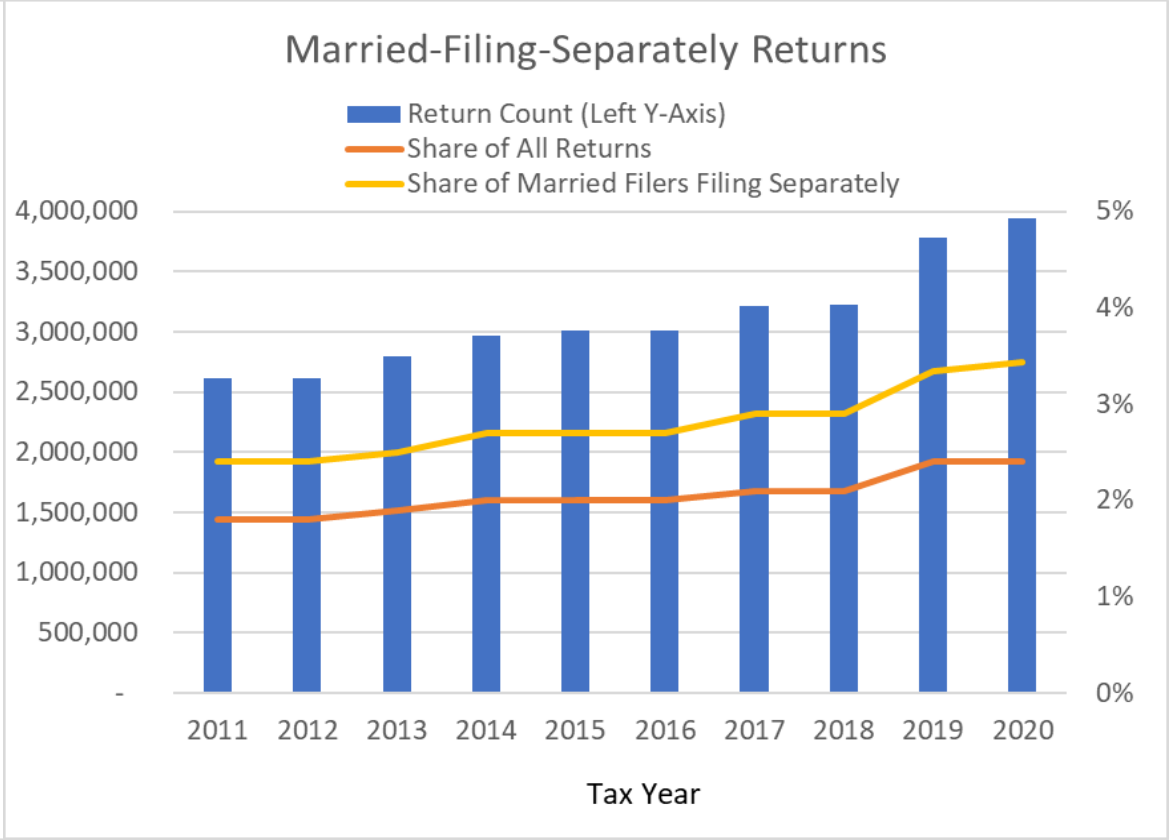
- Lengths of tax brackets for MFS and the amount of standard deduction are ½ of those for MFJ
- Limited eligibility for tax credits
  - -- Not eligible for the EITC until tax year 2021 when limited exceptions were allowed
  - -- Premium Tax Credit (PTC) only if victims of domestic abuse and spousal abandonment
  - -- Very limited eligibility for the Child and Dependent Care Tax Credit
  - -- Cannot take education credits and the adoption tax credit
- Examples of other provisions
  - -- Cannot take the deduction for student loan interest
  - -- A reduced amount of the child and dependent care exclusion
  - -- If one spouse claims itemized deductions, the other cannot take the standard deduction.
- Tax disadvantage relative to single or head-of-household status

Why Using MFS?

- Lower federal tax liability
  - If one spouse has low income and significant deductions subject to an adjusted gross income (AGI) floor, it is possible that filing separately is advantageous. For example, medical expenses are deductible to the extent that expenses exceed 7.5 percent of a taxpayer's AGI.
- U.S. persons married to a nonresident (unless they elect to treat the nonresident alien spouse as a resident alien for federal tax purposes)
- Cases of domestic abuse or spousal abandonment (for those not meeting the "abandoned spouse" rules)
- Protect from audits on the spouse's return and from being liable for the spouse's tax bill or refund offsets
- Estranged spouses who no longer live together or do not have an emotionally co-dependent relationship
- Couples in the process of divorce
- Stay financially independent
- Have large student loan expenses subject to an income-based repayment plan

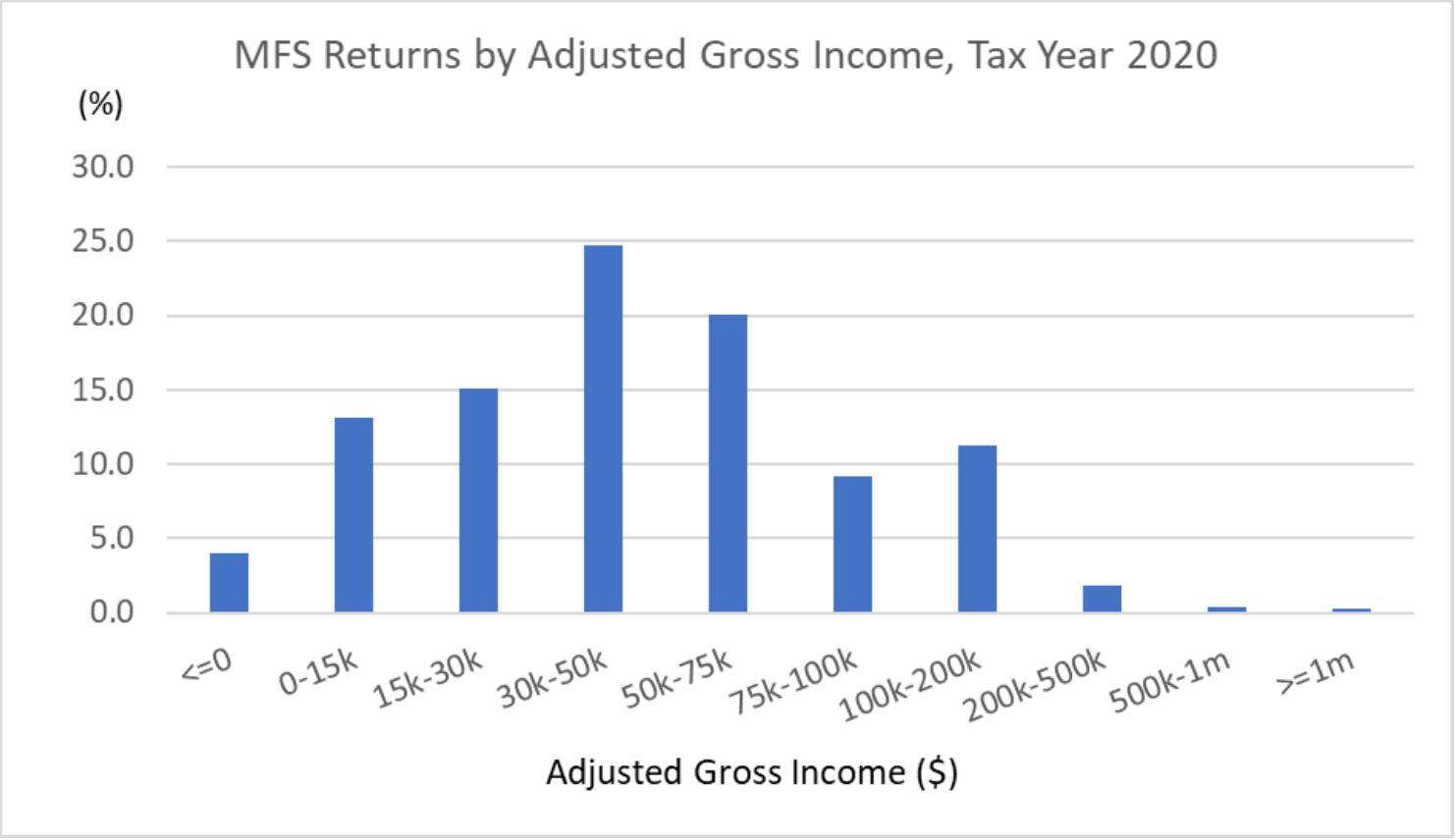
How Many MFS Returns Are Filed Each Year?





Data source: : Author calculation of the IRS Statistics of Income (SOI) publications (IRS, various years).

Income Reported on MFS Returns



Data source: : Author calculation of the IRS Statistics of Income (SOI) publications (IRS, 2020).

Dynamics of MFS Claims

- Data: Population of MFS returns filed for tax years 2013-2021; a total of 31.8 million returns filed by 13.4 million taxpayers

Number of Years with MFS Filing	Percentage (%) of All Filers	Accumulated Percentage (%)	Mean Age in 2021	Mean Adjusted Gross Income (AGI) in 2021$
1	51.69	51.69	45.8	55,290
2	18.29	69.98	47.5	59,228
3	9.78	79.75	49.1	64,292
4	6.05	85.80	50.9	65,794
5	4.13	89.93	52.7	67,757
6	2.92	92.85	53.8	73,397
7	2.26	95.10	55.3	74,360
8	1.93	97.03	57.0	98,647
9	2.97	100.00	60.7	118,026

- Longer claims if accounting for censored data: half of MFS claims end after 1 year, >70 percent end after 3 years, but 12 percent last after 8 years
- Each year, 39% to 42% of MFS filers newly used this filing status, 37% to 42% stopped filing as MFS in the subsequent year, 58% to 63% continued

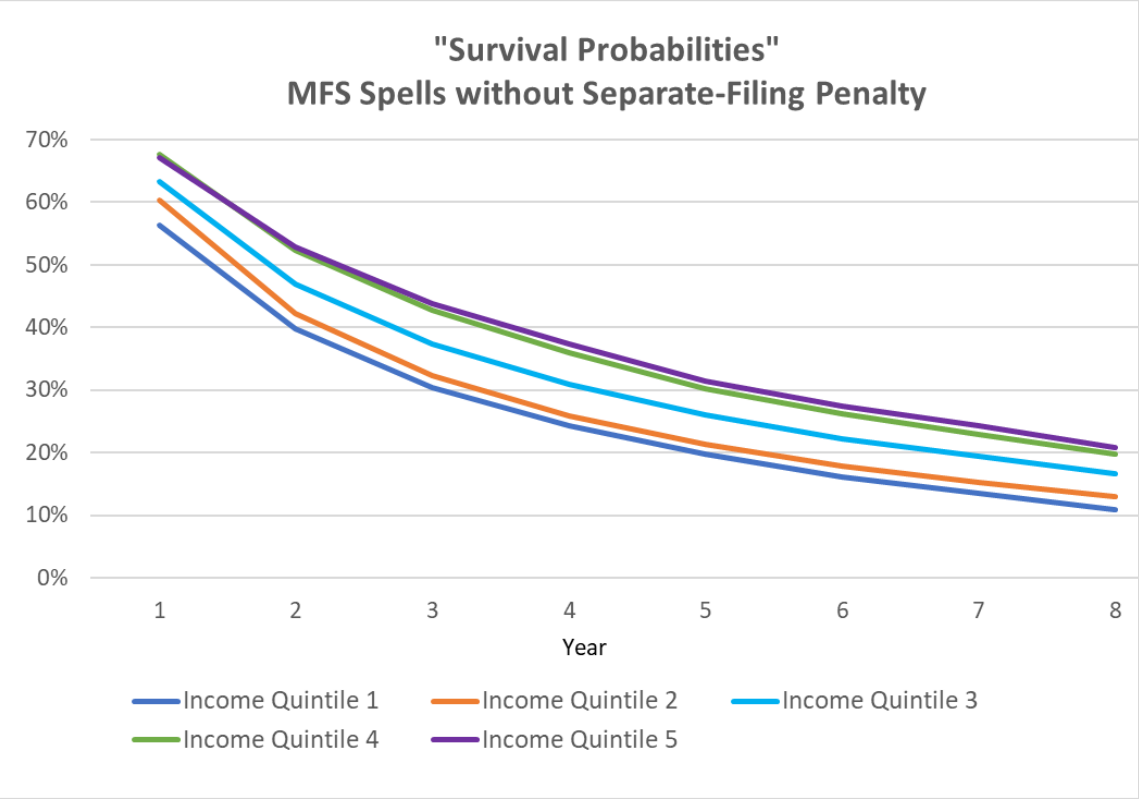
Tax Penalty or Bonus for Filing Separately

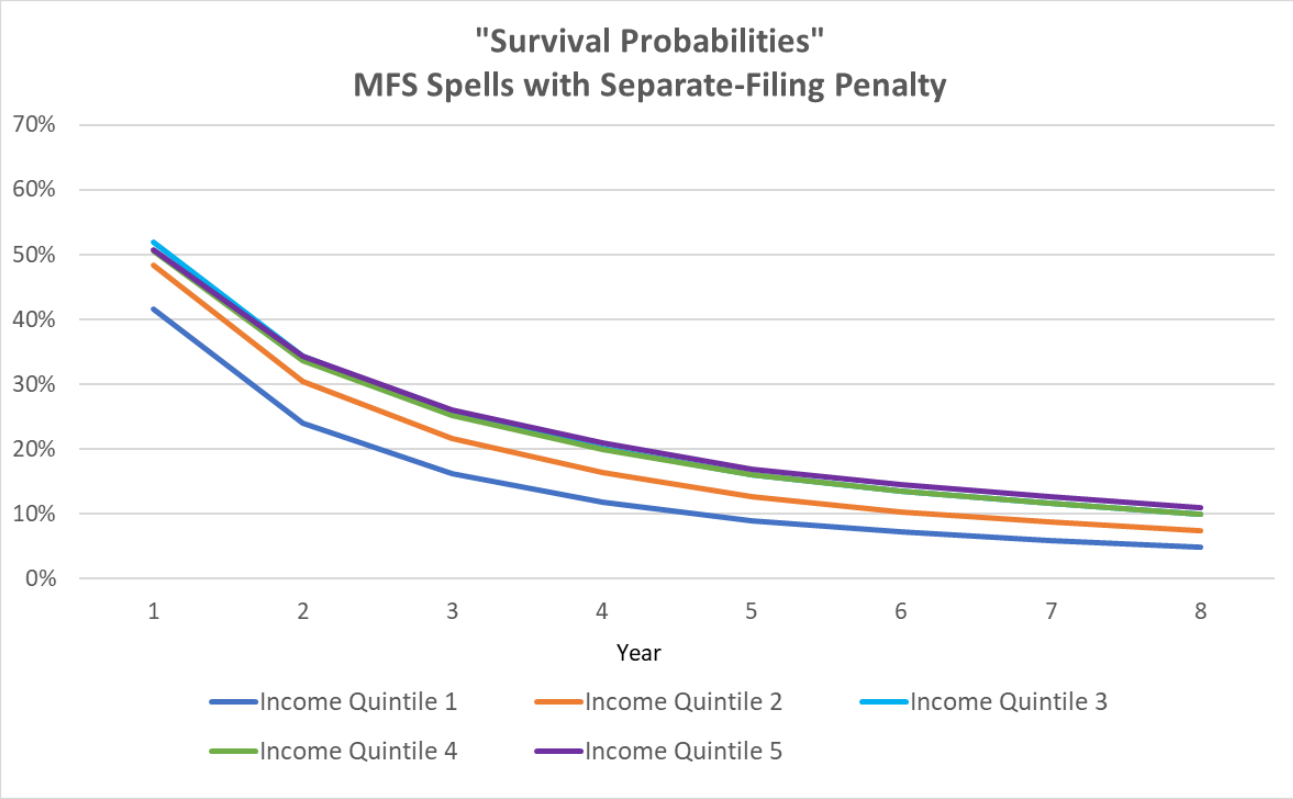
Variable	Mean			
	ALL	Separate Filing Penalty	Separate Filing Neutral	Separate Filing Bonus
Tax penalty ($)	-1,172	-2,260	0	1,130
Fraction of all MFS returns	100.0%	63.0%	23.7%	13.0%
Penalty as % of joint liability	-7.02%	-12.26%	0	4.56%
Adjusted gross income ($)	59,889	59,590	50,774	77,629
Age	47.4	47.8	46.0	48.3
Itemizer (0/1), self or spouse	0.3431	0.2960	0.1712	0.8746
EITC on joint return (0/1)	0.0922	0.1459	0.0007	0.0009
Child tax credit (0/1)	0.1733	0.1787	0.1363	0.2138
Number of dependents	0.3348	0.3520	0.2457	0.4129
Any dependents (0/1)	0.2184	0.2245	0.1734	0.2697
Number of observations	22,730,168	14,324,290	5,393,126	3,012,752

Effects of the Penalty on MFS Claim Dynamics

Survival probability (t) = the probability of continuing filing as MFS after year t

- The higher the income, the higher the survival probability
- The effect of the separate filing penalty is strong
  - -- For the first 3 years of a spell, penalty decreases the survival rate by 12 to 18 ppt each year
  - --The effect is attenuated with spell duration but remains substantial





Complexity and Equity

- Marital status
  -- Taxpayers going through a separation or divorce need to determine if their separation agreement or living situations meet the standard of being considered as unmarried for filing status purposes
- The “abandoned spouse” exception does not apply to separating individuals who
  -- do not have dependent children,
  -- do not live apart from their spouses for a required period, or
  -- do no furnish more than half of the cost of maintaining the household
- Rules may disadvantage low-income taxpayers
  -- Lack tax advice
  -- Lack resources to obtain the required court action for legal separation
  -- Hard to meet the household maintenance test if receiving outside support

CDCTC, PTC and EITC Rules for MFS Filers

- CDCTC (claimed by <1% MFS filers)
  Meet the "abandoned spouse" rules except that the household they maintain is the home they reside in with a qualifying person for the CDCTC purposes (e.g., a disabled sibling) who is not a dependent child.

- PTC (claimed by <2% MFS filers)
  For victims of domestic abuse and spousal abandonment. The taxpayer must live apart from the spouse at the time of filing the tax return. A taxpayer is a victim of spousal abandonment if he or she cannot locate the spouse after a "reasonably diligent" effort is made.

- EITC (claimed by about 2% of MFS filers for TY 2021)
  Live with a qualifying child for more than half of the year and either (1) separated under a legally binding written separation agreement (not necessarily a decree of divorce) and live apart from the spouse at the end of the tax year or (2) the spouse is not a member of the household during the last six months of the year.

Tax Administration Challenges

- EITC, PTC and CDCTC for MFS filers under specified situations
  -- Difficult for taxpayers to be aware of, or to determine, eligibility
  -- Difficult to target outreach efforts by IRS
  -- Compliance challenge

- Filing status
  -- Complex rules, unverifiable standards, coupled with tax incentives to file as unmarried
  -- 2.68% of returns should've claimed the MFS status compared to 1.74% claiming it (NRP, 2006-2014)

Compliance

Variable	Reported Other Status; Corrected to MFS		Reported MFS; Corrected to Other Status	
	Mean	Std. Dev.	Mean	Std. Dev.
Adjustment for tax after credits ($)	4,196	4,791	2,204	8,046
Positive adjustment (0/1)	**0.9619**	0.1915	0.5992	0.4924
Negative adjustment (0/1)	0.0139	0.1171	**0.3372**	0.4750
Adjustment for EITC and additional CTC ($)	-2318	2,497	-106	1,077
Negative adjustment (0/1)	**0.6842**	0.4651	0.0651	0.248
Positive adjustment (0/1)	0.0118	0.1081	0.0463	0.211

Data source: The NRP 1040 Study, 2006-2014.
Note: All dollar amounts are in 2021 level.

Summary

- Despite constituting a small share of tax filers, MFS filers consist of a diverse group of individuals by income and by how long they use this filing status.
- About 13 percent of MFS filers enjoy a tax bonus by filing separately; 63 percent have a penalty.
  - -- Bonus status is positively associated with income, dependents, and the claim of itemized deductions.
  - -- Penalty status is positively associated with EITC receipt when filing jointly.
  - -- The presence of a penalty substantially decreases the likelihood that an individual continues using this filing status.
- Complexity and equity concerns.
- A large percentage of filing status errors are associated with a small group of taxpayers.

Willing but Unable to Pay? The Role of Gender in TaxCompliance

Andrea Lopez-Luzuriaga[†] Carlos Scartascini[*]

[†]Universidad del Rosario

[*]Inter-American Development Bank

13th Annual IRS-TPC Joint Research Conference on Tax Administration
22 June, 2023

Motivation

- Women are more likely to comply with taxes.
  - Evidence from field interventions.
    (Wenzel, 2006; Kleven et al., 2011; Alstadsaeter and Jacob, 2013; Cabral, Myles, and Kotsogiannis, 2015; Advani, Elming, and Shaw, 2017)
  - Evidence from laboratory experiments.
    (Fortin, Lacroix, and Villeval, 2007; Bazart and Pickhardt, 2011; Eisenhauer, Geide-Stevenson, and Ferro, 2011; Finocchiaro Castro and Rizzo, 2014; Kogler, Mittone, and Kirchler, 2016)

Motivation

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- Hypothesis:
  - Risk aversion
    (Hibbert, Lawrence, and Prakash, 2013; Engstrom et al., 2015; Skatun, 2017; Charness et al., 2018)
  - Tax morale
    (Alm and Torgler, 2006; Torgler, 2005; Torgler and Valev, 2010; Shafiq, 2015; Cyan, Koumpias, and Martinez-Vazquez, 2016)

Motivation

- When faced with an intervention, who would react more?

Women	**Men**
⇓	⇓
More sensitive	Room for improvement

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  - Treatment for men and women.

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- Are there any other considerations?
- Ideal intervention:
  - Treatment for men and women.
  - Test for the effect of promoting tax morale and signal deterrence on compliance.
  - Simple tax that has very clear measure of compliance.

Outline

- Intervention: RCT property tax
- Results
- Complementary data
- Our interpretation

Intervention: RCT

Background

Castro and Scartascini (2015): Large field experiment designed to test which factors increase compliance with property tax. A message was included on the property tax bill (23,000 taxpayers)

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Castro and Scartascini (2015): Large field experiment designed to test which factors increase compliance with property tax. A message was included on the property tax bill (23,000 taxpayers)

Property tax is very simple:

- Tax is billed by the city.
- The tax is computed according to the front side of the property and the services the city provides, such as public lighting, trash collection, and street cleaning.

Compliance is very simple: either to **pay or not**.

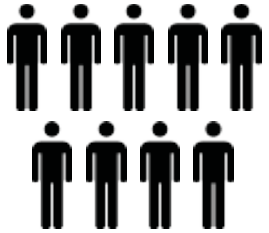
Background / treatments

Compliance messages were designed to trigger one the following:

T1 Deterrence → ***RiskAversion***

T2 Reciprocity → ***TaxMorale***

T3 Peer-effects → ***TaxMorale***



Gender

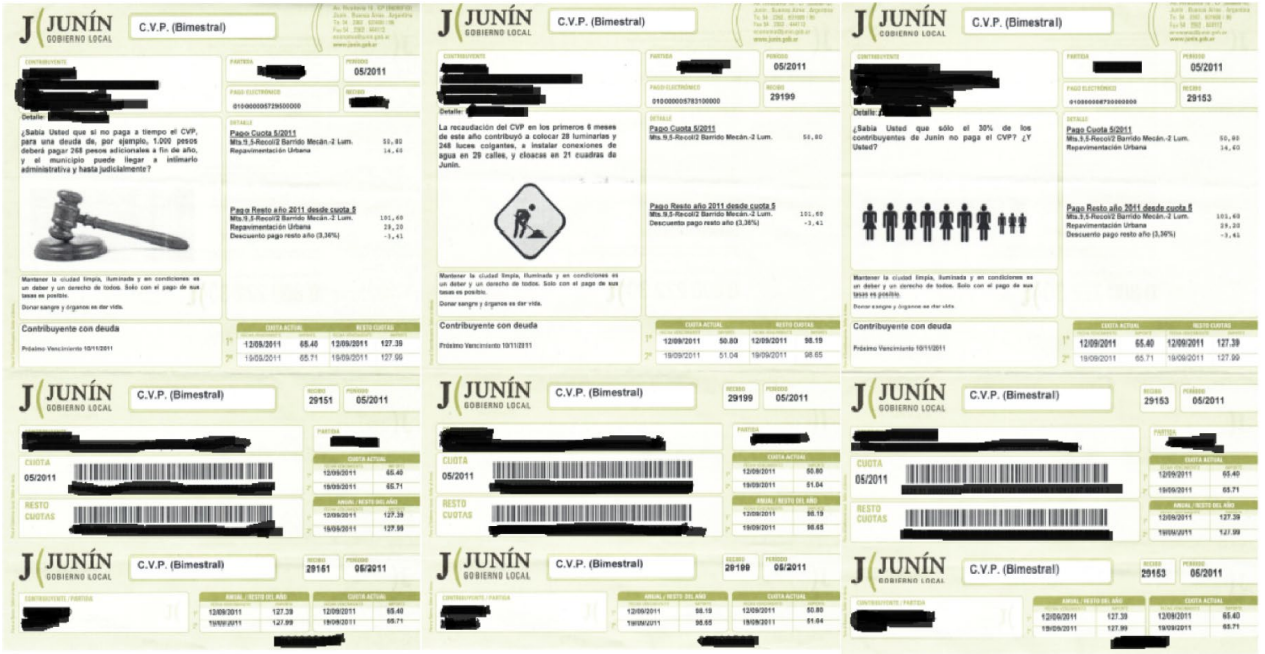
- The original experiment did not consider gender; recovered for this work
- The message was included in the tax bill.

Gender

The original experiment did not consider gender; recovered for this work

- The message was included in the tax bill.
- Gender of the person who the tax bill is addressed to:
  - Owns the property or,
  - Rents the property and the lease in their name
- List of officially-approved names of Provincia de Buenos Aires ⇒ 92% sample (21,500)

Randomization is still good: the groups were balanced by gender.



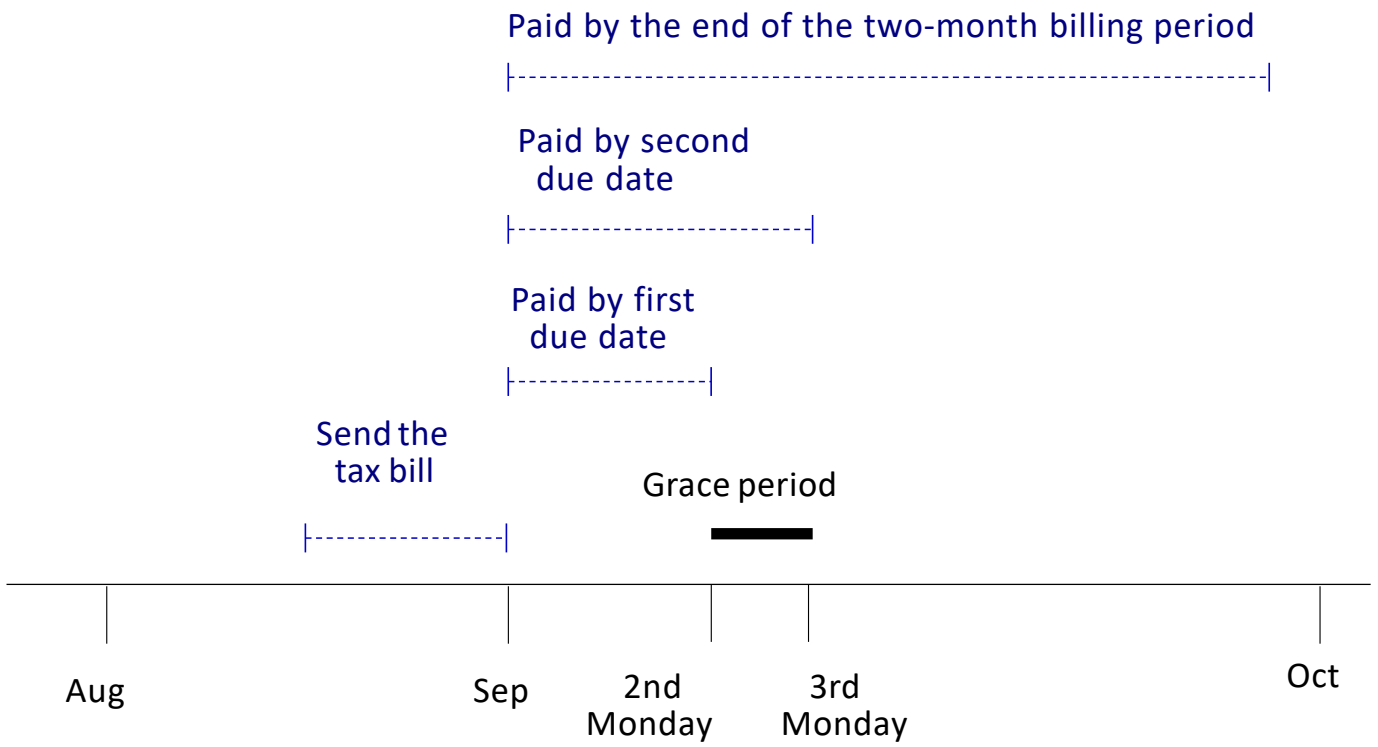
Tax Characteristics and Outcomes

Tax:

- Tax is billed by the city based on the property characteristics Fine: A
- compound monthly interest rate of 2%.

Outcomes:

- Binary outcomes for payment:



Results

Results

T1 Deterrence

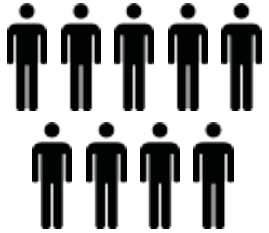
Increase in compliance

T2 Reciprocity

No average effect depending on the outcome

T3 Peer-effects

No average effect



Mechanisms - Deterrence Message

Mechanism:

Did you know that if you do not pay the CVP on time for a debt of AR$ 1,000 you will have to disburse AR$ 268 in fines at the end of the year and the Municipality can take administrative and legal action?

Mechanisms - Deterrence Message

Mechanism: **Fine**

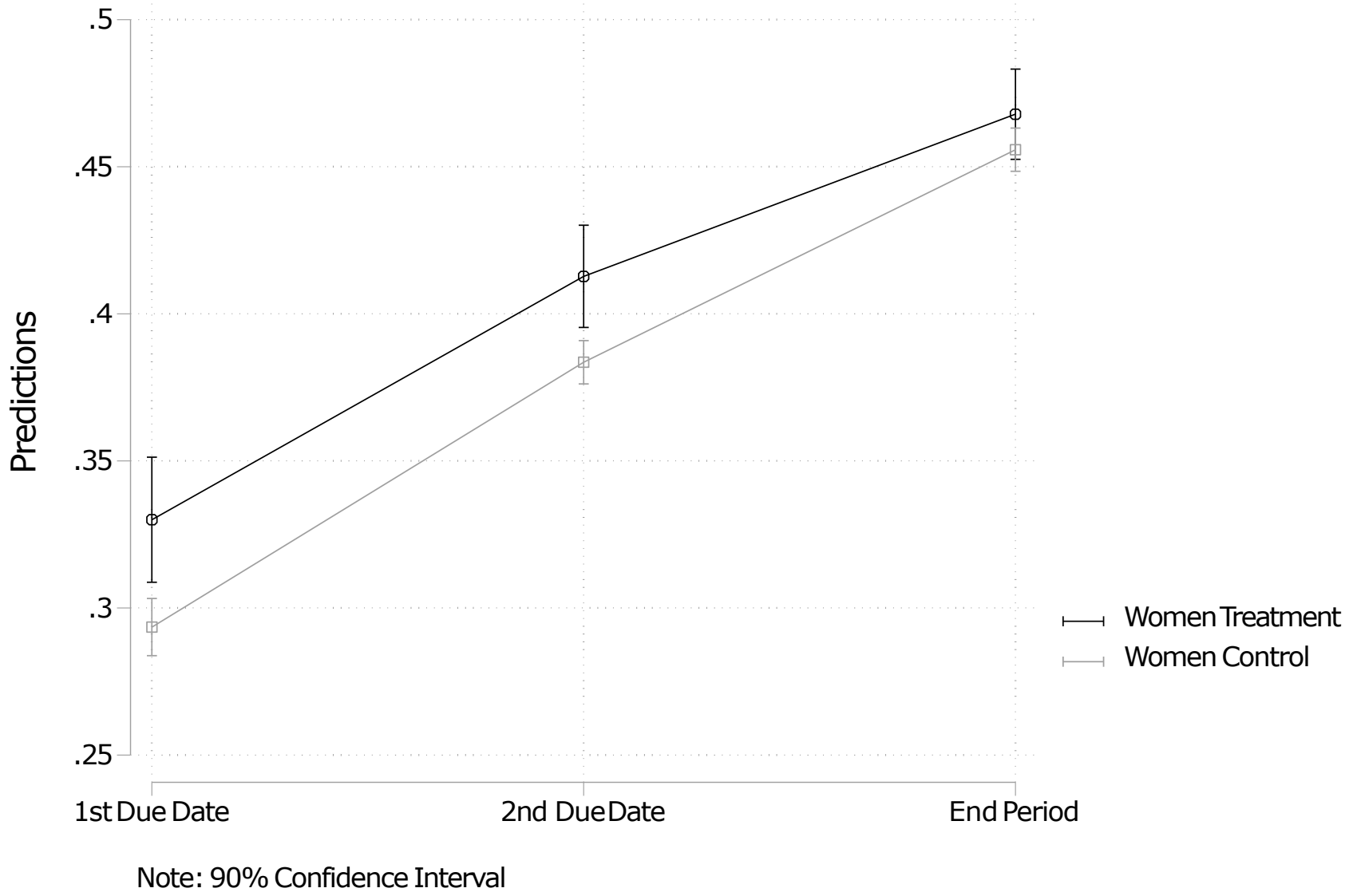
Did you know that if you do not pay the CVP on time for a debt of AR$ 1,000 you will have to disburse AR$ 268 in fines at the end of the year and the Municipality can take administrative and legal action?

Mechanisms - Deterrence Message

Mechanism: **Probability of Enforcement**

Did you know that if you do not pay the CVP on time for a debt of AR$ 1,000 you will have to disburse AR$ 268 in fines at the end of the year and **the Municipality can take administrative and legal action?**

Probability of Paying

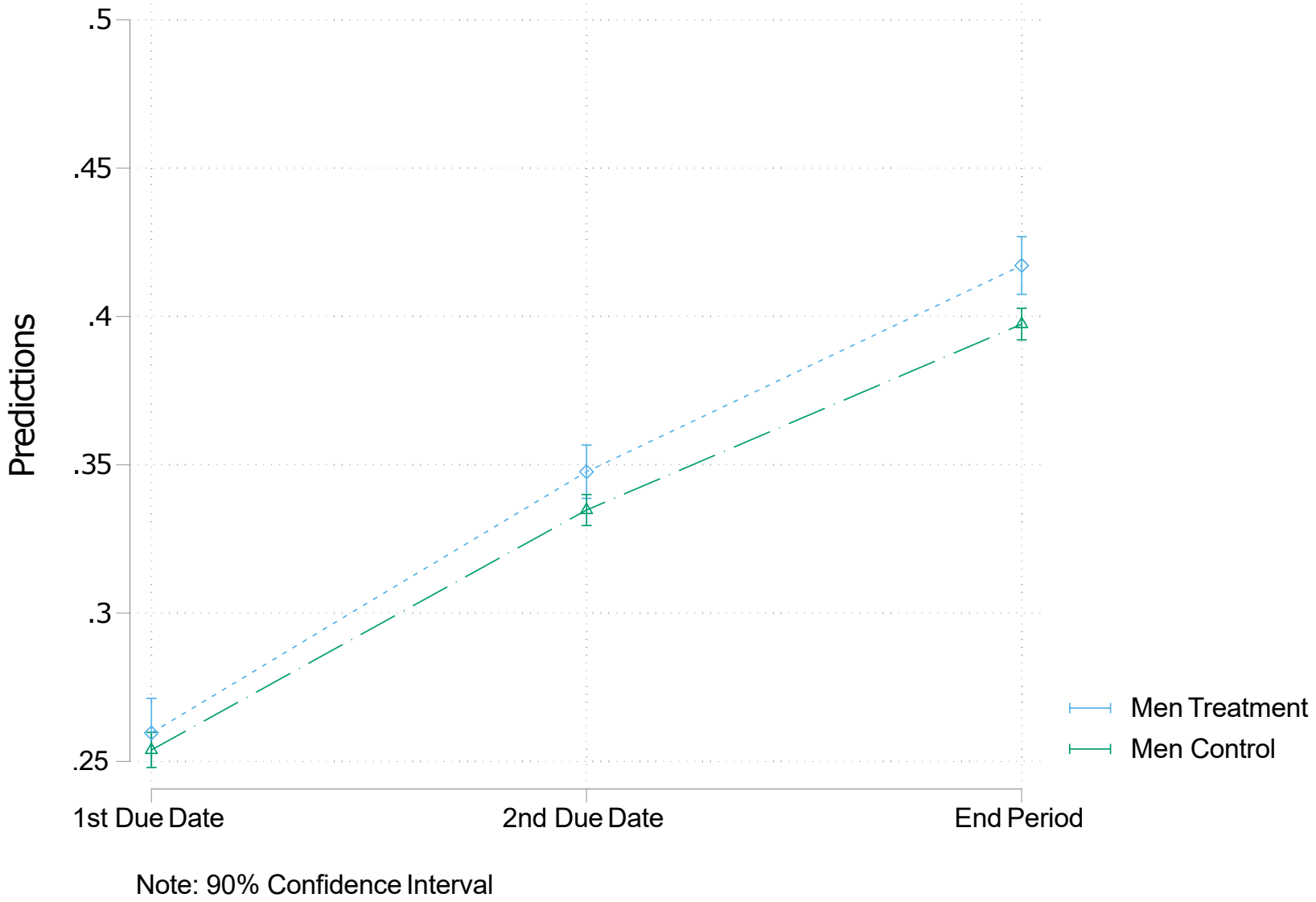


Note: 90% Confidence Interval

Women:

- 1st due date: Increase of 4 percentage points
- 2nd due date: Increase of 3 percentage points

Probability of Paying

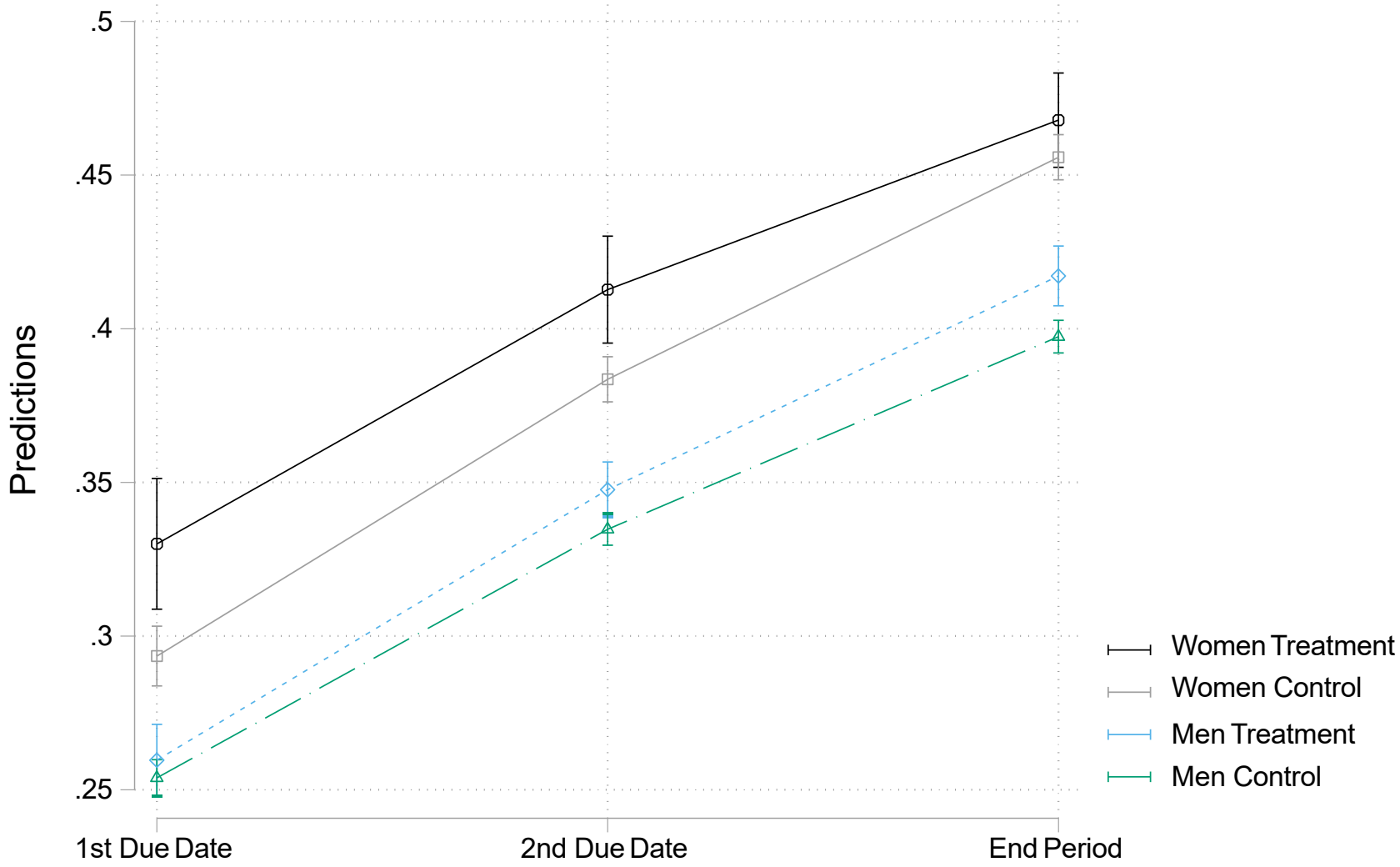


Note: 90% Confidence Interval

Men:

- Pay overall: Increase of 2 percentage points.

Probability of Paying



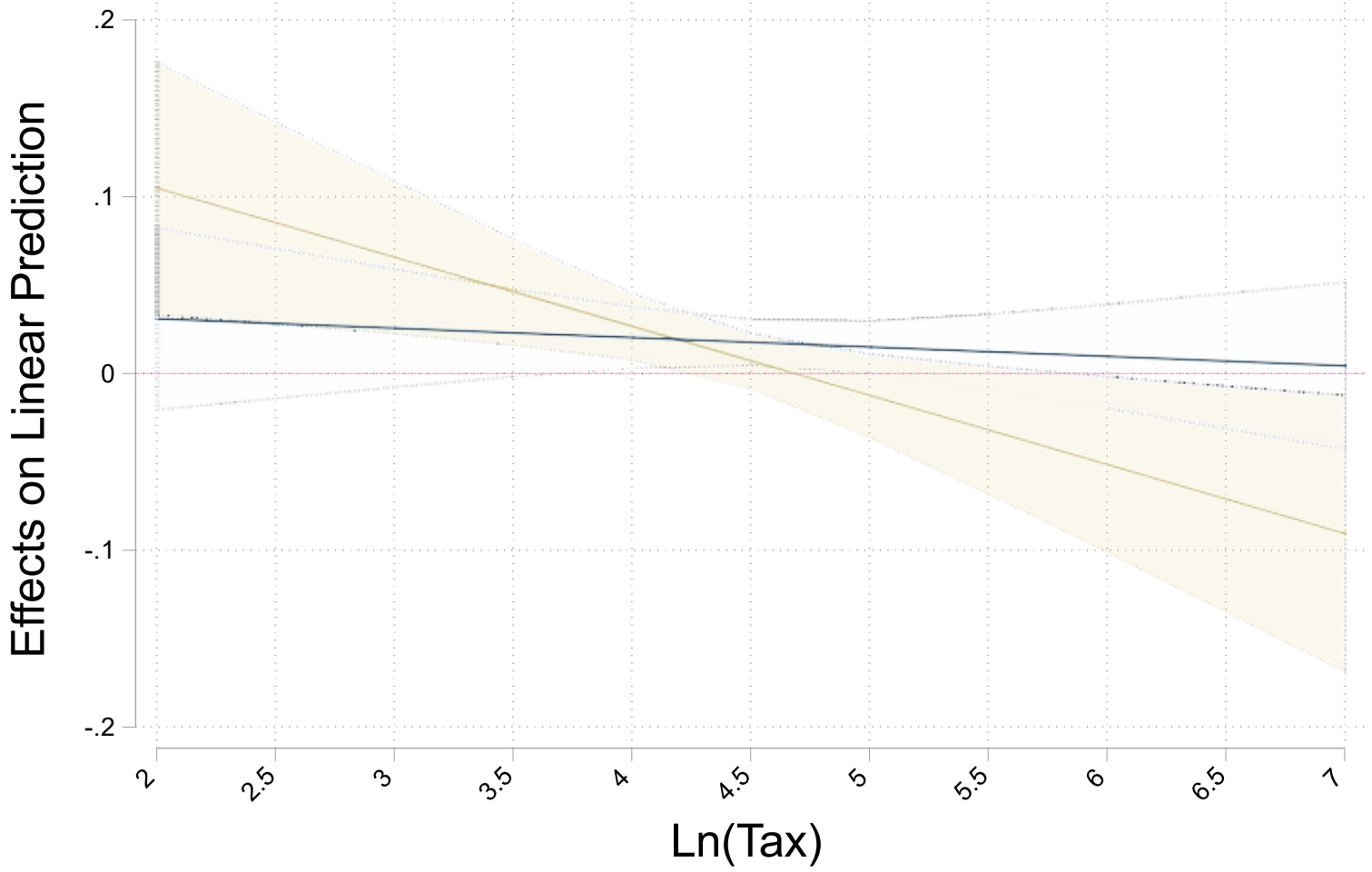
Note: 90% Confidence Interval

Heterogeneous Effect - Where?

Heterogeneous Effect - Where?

Probability of paying by the end of the period

Women (yellow) Men (blue)



Model pay or not

- Not paying is equivalent to playing a lottery with probability of been caught.

Model pay or not

- Not paying is equivalent to playing a lottery with probability of been caught.

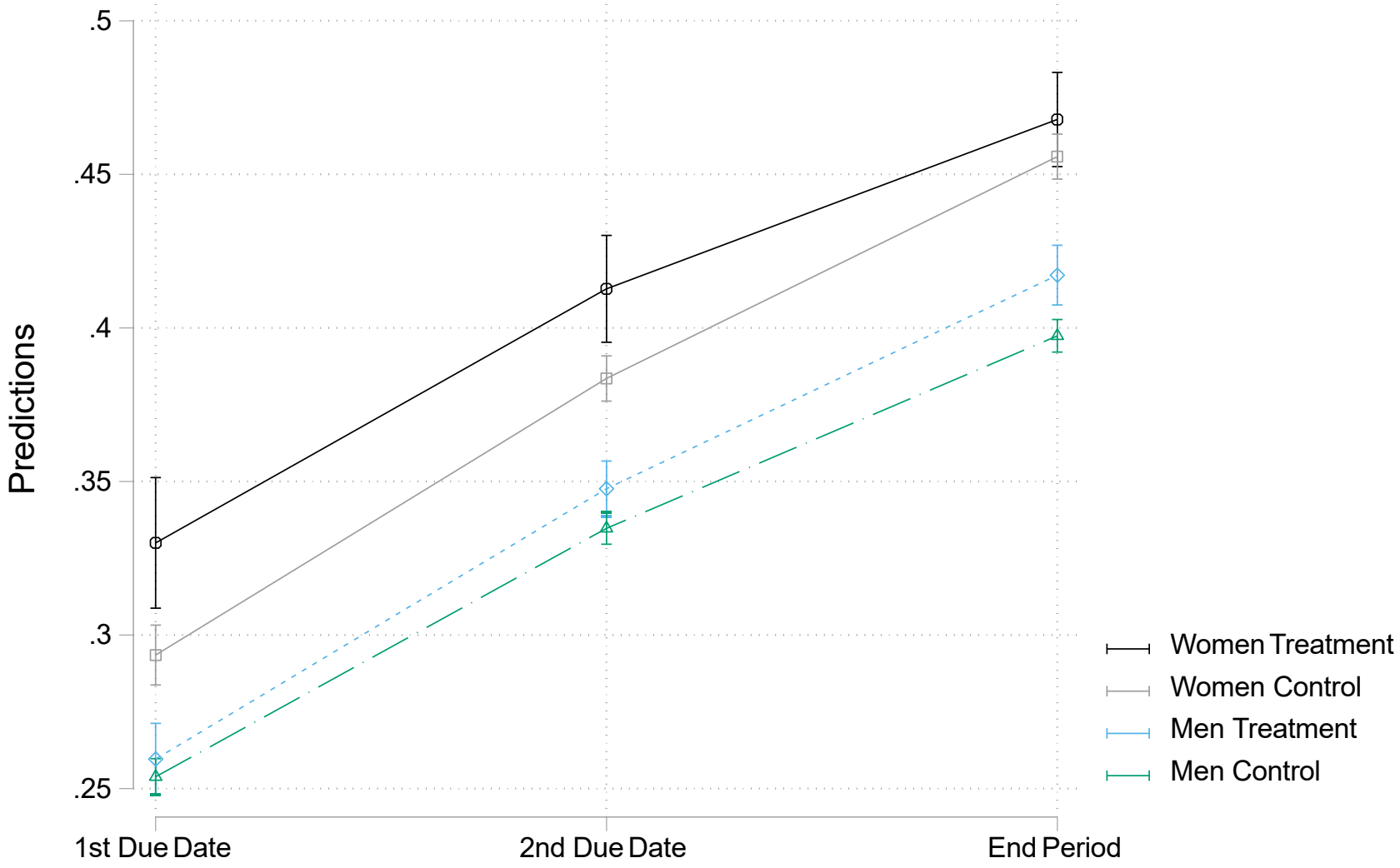
- BUT the tax does not depend on income, so the budget constraint matters.

$$max \quad \{U(Y - T + S), (1 - p)U(Y) + pU(Y - \theta T)\}$$

$$s.\,t. \quad U^* > U(\bar{C})$$

- Once a budget constraint is introduced, there is the possibility of corner solutions

Probability of Paying



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Complementary Survey Data

Survey Data

We do not have a survey with the same individuals of the RCT, but we can look at the population of Junin.

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- Survey made by the city government of Junin and the IADB to taxpayers of the property tax in 2015 (years after the experiment).
  Difference in perceptions about the tax.

Survey Data

We do not have a survey with the same individuals of the RCT, but we can look at the population of Junin.

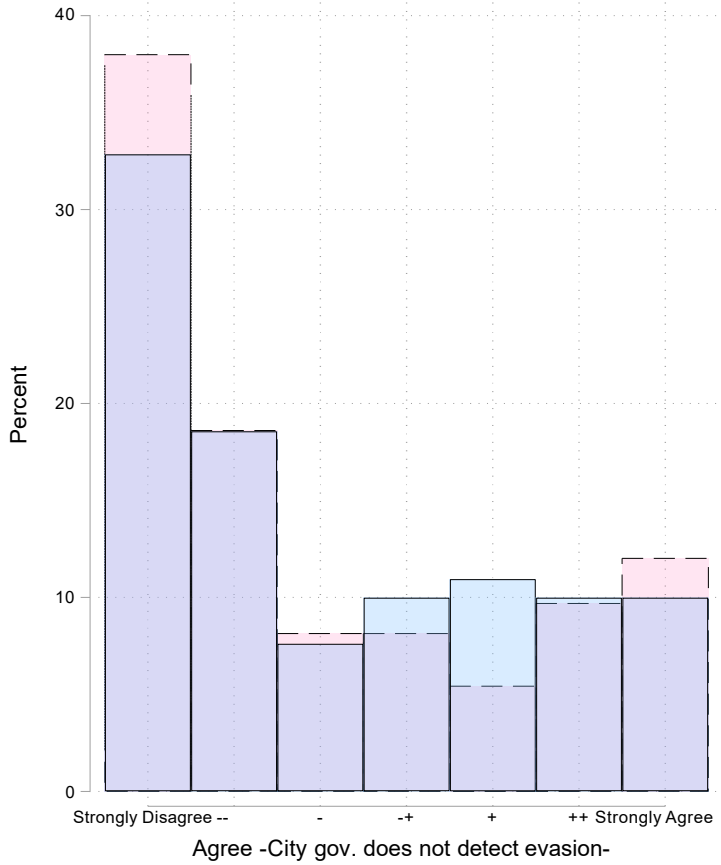
- Survey made by the city government of Junin and the IADB to taxpayers of the property tax in 2015 (years after the experiment).
  Difference in perceptions about the tax.

- Urban household survey - 2011 (same year of the experiment).
  Income differences between female and male headed households.

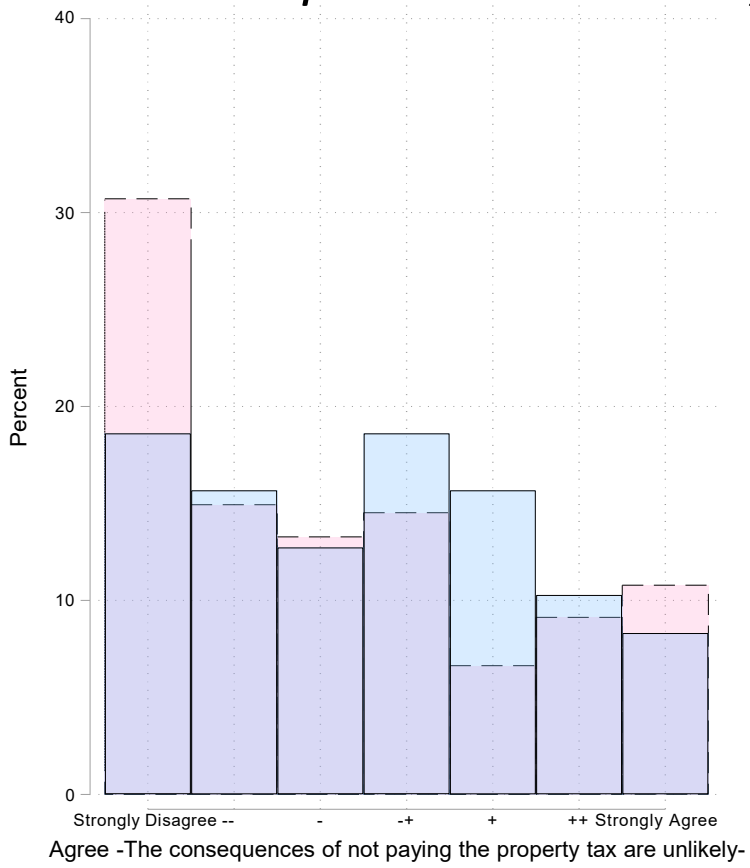
Perceptions about enforcement

Women tend to think that the city government detects evasion and takes action.

Gov. does not detect evasion



Consequences are unlikely

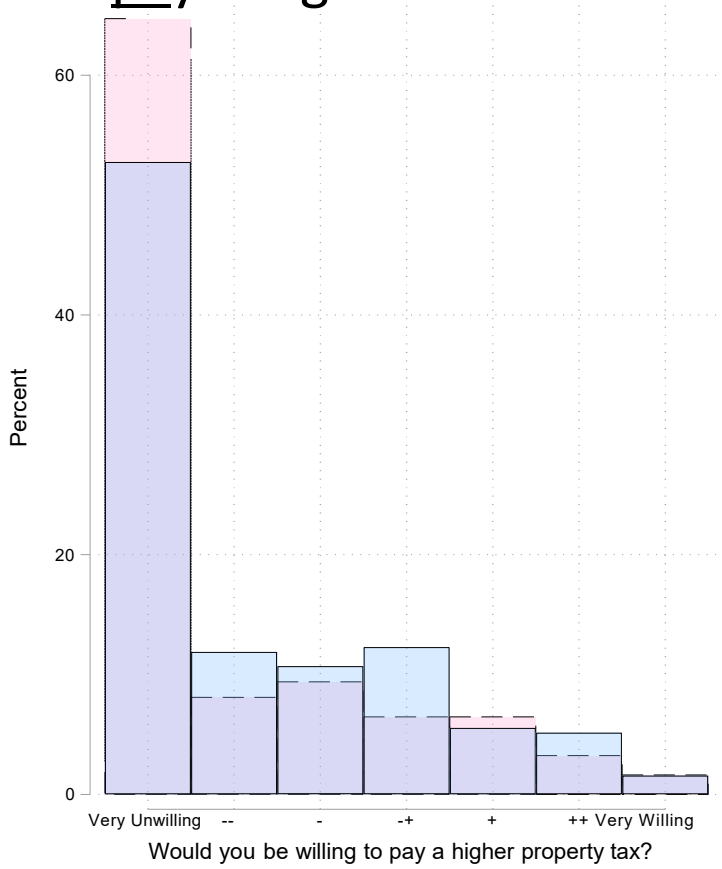


Women Men

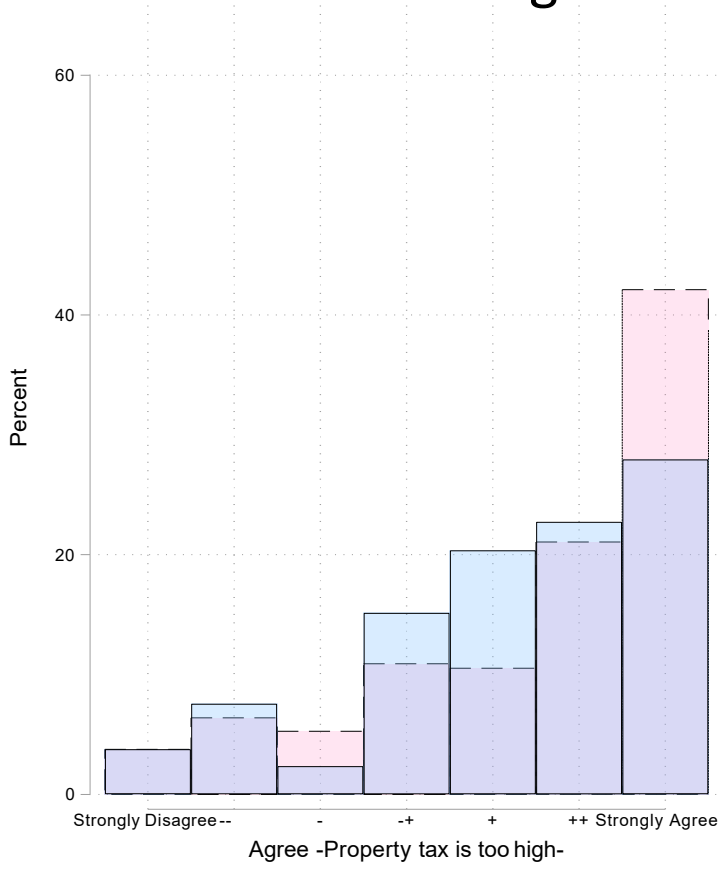
Perceptions about tax burden

Women tend to think that the property tax is too high and are not willing to pay more.

Willingness to pay a higher tax



The tax is too high

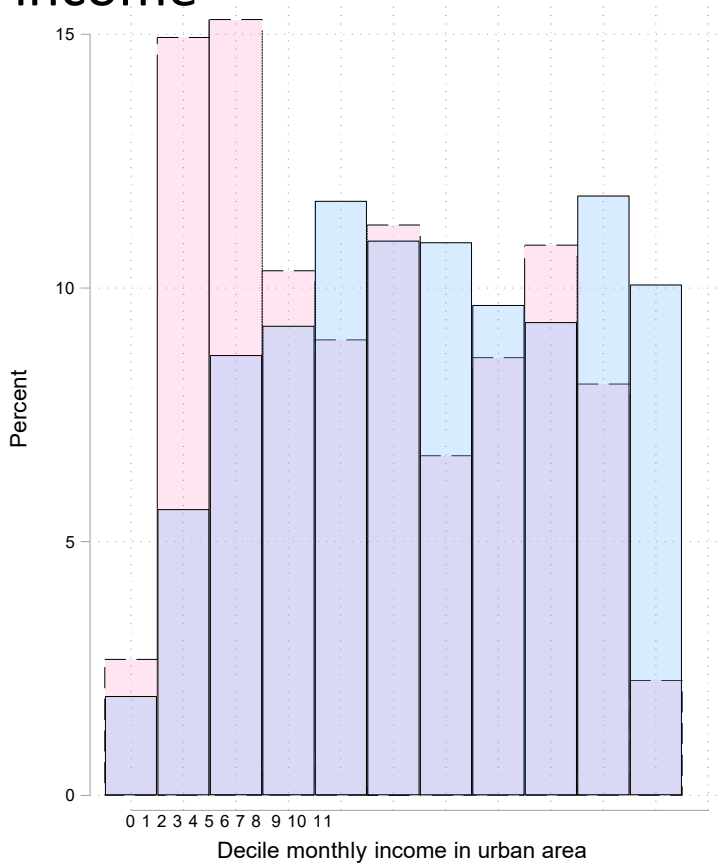


Women Men

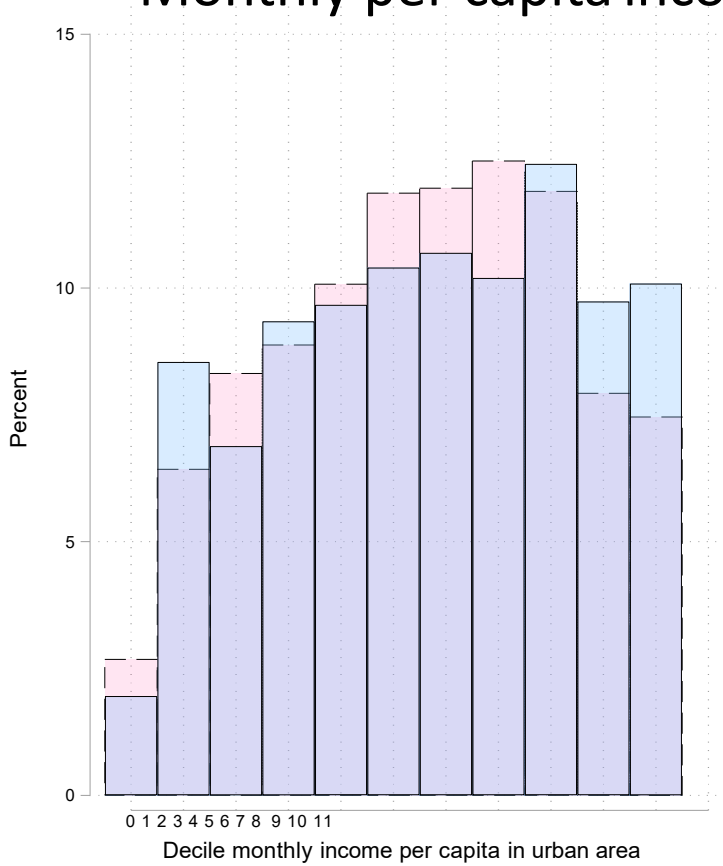
Household income

Women headed households have lower income.

Monthly income



Monthly per capita income



Women Men

Our interpretation of the results

- Women have a stronger reaction to the interventions,

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- Women have a stronger reaction to the interventions, but they are budget constrained. Therefore, there is no overall increase of compliance for women.

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- Women have a stronger reaction to the interventions, but they are budget constrained. Therefore, there is no overall increase of compliance for women.
- The evidence for men is consistent with the existing evidence for the overall population.

Final remarks

- Our study underscores that in contexts where tax enforcement is relatively lax and evasion is substantial, tax policy and enforcement could exacerbate income inequality between men and women.
- Women not only earn lower salaries than men but are also more likely to pay their taxes. This phenomenon may worsen pre-existing income disparities in developing countries, particularly where a small portion of taxation is proportional to income.
- Consequently, tax policy and enforcement campaigns must account for these differential impacts. For a given tax policy, stronger enforcement should aim to alleviate, not augment, inequality.

Thank you!

Who Sells Cryptocurrency?

Jeff Hoopes
University of North Carolina at Chapel Hill

Tyler Menzer
University of Iowa

Jaron Wilde
University of Iowa

Disclaimer

All data work for this project involving administrative tax data was done on IRS computers, by IRS employees. The views expressed here are those of the authors alone, and do not reflect the views of the Internal Revenue Service.

What

Why

How

IRS

Market failures

Unique enforcement

CRYPTOCURRENCIES

Black Wealth on the Rise With Progressive Cryptocurrency Investors

PUBLISHER
CultureBanx

PUBLISHED
NOV 17, 2021 10:20AM EST

CNN US Crime + Justice Energy + Environment Extreme Weather Space + Science

Cryptocurrency has been touted as the key to building Black wealth. But critics are skeptical

By Nicquel Terry Ellis, CNN
Updated 8:45 AM EDT, Sat August 20, 2022

The Atlantic

IDEAS

The Black Investors Who Were Burned by Bitcoin

Neglected by the traditional financial system, they got into cryptocurrency with gusto—but late.

By Annie Lowrey

Identifying cryptocurrency transactions

How

- IRS forms 1099-B (Third-party reported) and Schedule D, Form 8949 (Self-Reporting)
- Textual analysis of descriptions
- Bitcoin and Ethereum

Concerns

- Tax Avoiders/Non-reporters
- Buy and Hold

So, who are they?

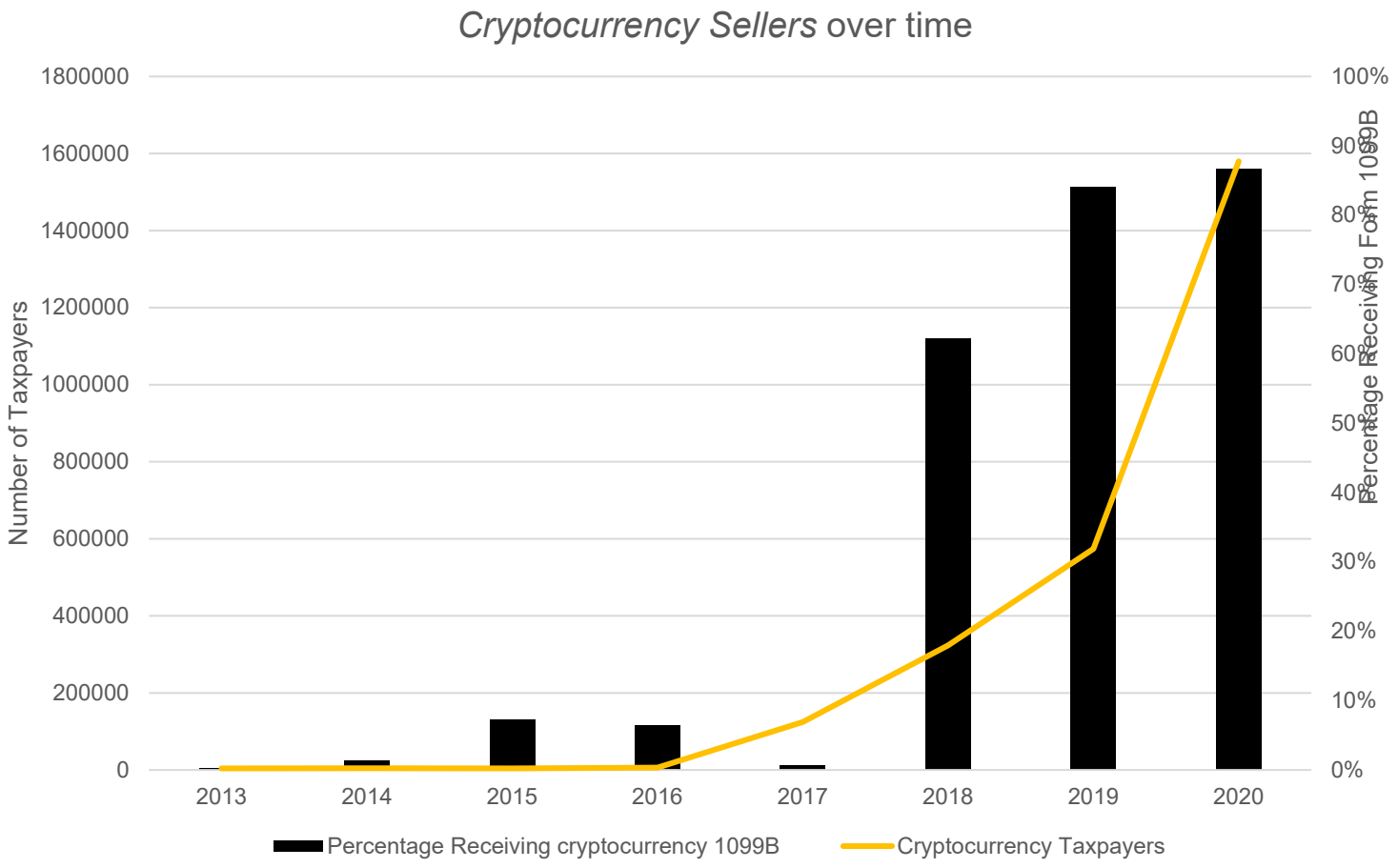
(Results)

What do we know already?

	Country	Years	Crypto Users	Total Sample	Direct Holding	Indirect Holdings
Our Paper	US	2013-2020	2,162,289	202,523,891	Y	Y
Hasso et al. (2019)	UK	2014-2017	~148,288	465,926	?	?
Hackethal et al. (2021)	Germany	2003-2017	872	100,053		Y

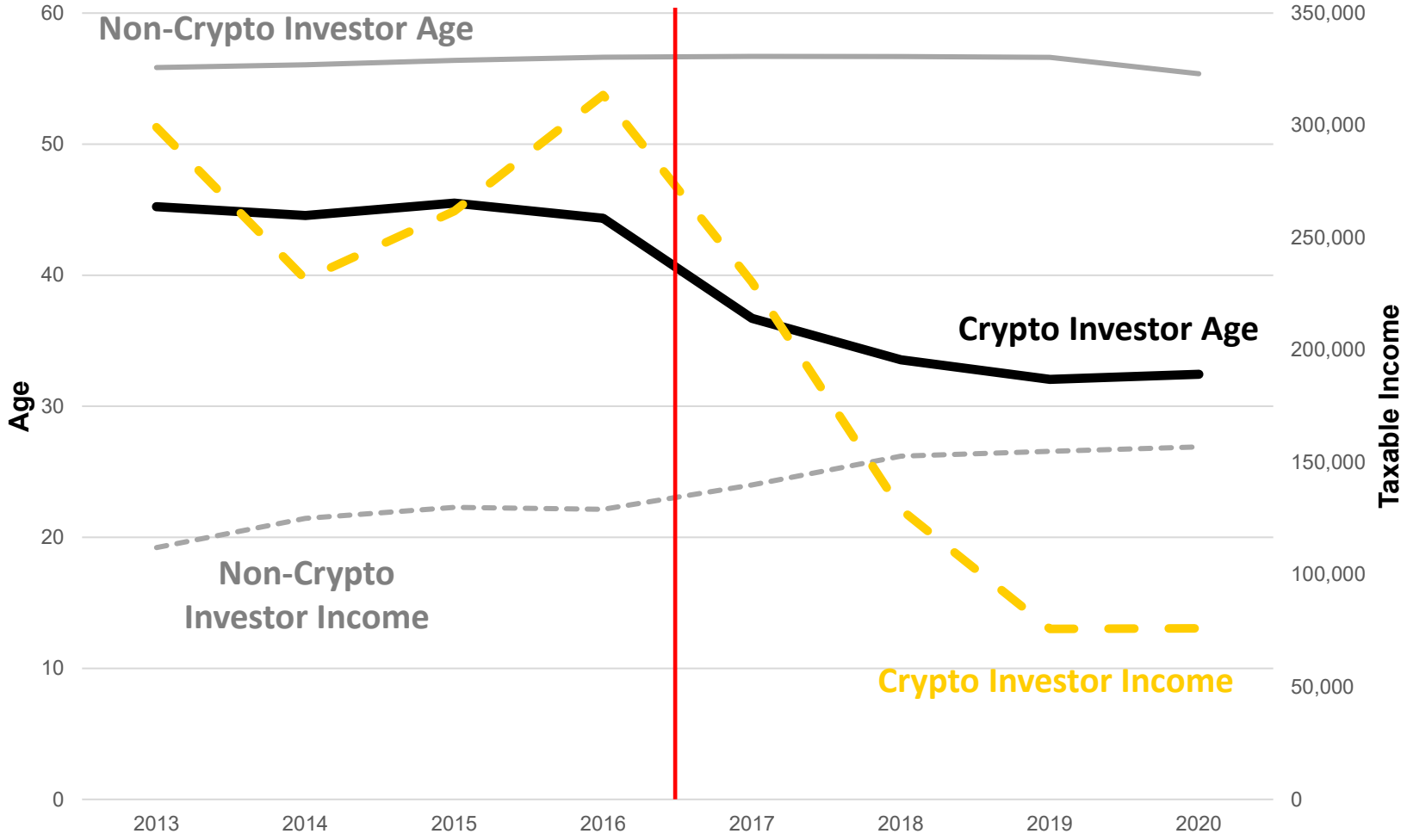
Cryptocurrency Sellers

- 2.16 Million Unique crypto tax returns
- Cryptocurrency gains
  - Average: $12,484
  - Median*: $27



*Median is the average around the median per IRS disclosure guidelines

Cryptocurrency Sellers v. Non-Crypto Investors



Are their racial disparities?

- Problem:
  - IRS does not have taxpayer level racial data

- Solution:
  - US Census, zip code level data
  - Aggregate IRS data by zip code of the tax return

*Additional note, we standardize all variables to (0,1) to aid comparison between groups

Racial Characteristics: Sellers

Dependent Variable:
Percent Cryptocurrency Seller

Independent Variables	(1) 2017	(2) 2018	(3) 2019	(4) 2020
Percent Hispanic	0.0053**	0.0519***	0.0562***	0.1344***
	(2.14)	(17.79)	(16.93)	(18.45)
Percent African American	-0.0050***	-0.0055***	0.0002	0.0722***
	(-4.55)	(-2.81)	(.05)	(13.06)
Percent Asian	0.0596***	0.1443***	0.1488***	0.2991***
	(15.95)	(21.13)	(24.35)	(27.27)
Other/Multiple Races	0.0024*	-0.0098***	-0.025***	-0.0613***
	(1.96)	(-3.49)	(-7.50)	(-9.62)
Controls				
Income	YES	YES	YES	YES
Age	YES	YES	YES	YES
Education	YES	YES	YES	YES
Adjusted R-squared	0.3086	0.3190	0.2848	0.3823
Observations	30,347	30,314	30,255	29,973
Yearly Buy and Hold Bitcoin Return	1243%	-71%	88%	310%

Racial Characteristics: Gains

Dependent Variable:
LN(Per Capita Cryptocurrency Gain)

Independent Variables	(1) 2017	(2) 2018	(3) 2019	(4) 2020
Percent Hispanic	0.1345***	-0.0302***	-0.0149***	0.064***
	(21.92)	(-4.78)	(-2.96)	(12.06)
Percent African American	0.0837***	-0.0391***	-0.0223***	0.0287***
	(14.86)	(-6.25)	(-4.68)	(6.19)
Percent Asian	0.1383***	-0.0212**	-0.0241***	0.0597***
	(20.01)	(-2.06)	(-2.92)	(9.50)
Other/Multiple Races	0.0044	0.0126***	0.0051	0.0029
	(1.04)	(2.96)	(1.49)	(.73)
Controls				
Income	YES	YES	YES	YES
Age	YES	YES	YES	YES
Education	YES	YES	YES	YES
Adjusted R-squared	0.2893	0.0121	0.0021	0.1132
Observations	30,355	30,323	30,262	39,982
Yearly Buy and Hold Bitcoin Return	1243%	-71%	88%	310%

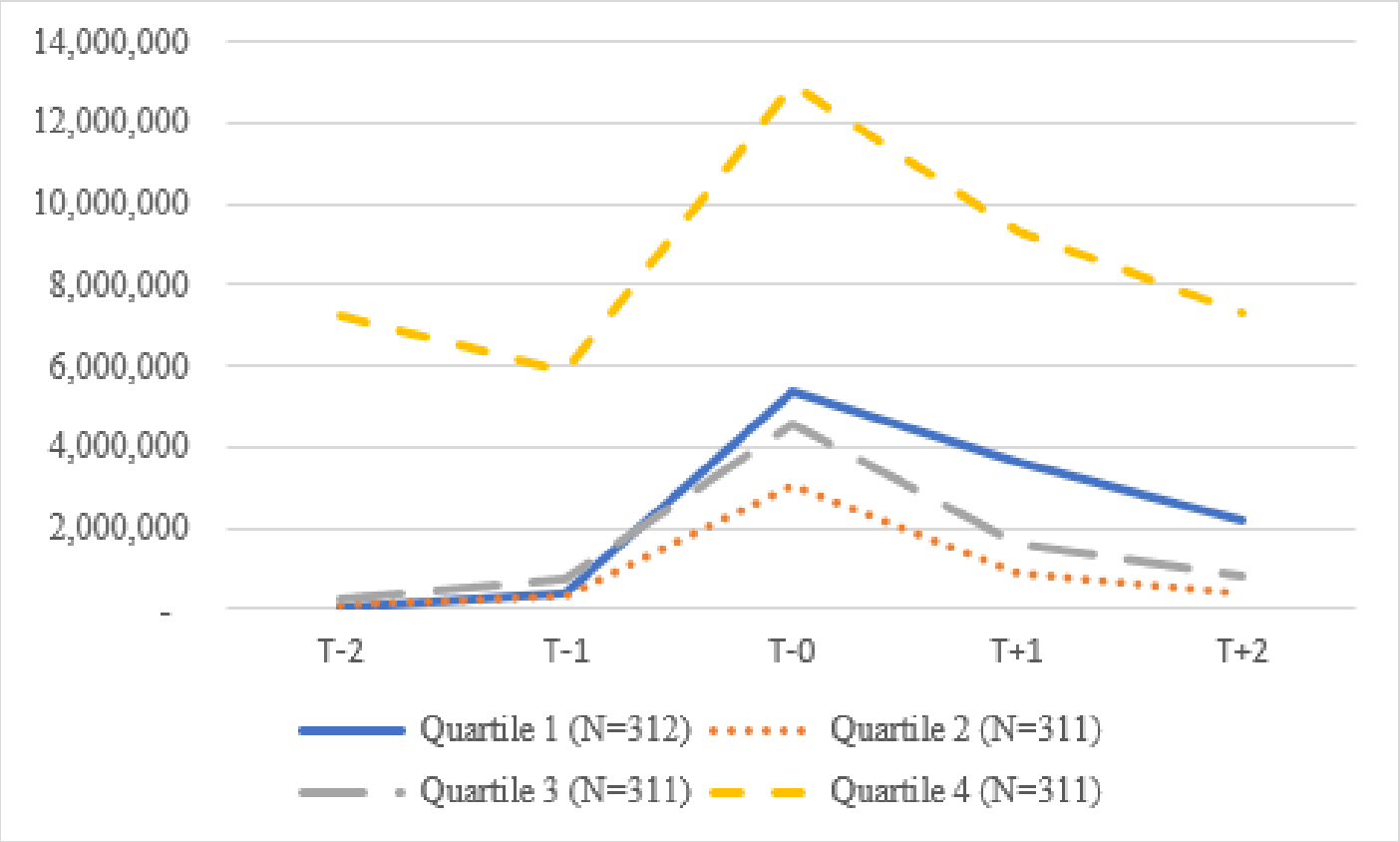
Other Observations

- Increased Geographic dispersion over time
- Increasing adoption by a wide range of professions
- Cryptocurrency may have long-term wealth implications

Takeaways

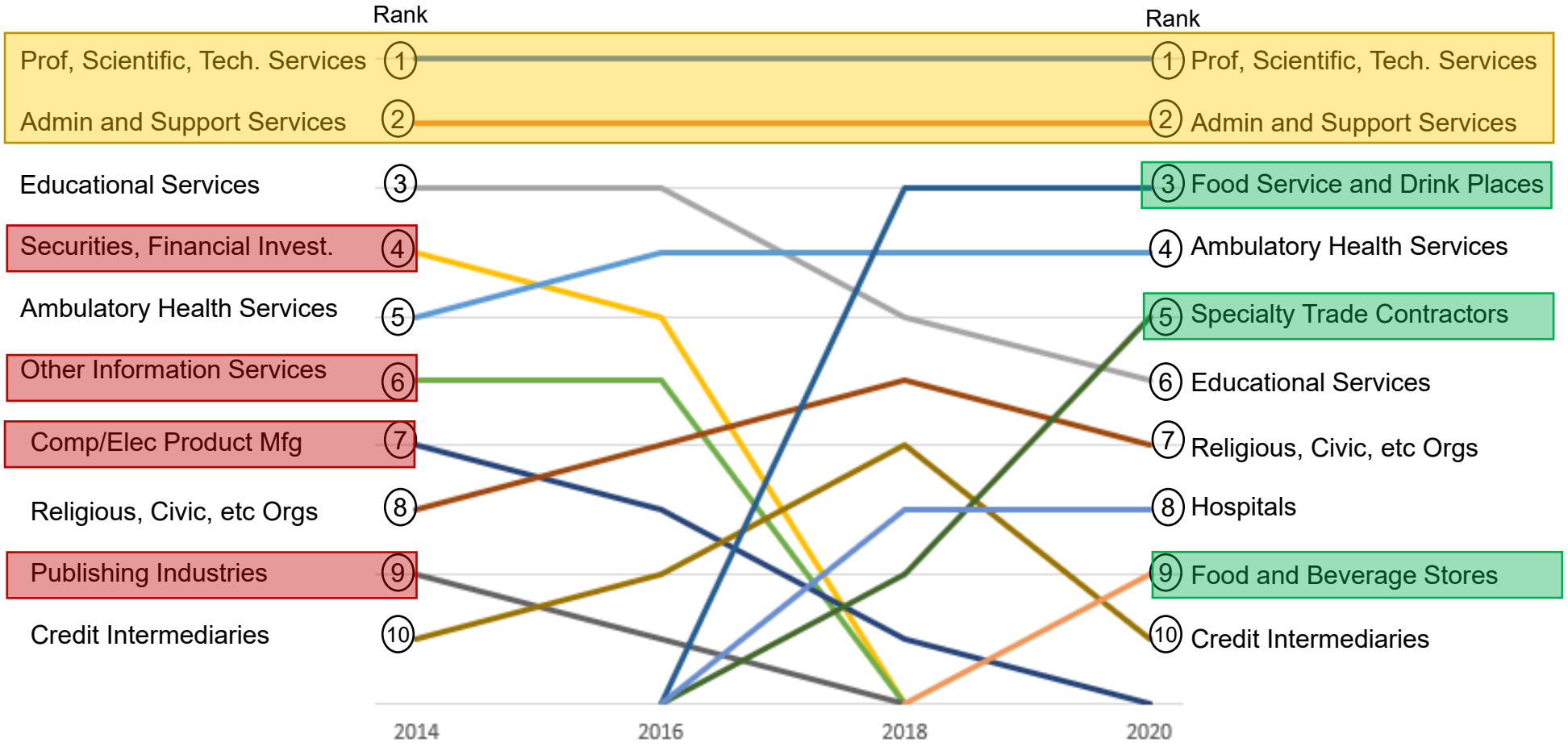
- Cryptocurrency user base is not stable over time
- Demographics continue to rapidly change
- Geography, Profession, and Racial composition continue to change

What if you had a $1 Million Gain?



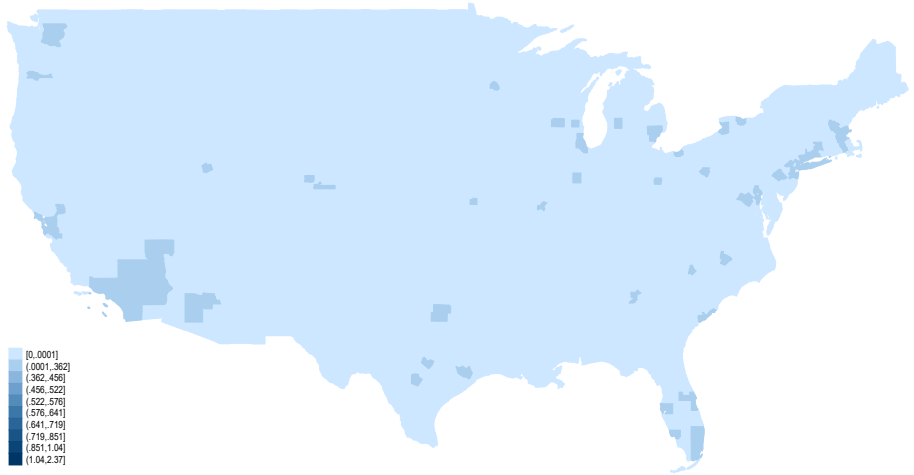
Occupation over Time

(Rank of Raw Count)

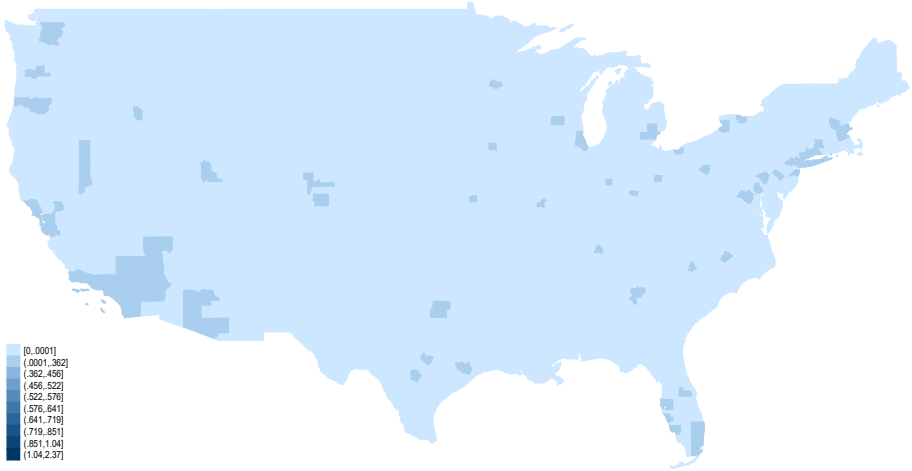


Geographic Spread

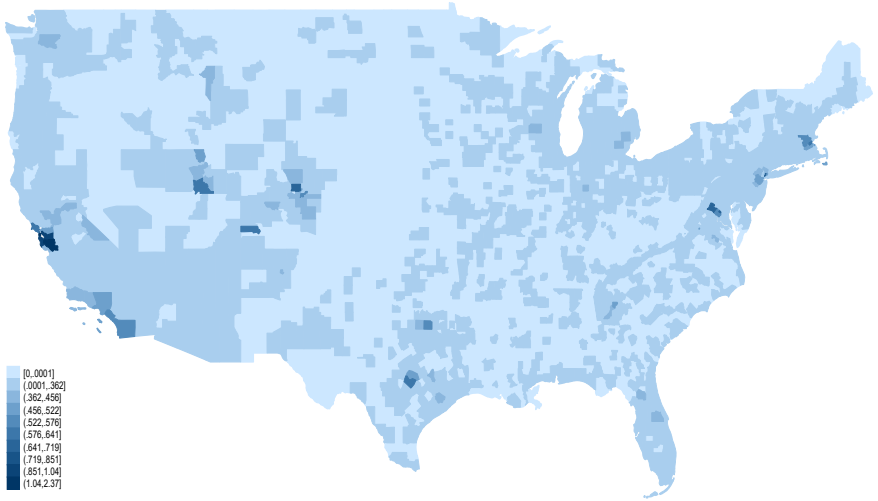
2014



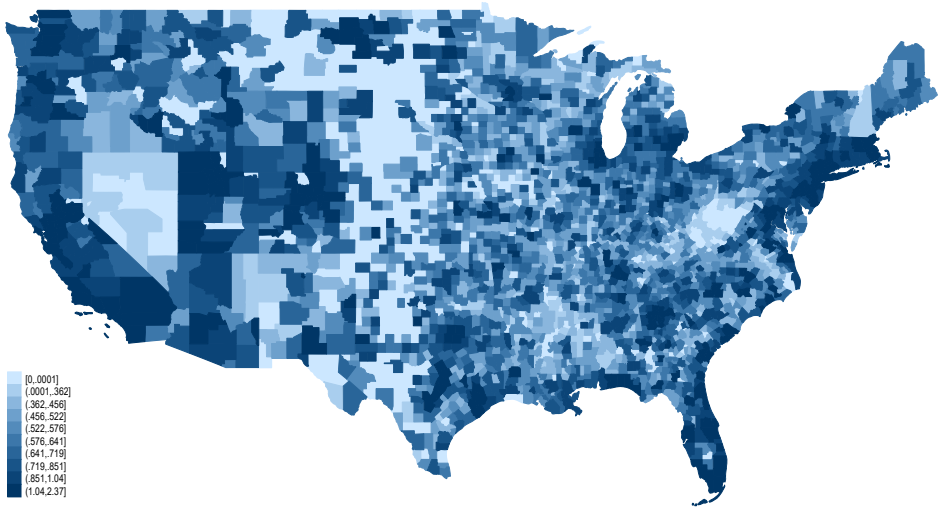
2016

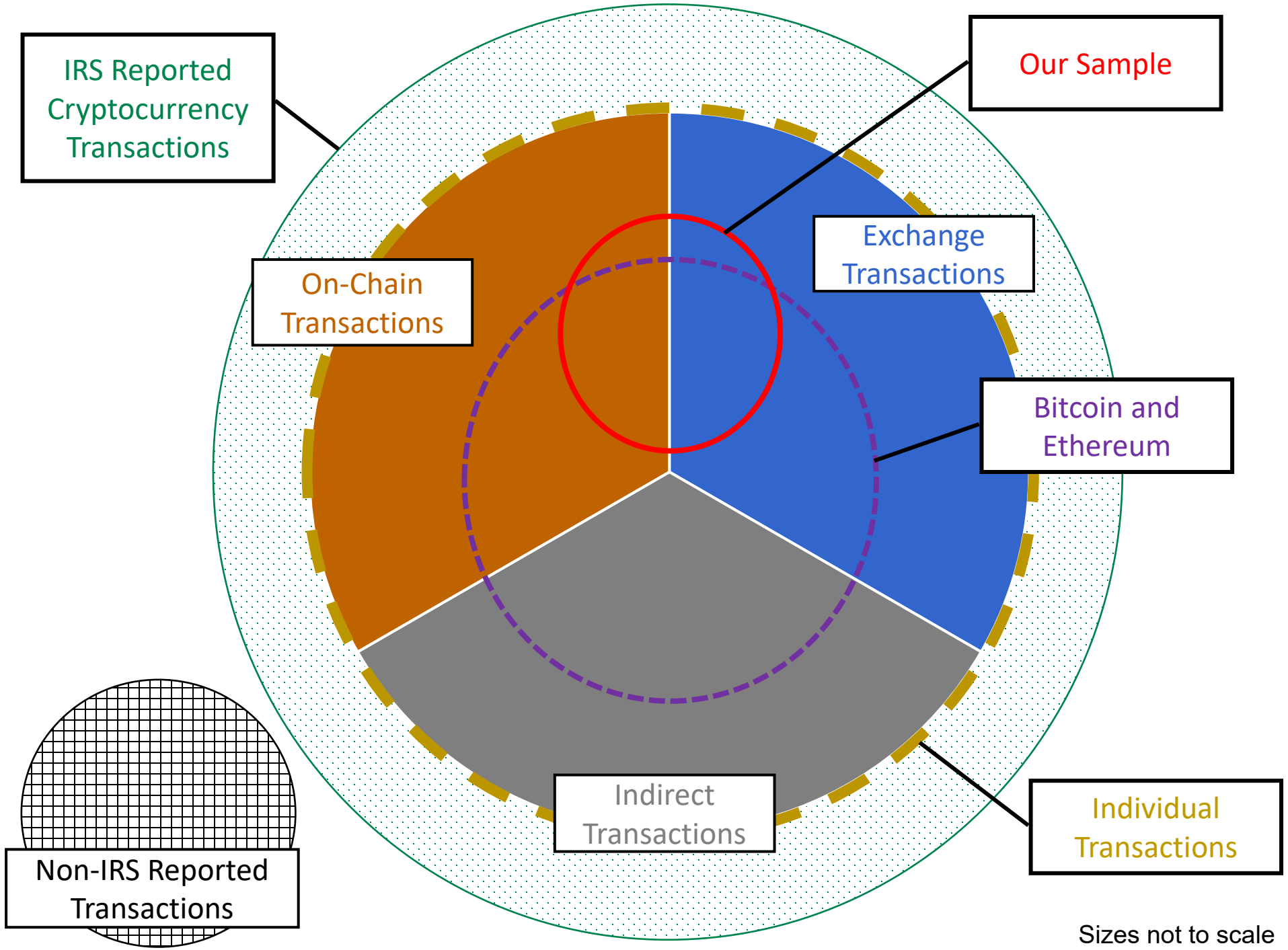


2018



2020




IRS Reported Cryptocurrency Transactions
Our Sample
Exchange Transactions
On-Chain Transactions
Bitcoin and Ethereum
Indirect Transactions
Individual Transactions
Non-IRS Reported Transactions
Sizes not to scale

Determinants Model

- Full sample of over 1 billion
- Random sampling
  - 10 million draws using a simple random sample from population
  - Repeat the process 10 times
- Descriptive statistics for samples are very similar to whole population
- Variables based on prior survey evidence

Cryptocurrency Seller Determinants

Variable	Avg. Coef (Avg. Std. Err)	†
AGE (UNDER 24)	0.00458	10
	(0.000062)	
AGE (25-44)	0.00466	10
	(0.000054)	
AGE (45-64)	0.00113	10
	(0.000036)	
LN WAGES	0.00006	10
	(0.000004)	
LN DIVIDENDS	0.00035	10
	(0.000007)	
MARRIED	0.00247	10
	(0.000035)	
SINGLE MALE	0.00353	10
	(0.000041)	
HOMEOWNER	0.00029	10
	(0.000036)	
DEPENDENTS	-0.00031	10
	(0.000017)	
STUDENT	0.00380	10
	(0.000126)	
Intercept	-0.00031	10
	(0.000017)	
Observations	10,000,000	
Year Fixed Effects	YES	
Baseline Full Sample Probability of Crypto Seller	0.00243	
Average Adj R-Squared	0.002	

† indicates number of significant coefficients out of 10

Cryptocurrency Sellers Compared

	Non-Investors	Non-Cryptocurrency Investors	Cryptocurrency Sellers
AGE	41.47	56.26	32.78
SINGLE MALE	31.4%	18.2%	54.1%
STUDENTS	6.2%	3.1%	19.7%
TAXABLE INCOME	34,346	138,353	91,421

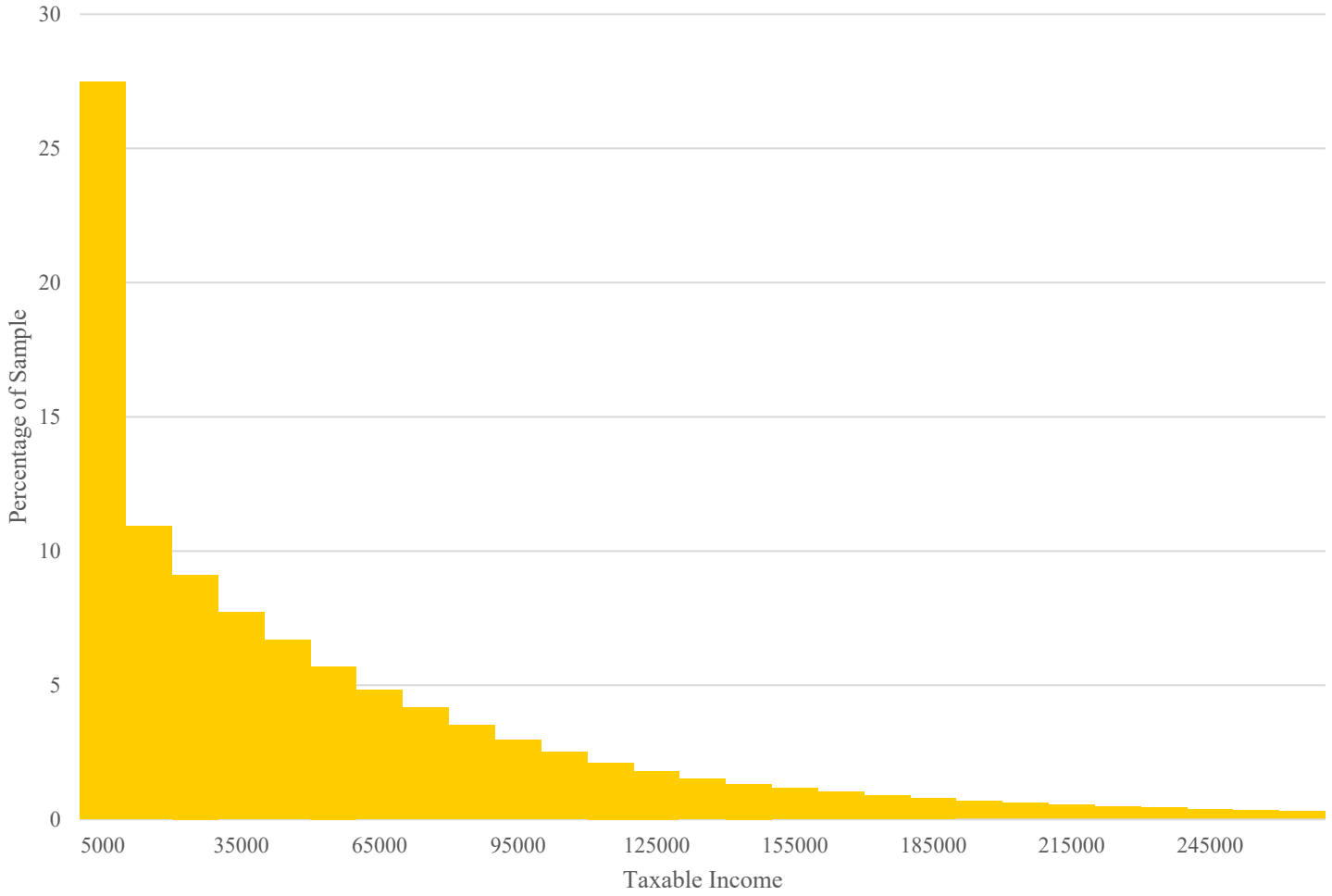
Identifying Cryptocurrency Transactions

- On-Chain and exchange-based transactions
- Attachments and summaries – generic search terms such as Crypto and Virtual
- Both self-reported and third-party reported
- Captures non-standard formats
- Low false positive rates, less than 1% for recent years

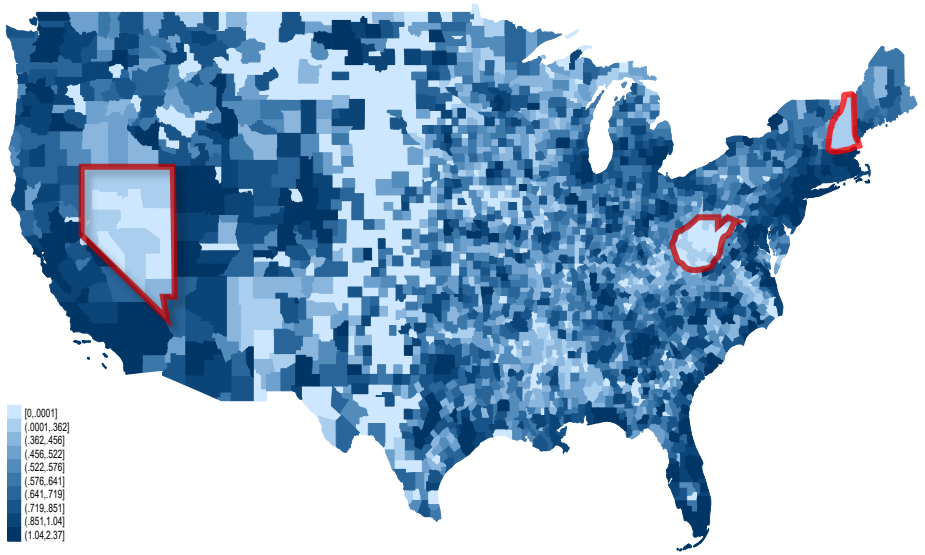
Identifying Cryptocurrency Transactions

- Excludes indirectly held transactions
  - Coinbase, Greyscale Bitcoin Trust, Public Mining companies
- Excludes attachments combined with other stocks (e.g. "Robinhood LT")
- Spelling mistakes and errors
- Relies on uniqueness
- Does not capture Schedule C or miscellaneous income reporting

Histogram of Crypto Sellers By Taxable Income



Location over Time



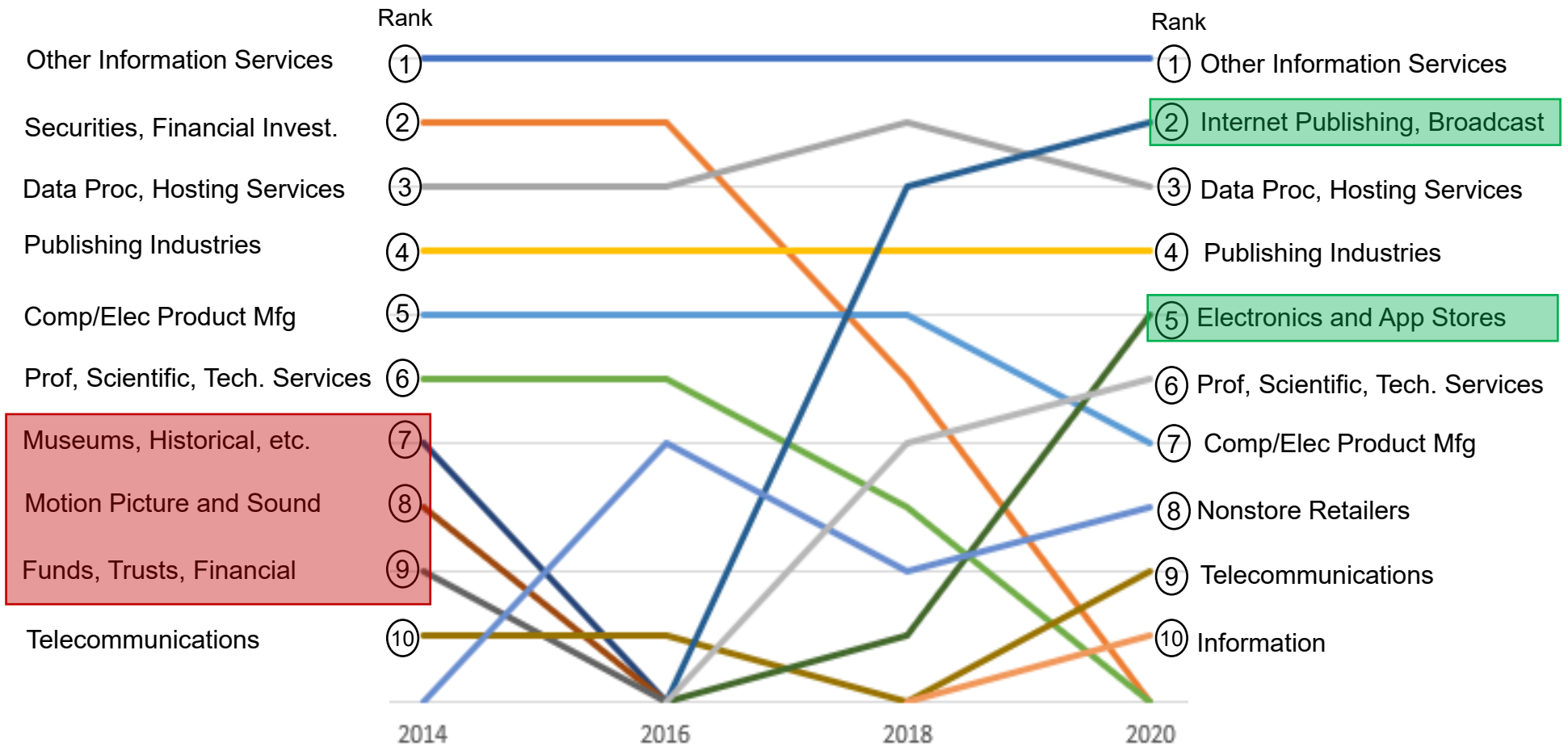
Google Trends for 2020 – “Bitcoin”

1	Nevada	100
2	California	93
3	Washington	89

49	South Dakota	41
50	Mississippi	37
51	West Virginia	34

Occupation over Time

(Rank of Percent)



Trends Model

Variable	Avg. Coef (Avg. Std. Err)	†
TREND	-0.00140	10
	(0.000018)	
AGE (UNDER 24) * TREND	0.00232	10
	(0.000034)	
AGE (25-44) * TREND	0.00227	10
	(0.000028)	
AGE (45-64) * TREND	0.00048	10
	(0.000018)	
LN WAGES * TREND	0.00002	10
	(0.000002)	
LN DIVIDENDS * TREND	0.00015	10
	(0.000003)	
MARRIED * TREND	0.00125	10
	(0.000019)	
SINGLE MALE * TREND	0.00179	10
	(0.000022)	
HOMEOWNER * TREND	0.00011	10
	(0.00002)	
DEPENDENTS * TREND	-0.00018	10
	(0.00001)	
STUDENT * TREND	0.00163	10
	(0.000053)	
Main Effects	YES	
Observations	10,000,000	
Year Fixed Effects	NO	
Baseline Full Sample Probability of Crypto Seller	0.00243	
Average Adj R-Squared	0.002	

† indicates number of significant coefficients out of 10

VARIABLE	DESCRIPTION
Variables of Interest	
CRYPTOCURRENCY SELLERS	1 if either the description of a Form 8949 transaction is identified as cryptocurrency or a description from Form 1099-B is identified as cryptocurrency for tax return$_i$ in year$_t$. 0 otherwise. See online appendix A for a description of the textual analysis which identifies transactions as cryptocurrency.
NON-CRYPTO SELLING INVESTOR	1 if tax return in year$_t$ reports either a non-zero amount for dividends or a non-zero amount for capital gain on Form 1040, and is not identified as a CRYPTOCURRENCY SELLERS in year$_t$. 0 otherwise.
NON-INVESTOR	1 if a tax return is neither a CRYPTOCURRENCY SELLERS nor a NON-CRYPTO SELLING INVESTOR, 0 otherwise.
CRYPTOCURRENCY GAIN*	Sum of the total gain or loss reported on form 8949 for transactions identified as cryptocurrency for tax return$_i$ in year$_t$
NUM OF CRYPTO TRANSACTIONS*	Number of separate lines which are identified as cryptocurrency transactions on Form 8949 for tax return$_i$ in year$_t$
CRYPTOCURRENCY 1099B	An indicator equal to 1 if the primary or secondary taxpayer received any Form 1099-B which includes a transaction identified as cryptocurrency. See Online Appendix A. 0 Otherwise.
TREND	A year trend variable which takes the value of 0 in 2013 and increases in increments of 1.
Continuous/Discrete Variables	
AGE	The year in which tax return$_{it}$ was filed less the birth year for the primary taxpayer on tax return$_i$
WAGES	Wages as reported on Form 1040 for tax return$_i$ in year$_t$.
TAXABLE INTEREST	Taxable Interest as reported on Form 1040 for tax return$_i$ in year$_t$.
TAXABLE DIVIDENDS	Taxable Dividends as reported on Form 1040 for tax return$_i$ in year$_t$.
CAPITAL GAIN/LOSS†	Capital Gain/Loss as reported in Form 1040 for tax return$_i$ in year$_t$.
TAXABLE INCOME	Taxable income after all deductions reported on Form 1040 for tax return$_i$ in year$_t$.
DEPENDENTS	Number of dependents reported on a taxpayer's return for year$_t$. This variable ranges from 0 to 4 dependents due to restrictions in IRS data.
Indicator Variables	
MARRIED	1 if tax return$_i$ in year$_t$ reports both a primary taxpayer and a spouse, 0 otherwise.
SINGLE MALE	1 if tax return$_i$ in year$_t$ does not report a spouse and census data lists the primary taxpayer as male. 0 if census data lists the primary taxpayer as female. Missing otherwise.
SCH A‡	1 if tax return$_i$ in year$_t$ had Schedule A for Itemized deductions attached. 0 otherwise.
EIC TAX CREDIT‡	1 if tax return$_i$ in year$_t$ included Schedule EIC for the Earned Income Tax Credit. 0 otherwise.
HOMEOWNER‡	1 if tax return$_i$ in year$_t$ receives a Form 1098 for mortgage interest.
GAMBLER‡	1 if tax return$_i$ in year$_t$ receives a W-2G for gambling winnings with reported amounts in Box 1 or Box 7
STUDENT‡	1 if tax return$_i$ in year$_t$ receives a 1098-T for tuition and has reported amounts in Box 1 for Tuition and Fees in Box 1
CANCELLATION OF DEBT‡	1 if tax return$_i$ in year$_t$ receives a 1099-C for the cancellation of debt and reports an amount in Box 2

Descriptive Statistics

	NON-INVESTOR (N=845,102,236)			NON-CRYPTOCURRENCY INVESTOR (N=230,965,310)			CRYPTOCURRENCY SELLERS (N=2,620,926)		
Variables of Interest	**Mean**	**Std. Dev.**	**Median**	**Mean**	**Std. Dev.**	**Median**	**Mean**	**Std. Dev.**	**Median**
AGE	41.47	16.72	39	56.26	18.52	58	32.78	10.75	30
WAGES	39,506	257,012	26,604	86,318	392,742	37,413	77,049	355,060	46,010
TAXABLE INTEREST	98	49,955	0	2,757	152,022	47	1,733	1,263,304	0
TAXABLE DIVIDENDS	0	0	0	7,882	267,688	469	1,649	81,328	0
SCH A	0.168	0.374	0	0.442	0.497	0	0.131	0.338	0
MARRIED	0.316	0.465	0	0.584	0.493	0	0.378	0.485	0
MALE	0.314	0.464	0	0.182	0.385	0	0.541	0.498	0
STUDENT	0.062	0.242	0	0.031	0.174	0	0.197	0.398	0
LN WAGES	8.877	3.611	10.19	7.491	5.263	10.53	9.724	3.309	10.74
LN DIVIDENDS	-	0.000	0	5.663	3.194	6.15	1.686	2.690	0
Descriptive Variables									
*CAPITAL GAIN/LOSS**	0	0	0	22,512	856,090	24	18,765	1,167,616	0
TAXABLE INCOME	34,346	88,971	19,747	138,353	1,079,166	67,115	91,421	1,086,150	36,372
CRYPTOCURRENCY GAIN	-			-			12,484	824,804	27
NUM OF CRYPTO TRANSACTIONS	-			-			9.90	100.40	1
EIC TAX CREDIT	0.173	0.378	0	0.015	0.123	0	0.066	0.249	0
GAMBLER	0.009	0.096	0	0.010	0.099	0	0.009	0.094	0
CANCELLATION OF DEBT	0.018	0.134	0	0.007	0.085	0	0.017	0.129	0
CRYPTOCURRENCY 1099B	-			-			0.784	0.412	1

Descriptive statistics - millionaires

	NON-MILLIONAIRE									
	NON-INVESTOR (N=845,096,538)		NON-CRYPTO INVESTOR		CRYPTOCURRENCY SELLER (N=2,601,317)		EQUITY MILLIONAIRE (N=75,488)		CRYPTOCURRENCY MILLIONAIRE	
Variable	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
AGE	41.47	16.72	56.26	18.52	32.69	10.67	46.76	13.37	40.53	11.49
WAGES	39,505	257,012	86,215	389,079	74,387	182,305	457,407	2,688,332	366,092	5,790,899
TAXABLE INTEREST	98	49,955	2,739	151,735	1,173	1,266,663	63,392	523,876	96,070	949,502
TAXABLE DIVIDENDS	-	-	7,853	267,254	797	24,845	102,780	513,208	165,186	2,225,614
SCH A	0.17	0.37	0.44	0.50	0.13	0.33	0.81	0.40	0.57	0.50
MARRIED	0.32	0.46	0.58	0.49	0.38	0.48	0.75	0.43	0.56	0.50
SINGLE MALE	0.31	0.46	0.18	0.39	0.54	0.50	0.22	0.42	0.41	0.49
STUDENT	0.06	0.24	0.03	0.17	0.20	0.40	0.02	0.13	0.03	0.16
*CAPITAL GAIN/LOSS**	0	0	22,207	839,433	5,682	536,312	1,065,872	8,058,907	2,397,415	20,173,968
TAXABLE INCOME	34,345	88,960	137,908	1,068,095	74,386	355,173	1,699,424	8,233,654	2,833,299	16,598,034
CRYPTOCURRENCY GAIN	0	0	0	0	3,402	33,204	-33,068	3,801,461	1,753,248	8,722,526
NUM OF CRYPTO TRANSAC	0.00	0.00	0.00	0.00	9.57	92.93	15.23	214.31	54.57	404.87
EIC TAX CREDIT	0.17	0.38	0.02	0.12	0.07	0.25	0.00	0.05	0.01	0.08
GAMBLER	0.01	0.10	0.01	0.10	0.01	0.09	0.01	0.11	0.02	0.12
CANCELLATION OF DEBT	0.02	0.13	0.01	0.09	0.02	0.13	0.00	0.07	0.01	0.08
CRYPTOCURRENCY 1099B	0.00	0.00	0.00	0.00	0.79	0.41	0.03	0.16	0.02	0.15

Table 4. Determinants of Cryptocurrency Sellers

	(1)		(2)	
Dependent Variable: *CRYPTOCURRENCY SELLERS*				
Independent Variables				
		†		†
AGE (UNDER 24)	0.00458	10	-0.00395	10
	(0.000062)		(0.000068)	
AGE (25-44)	0.00466	10	-0.00372	10
	(0.000054)		(0.000058)	
AGE (45-64)	0.00113	10	-0.00073	10
	(0.000036)		(0.000039)	
LN WAGES	0.00006	10	-0.00004	10
	(0.000004)		(0.000005)	
LN DIVIDENDS	0.00035	10	-0.00021	10
	(0.000007)		(0.000007)	
MARRIED	0.00247	10	-0.00333	10
	(0.000035)		(0.000057)	
SINGLE MALE	0.00353	10	-0.00482	10
	(0.000041)		(0.000066)	
HOMEOWNER	0.00029	10	-0.00012	6
	(0.000036)		(0.00004)	
DEPENDENTS	-0.00031	10	0.00032	10
	(0.000017)		(0.000019)	
STUDENT	0.00380	10	-0.00487	10
	(0.000126)		(0.00016)	
TREND			-0.00140	10
			(0.000018)	
*AGE (UNDER 24) * TREND*			0.00232	10
			(0.000034)	
*AGE (25-44) * TREND*			0.00227	10
			(0.000028)	
*AGE (45-64) * TREND*			0.00048	10
			(0.000018)	
*LN WAGES * TREND*			0.00002	10
			(0.000002)	
*LN DIVIDENDS * TREND*			0.00015	10
			(0.000003)	
*MARRIED * TREND*			0.00125	10
			(0.000019)	
*SINGLE MALE * TREND*			0.00179	10
			(0.000022)	
*HOMEOWNER * TREND*			0.00011	10
			(0.00002)	
*DEPENDENTS * TREND*			-0.00018	10
			(0.00001)	
*STUDENT * TREND*			0.00163	10
			(0.000053)	
Intercept	-0.00031	10	0.00032	10
	(0.000017)		(0.000019)	
Observations	10,000,000		10,000,000	
Year Fixed Effects	YES		NO	
Baseline Full Sample Probability of Crypto Seller	0.00243		0.00243	
Average Adj R-Squared	0.002		0.002	

Online Appendix Table 1. Sample Splits for Cryptocurrency Determinants

	(1)		(2)		(3)		(4)	
Sample	Early Sample 2013-2016		Late Sample 2017-2020		Only Crypto Sellers and Investors		Only Crypto Sellers and non-Investors	
Dependent Variable: *CRYPTOCURRENCY SELLERS*								
Independent Variables								
		†		†		†		†
AGE (UNDER 24)	0.00004	8	0.00850	10	0.03255	10	0.00380	10
	(0.000012)		(0.000117)		(0.000574)		(0.000063)	
AGE (25-44)	0.00007	10	0.00856	10	0.02076	10	0.00348	10
	(0.000013)		(0.000098)		(0.000272)		(0.000053)	
AGE (45-64)	0.00004	7	0.00189	10	0.00090	10	0.00064	10
	(0.000012)		(0.000064)		(0.000135)		(0.000039)	
LN WAGES	0.00000	1	0.00010	10	0.00011	10	0.00004	10
	(0.000001)		(0.000008)		(0.000015)		(0.000005)	
LN DIVIDENDS	0.00002	10	0.00062	10	-0.00342	10	0.16578	10
	(0.000002)		(0.000012)		(0.000029)		(0.00085)	
MARRIED	0.00003	10	0.00469	10	0.00694	10	0.00256	10
	(0.000006)		(0.000067)		(0.000137)		(0.00004)	
SINGLE MALE	0.00004	10	0.00661	10	0.01865	10	0.00327	10
	(0.000006)		(0.000076)		(0.000257)		(0.000041)	
HOMEOWNER	0.00001	2	0.00051	10	-0.00788	10	0.00029	10
	(0.000007)		(0.000069)		(0.000155)		(0.000041)	
DEPENDENTS	0.00000	2	-0.00058	10	0.00006	0	-0.00030	10
	(0.000003)		(0.000033)		(0.000096)		(0.000017)	
STUDENT	0.00000	0	0.00413	10	0.02613	10	0.00363	10
	(0.000016)		(0.000163)		(0.000912)		(0.000126)	
Intercept	0.00000	2	-0.00058	10	0.00006	0	-0.00030	10
	(0.000003)		(0.000033)		(0.000096)		(0.000017)	
Observations	10,000,000				10,000,000			
Year Fixed Effects	YES		YES		YES		YES	
Baseline Full Sample Probability of Crypto Seller	0.00004		0.00459		0.00309		0.01122	
Average Adj R-Squared	0.000		0.005		0.011		0.003	

Comments on: "Session 3: Understanding Contemporary Taxpayers"

Yan Sun

June 22, 2023

IRS-TPC

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

By Lin, Emily and Navodhya Samarakoon

Overview

- **Interesting Paper Examining Married-filing-separately (MFS) Filing Status**
  - MFS returns, 2013-2021
  - Link an MFS return to the spouse's MFS return
  - TAXSIM model to simulate tax liability
  - Calculate tax penalty/bonus

- **Key Findings**
  - Most MFS filers face a separate filing penalty
  - MFS is susceptible to misreporting

Contribution of the Paper

- **Quantify the MFS penalty/bonus**
- **MFS is linked to inequality**
- **Taxes vs. tax credit**

The Paper Would Be More Interesting If

- **Discuss the scenarios under which MFS are better/worse**
- **Examine heterogeneity in the MFS sample**
- **Impact of MFS**
- More Reference
  - “Holtzblatt, et. al. 2023. Racial Disparities in the Income Tax Treatment of Marriage. Tax Policy Center.

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

By Lopez-Luzuriaga, Andrea and Carlos Scartascini

Overview

- **Use an experimental method to inform policy**
  - Municipality in Argentina
  - Examine how taxpayers respond to an intervention from city government on property tax payment
- **Main findings**
  - Deterrence message was the most successful on average for increasing compliance
  - Women maybe more motivated to pay, but they fact significant liquidity constraints
  - Conversely, men who receive a deterrence letter are more likely to improve overall compliance

Contribution of the Paper

- **Develop a compliance analytical framework**
- **Beyond risk aversion and tax morale**
- **Carefully conducted empirical analysis**

Gain More Insights from the Experiment

Experiment specificity

- Latin American country vs. developed countries
- Property tax vs. income tax
- Local government vs. central government

- **Something may affect your result**
  - Property joint owners
  - People may react different in another time

“Who Sells Cryptocurrency”

By Hoopes, Jeffrey, Tyler Menzer, ad Jaron Wilde

Overview

- **Examine cryptocurrency sellers who report cryptocurrencies sales to IRS**
  - **Use tax data to identify cryptocurrency users**
    - 2013 -- 2020
    - Form 8949.
    - Form 1099B.
    - Form 1040 (and its related schedules)
    - Social Security Administrative data
  - **Three groups**: non-investor, non-crypto selling investor, cryptocurrency seller
- **Provide information on the general characteristics of cryptocurrency users who report their sales to IRS**

Contribution of the Paper

- **Use administrative tax data to understand the relatively new financial product**
- **Offer the first broad-sample descriptive evidence on US taxpayers selling cryptocurrency**
- **Provide empirical evidence on cryptocurrency users**

Some Questions

- **Underreporting**
- **Other factors affecting the investor behavior**
- **Network externality and complementarity**
- **Minor data issues**
  - Sample selection
  - Form 1098 T
  - Income

Following K-1s: Considering Foreign Accounts in Context

Tomas Wind (IRS, RAAS::P&I)
David Bratt (IRS, RAAS::P&I)
Alissa Graff (IRS, RAAS::P&I)
Anne Herlache (IRS, RAAS::P&I)

The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors and do not necessarily reflect the views or the official positions of the U.S. Department of the Treasury or the Internal Revenue Service. All results have been reviewed to ensure that no confidential information is disclosed.

Motivation

- US taxpayers have been estimated to hold accounts with roughly $4 trillion in assets overseas, the majority of which is held by the top 1% of the income distribution (Johannesen et al., 2023)
- The presence of pass-through entities in corporate structures has been linked to tax avoidance and uncertainty (Agarwal et al., 2020)
- Between 2011 and 2019, over $1 trillion of income reported by partnerships flowed to owners in tax havens (Love, 2021)
- Want to understand the indirect effects of IRS initiatives aimed at promoting compliance among taxpayers who have overseas assets
- Build on recent research that uses K-1 networks rather than individual returns to better understand non-compliance

Research Question

To what extent are a taxpayer's K-1 network characteristics predictive of their disclosing a foreign account?

Overview of Methodology

- Identify taxpayers that reported holding a foreign account
- Identify sample of taxpayers with a foreign account that received a K-1 (RFA taxpayers) and a sample of K-1 recipients that never reported a foreign account (nRFA taxpayers)
- Create a graph database depicting the K-1 networks and spouses of RFA and nRFA taxpayers
- Model whether a taxpayer reported a foreign account in a specific year

Identifying Taxpayers who Have Reported Foreign Accounts

- **Report of Foreign Bank and Financial Accounts (FBAR)**
- **Foreign Account Tax Compliance Act (FATCA)**
  - Form 8938
- **Offshore Voluntary Disclosure (OVD) programs**
- **Streamlined Filing Compliance Procedures**

RFAs with K1s

- Individuals that received at least one K-1 between 2006 and 2017
- Held a "significant stake" in at least one K-1 issuing entity
- Reported holding a foreign account
- Ten percent sample of all RFAs that received at least one K-1

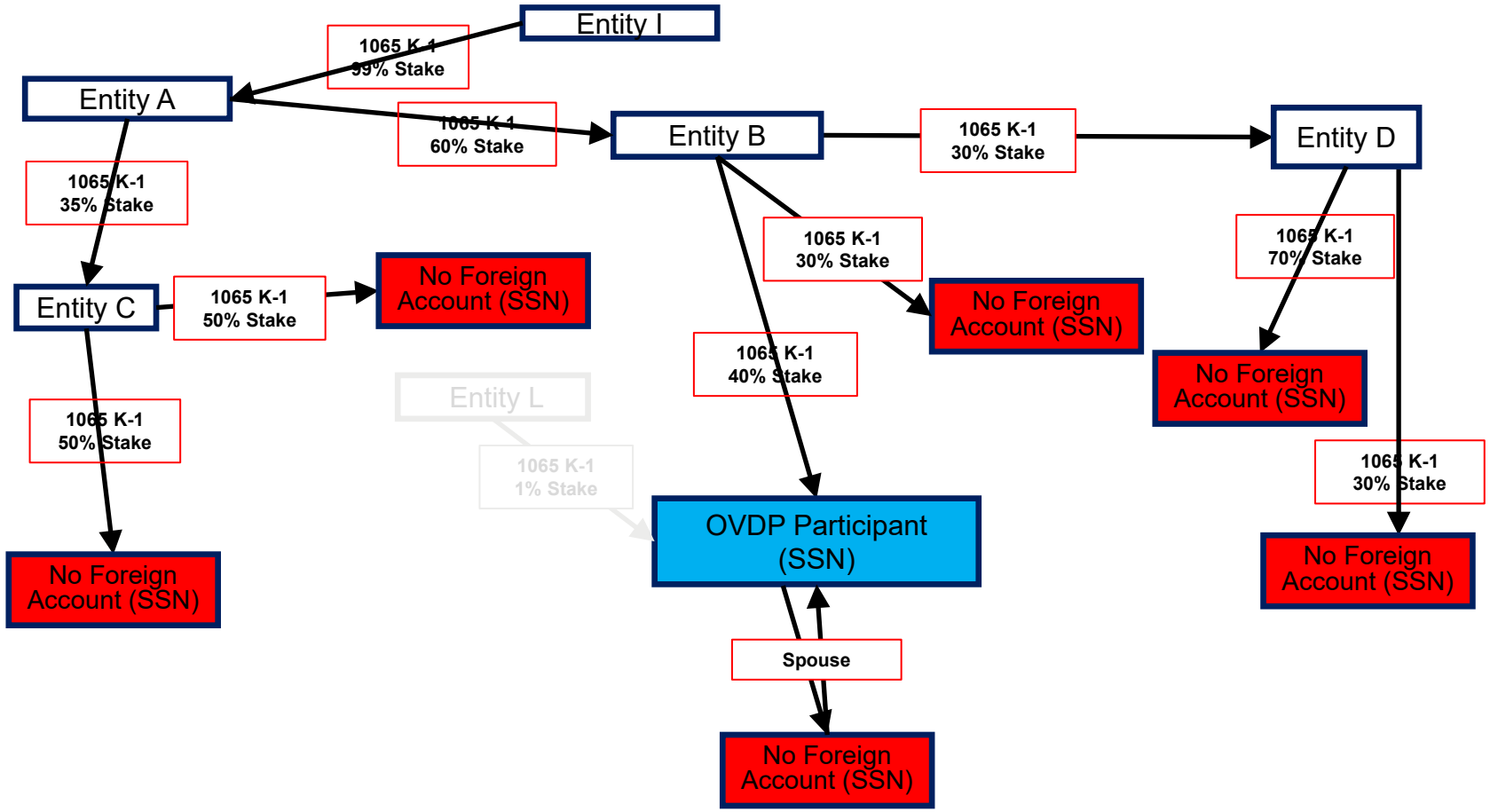
nRFAs with K1s

- Individuals that received at least one K-1 between 2006 and 2017
- Held a "significant stake" in at least one K-1 issuing entity
- Never reported holding a foreign account
- Has never been reported to hold a foreign account on Form 8966
- Selected a sample containing roughly the same number of taxpayers as RFA sample

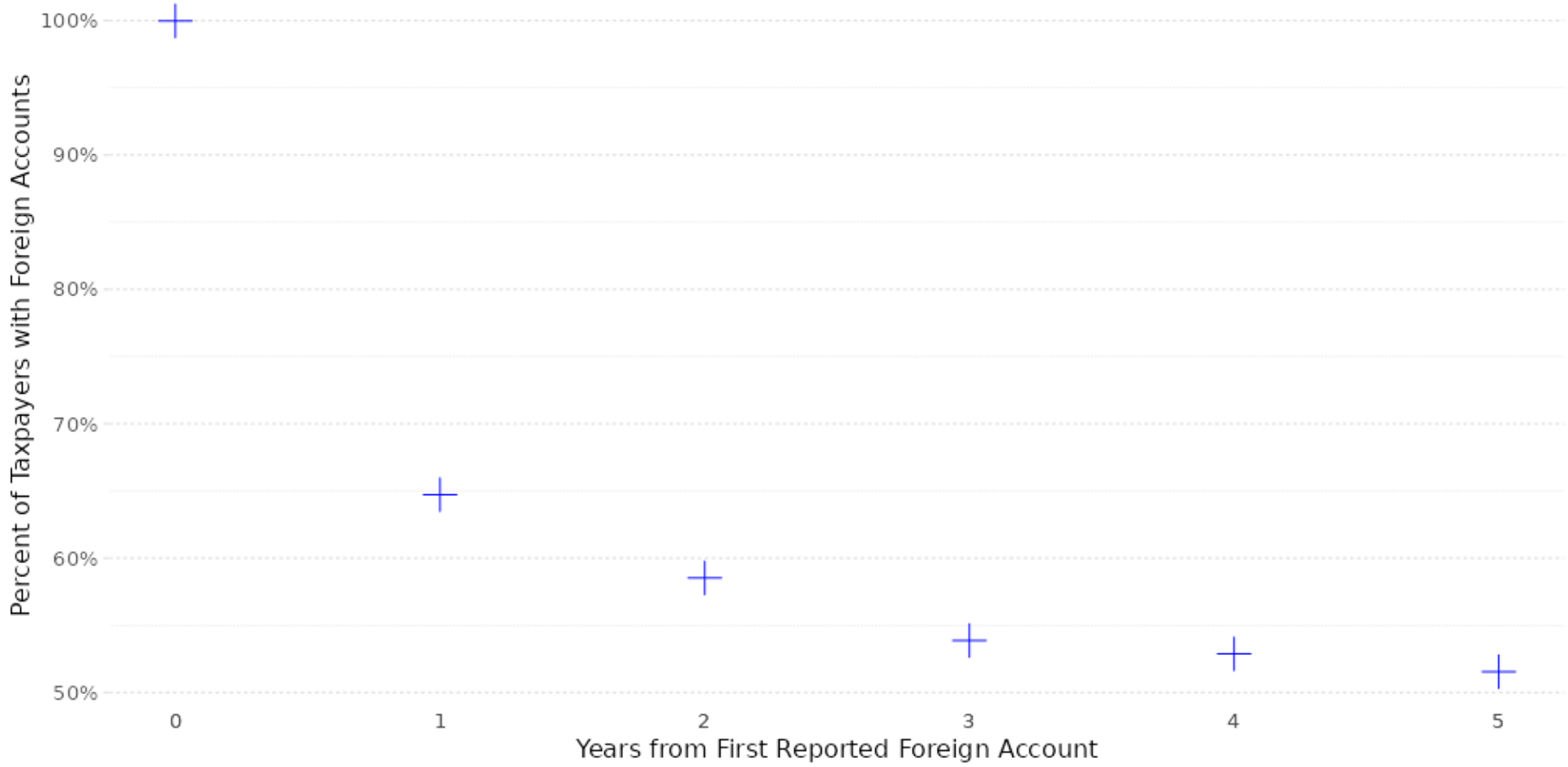
Construction of Graph Database

- **Get K-1 network for each RFA and nRFA taxpayer**
  - Payees must hold at least a one percent share in payer (e.g., taxpayer who owns one-percent share in a partnership) to be included in network
  - Expand each network up to five levels from initial taxpayer
- **Add spouses of RFA and nRFA taxpayers to graph**
- **Add F1040 and other data to each node and edge**

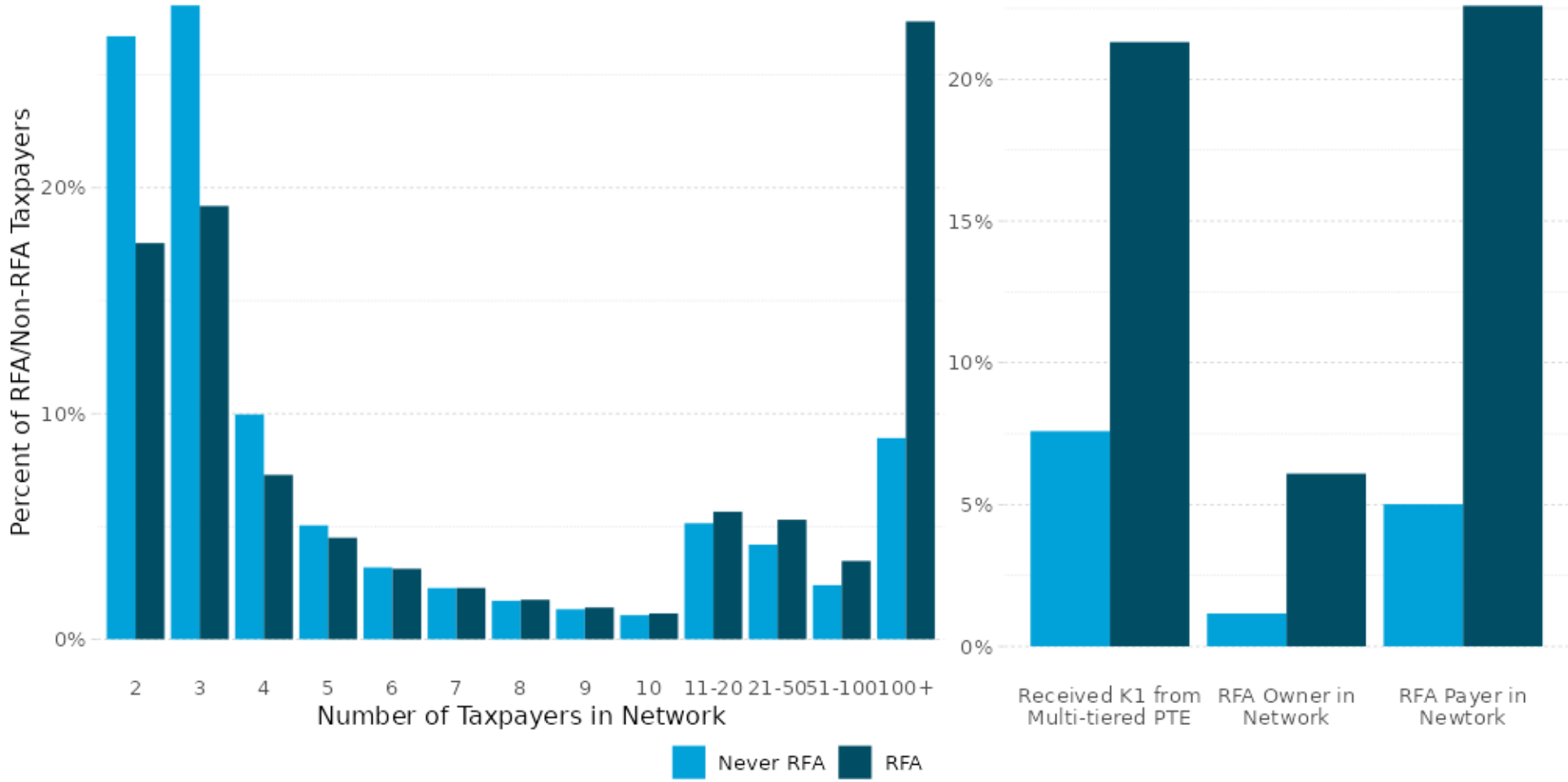
Graph Layout



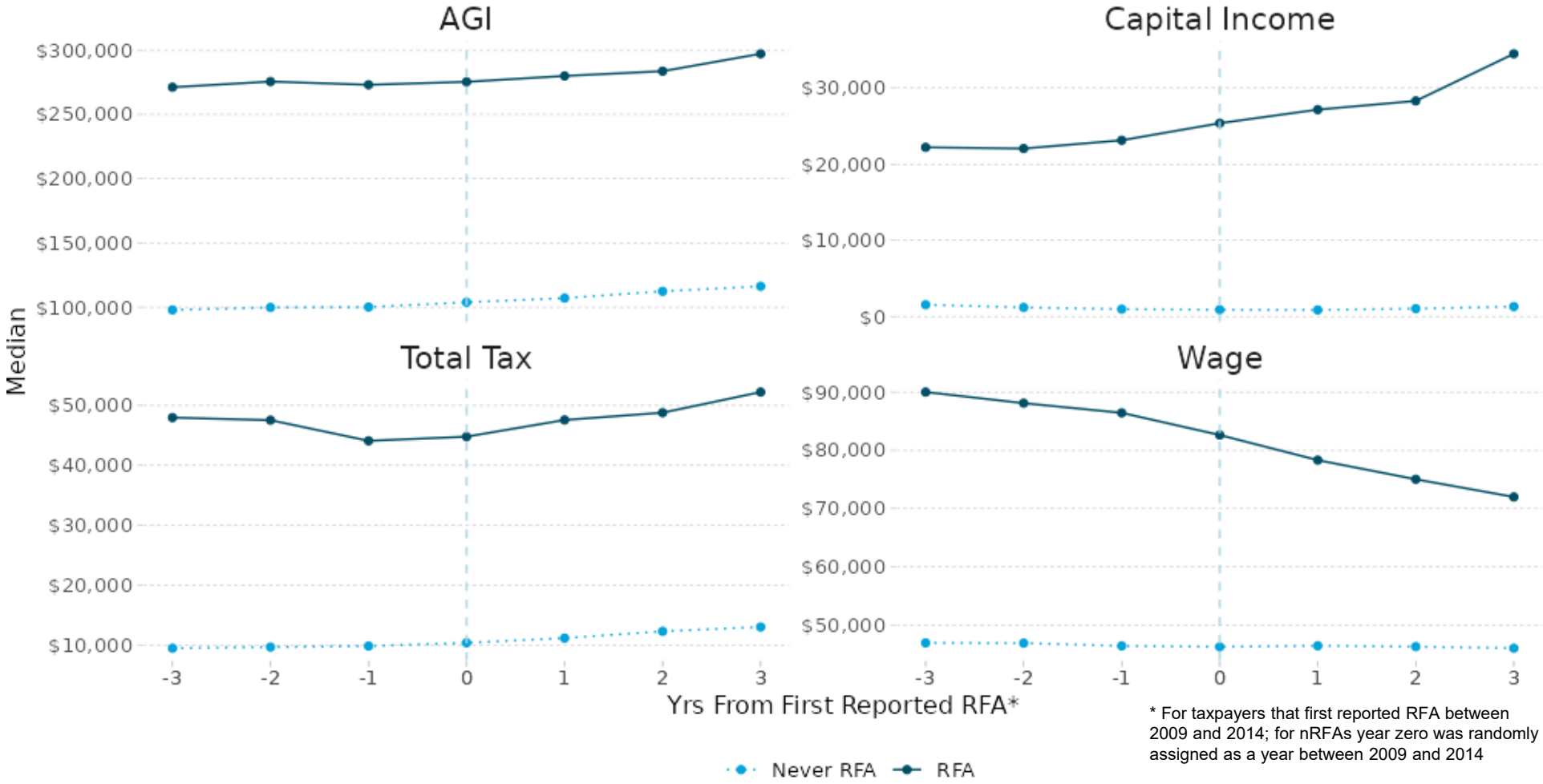
Among RFA Taxpayers with First Foreign Account Between 2006-2012: Percent who RFA-ed in Years Following First RFA



RFA and nRFA Networks

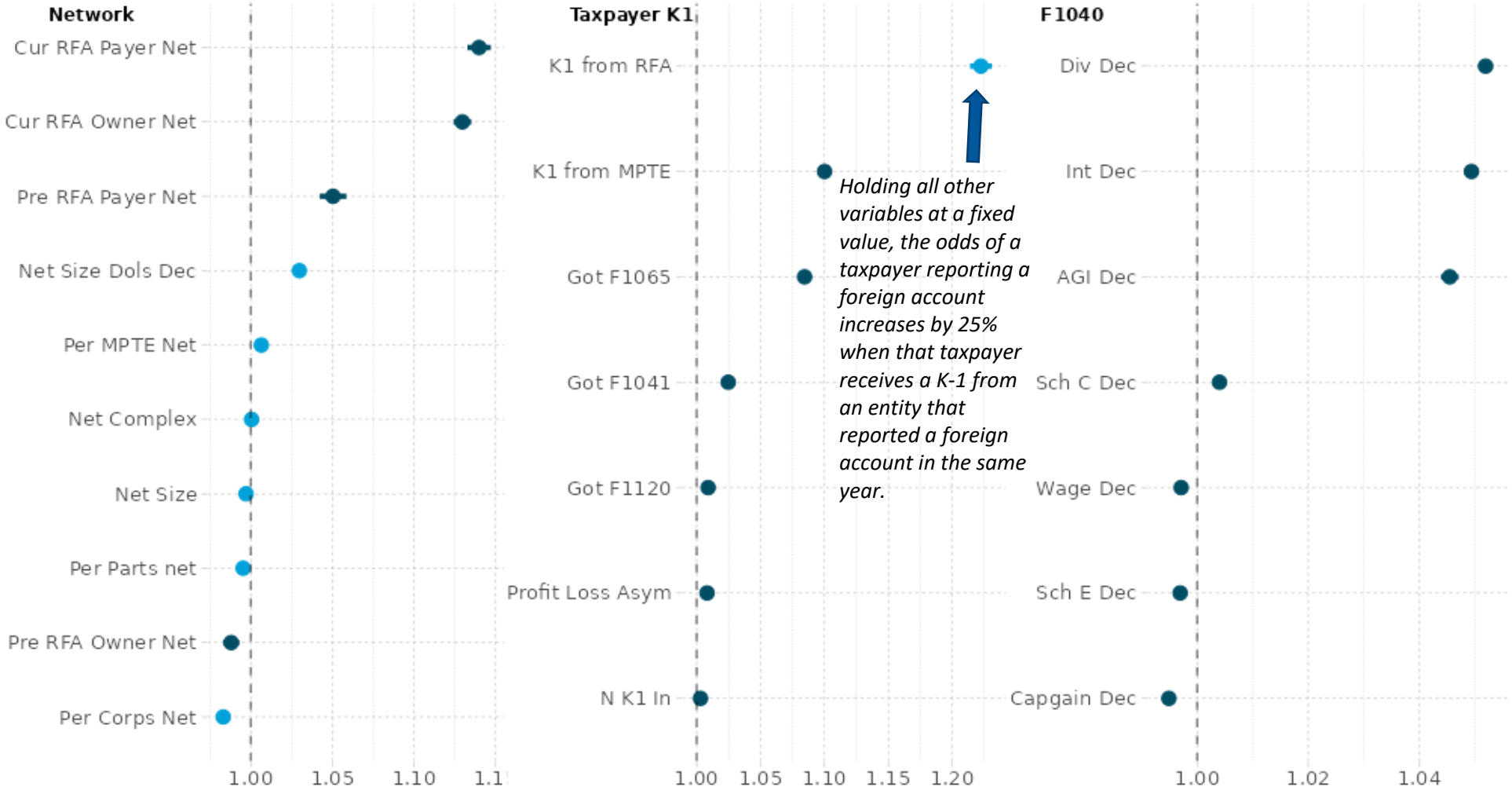


RFA and nRFA Income

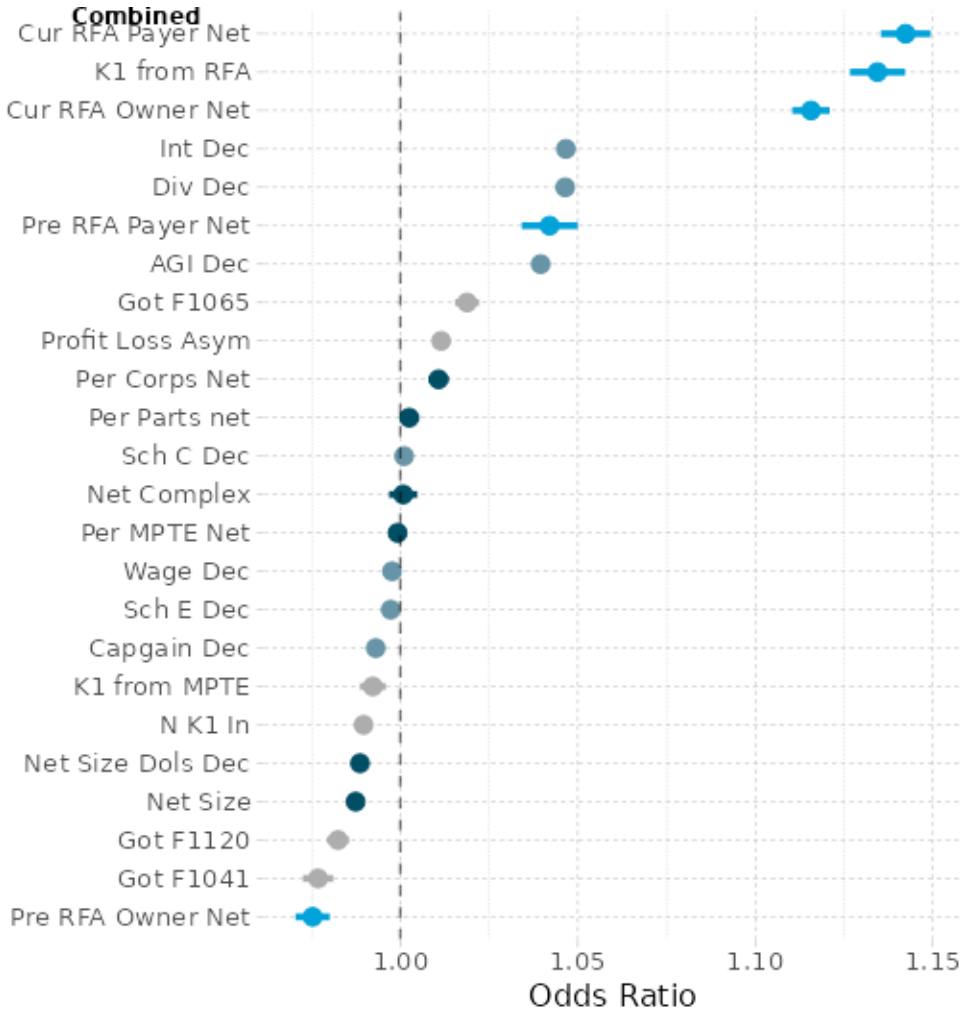


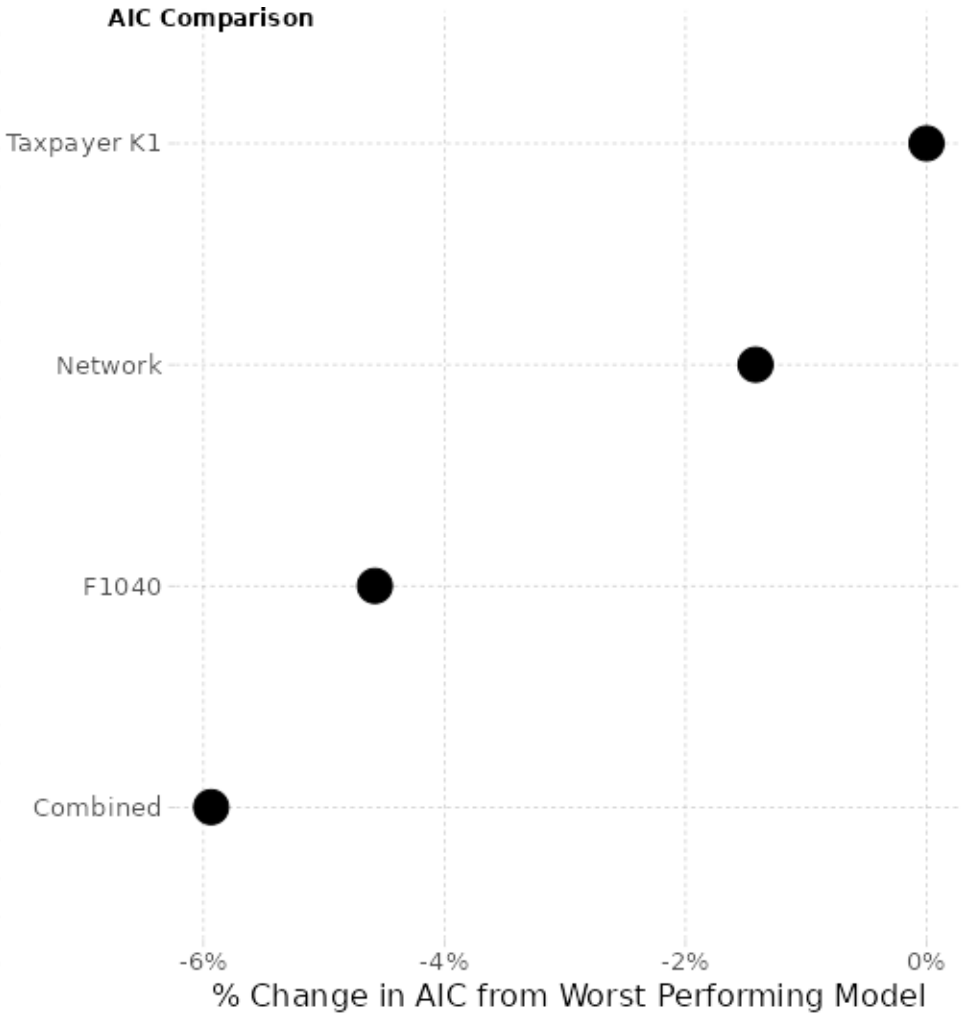
* For taxpayers that first reported RFA between 2009 and 2014; for nRFAs year zero was randomly assigned as a year between 2009 and 2014

Results


Network
Cur RFA Payer Net
Cur RFA Owner Net
Pre RFA Payer Net
Net Size Dols Dec
Per MPTE Net
Net Complex
Net Size
Per Parts net
Pre RFA Owner Net
Per Corps Net
1.00
1.05
1.10
1.1
Taxpayer K1
K1 from RFA
K1 from MPTE
Got F1065
Got F1041
Got F1120
Profit Loss Asym
N K1 In
1.00
1.05
1.10
1.15
1.20
F1040
Div Dec
Int Dec
AGI Dec
Sch C Dec
Wage Dec
Sch E Dec
Capgain Dec
1.00
1.02
1.04
Holding all other variables at a fixed value, the odds of a taxpayer reporting a foreign account increases by 25% when that taxpayer receives a K-1 from an entity that reported a foreign account in the same year.

Results


Combined
Cur RFA Payer Net
K1 from RFA
Cur RFA Owner Net
Int Dec
Div Dec
Pre RFA Payer Net
AGI Dec
Got F1065
Profit Loss Asym
Per Corps Net
Per Parts net
Sch C Dec
Net Complex
Per MPTE Net
Wage Dec
Sch E Dec
Capgain Dec
K1 from MPTE
N K1 In
Net Size Dols Dec
Net Size
Got F1120
Got F1041
Pre RFA Owner Net
1.00
1.05
1.10
1.15
Odds Ratio


AIC Comparison
Taxpayer K1
Network
F1040
Combined
-6%
-4%
-2%
0%
% Change in AIC from Worst Performing Model

Future and Ongoing Work

- Update data
- Add more variables
- Try different models
- Explore how RFA taxpayer behavior changes after first reporting a foreign account

Thank you

Application of Network Analytics to Identify Likely Ghost Preparer Networks

Presenter: Joshua King (IRS:RAAS)

June 22nd, 2023

Ghost Preparers Undermine Tax Administration

Paid preparers are an important IRS partner.

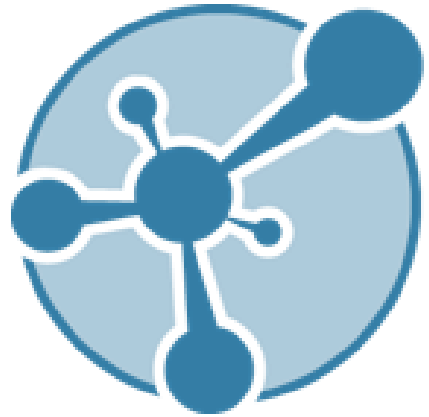
- More than half of taxpayers depend on the paid tax preparation community to assist in meeting their federal tax filing obligations.
- The IRS depends on paid preparers to help taxpayers comply with tax laws.

Ghost preparers are compensated tax return preparers who do not identify themselves on the returns they prepare.

- Ghost preparers avoid **IRS oversight.**
- Ghost preparers are in **violation of Treasury rules and regulations**.
- Ghost prepares may engage in unscrupulous behavior which **victimizes taxpayers** and **undermines the integrity of tax administration.**
- See **2/5/21 News Release** **“Beware of “ghost” preparers who don’t sign tax returns”**

Ghost Preparer Identification Project

- **RAAS collaborated with Criminal Investigations and Return Preparer Office to prepare a research proposal to identify Ghost Preparers using network analysis**
- **In 2021 the Innovation Lab 2.0 endorsed and funded the project**
- **Analysis Delivered at the conclusion of the Innovation Lab:**
  - A networked dataset of Form 1040 returns across 3 filing years
  - 2 clustering approaches of 1040 returns
  - A Ghost Preparer tool which:
    - Delivers suspicious cluster to users
    - Facilitates investigation of ghost preparers



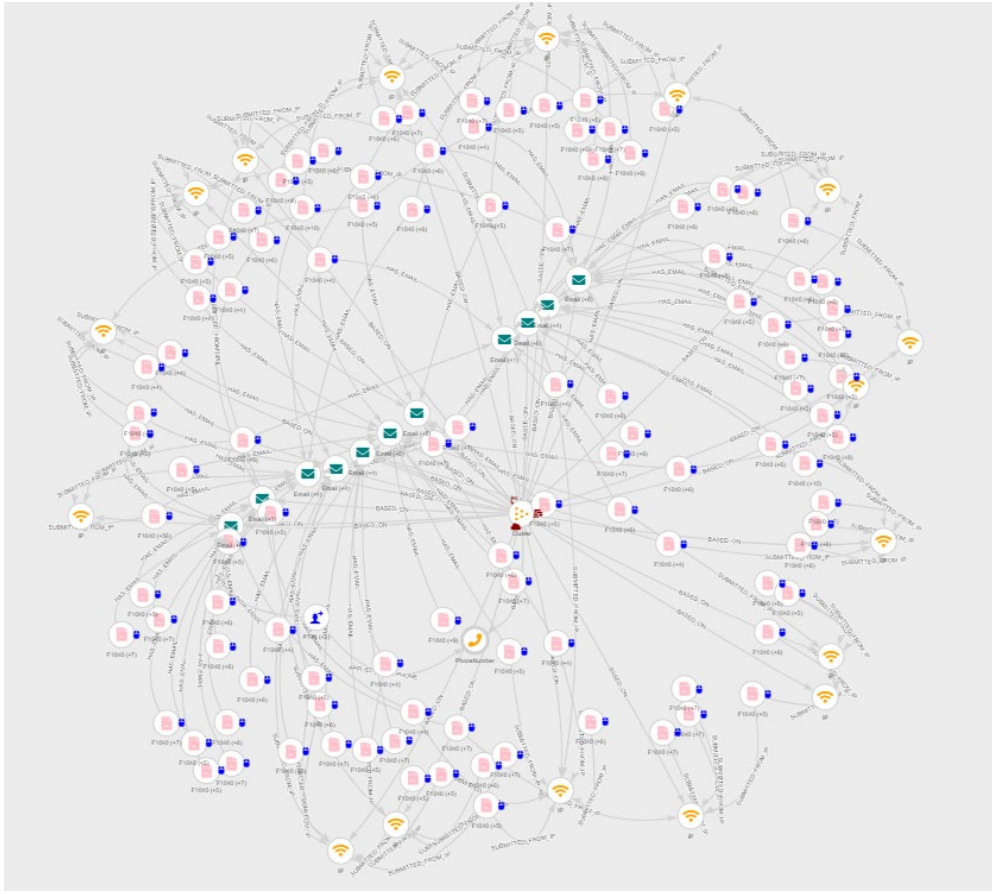
Value of Network Analysis

Behind a ghost preparer is a complex web of relationships, we can capture a piece of those connections in a network model.

Network Analysis Supports:

1. Identifying clusters of interconnected self prepared returns

2. Generating leads for a potential ghost preparer investigation



Data and Limitations

All analysis relied on Risk Based Clustering

Risk Based Clustering:

- Calculates **risk scores** for individual returns and linking factors
- Uses scoring to **limit data included in the initial network analysis**

Limitations:

- **One clustering approach**
- **Lack of labeled data**
  - No verification clusters are ghost preparers.
  - No measure of the extent to which we misidentify ghost prepared returns.
- Analysis spans the **Covid Pandemic**.

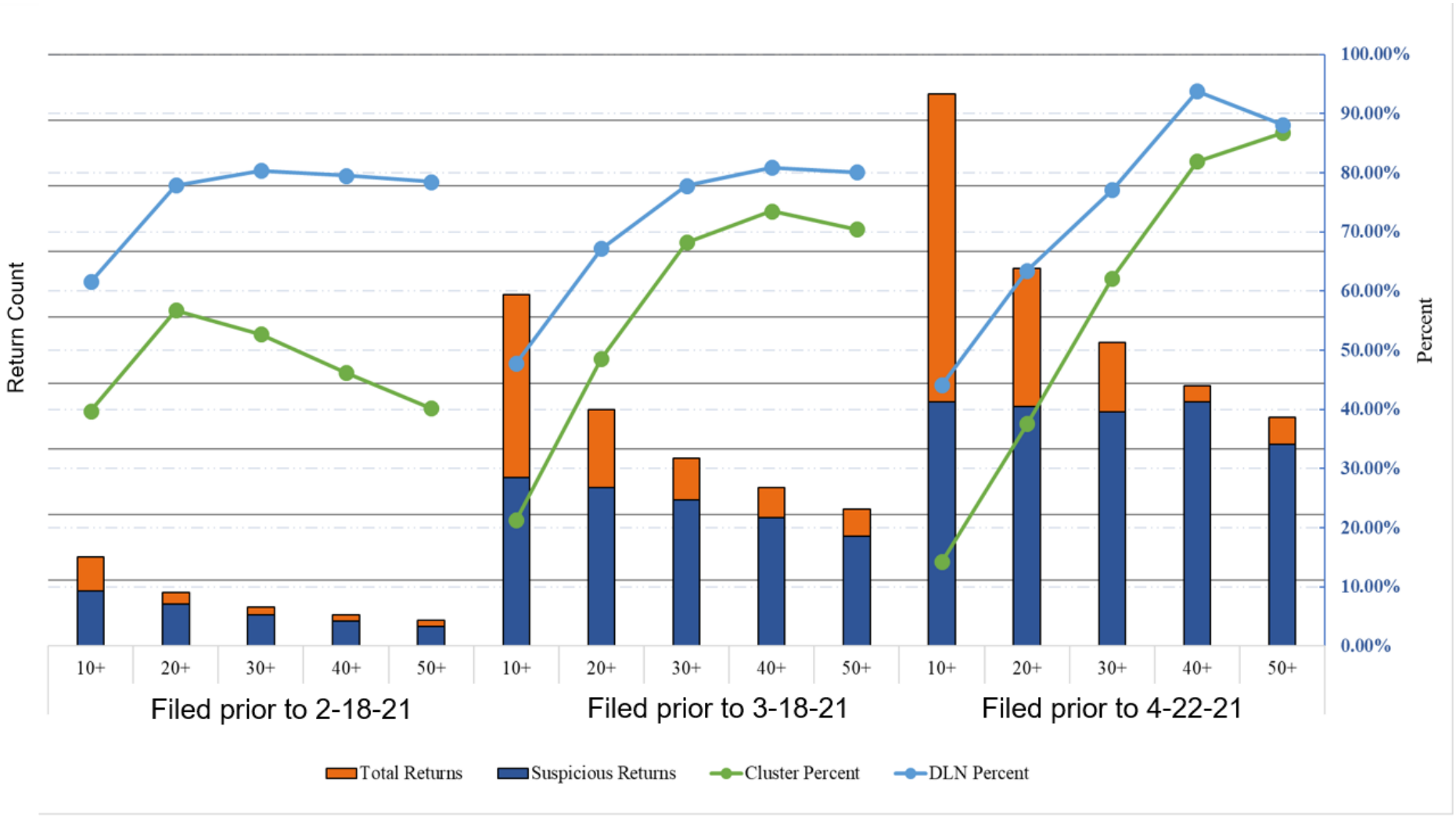
Cluster Evolution Over the Filing Season

How to interpret this graph:

Horizontal Axis shows suspected ghost cluster sizes and total returns at 3 time points during the filing season.

The green lines show the % of total clusters where 100% of the cluster shows up in the final suspect population.

The blue lines show the percent of returns that showed up in the final suspect ghost population; i.e. not all returns end up in the final suspect population.



Take Away:

Early in the filing season, 80% of returns in cluster group of size 20 or more, appear in the final suspect ghost population.

Impact Analysis

Sample of primary filers who appeared in a cluster across 3 years to find returns where that taxpayer

- appeared in a cluster for consecutive years (Stayed GPC)
- appeared in a cluster after not appear being identified in a cluster (Joined GPC)

Compared the annual changes of returns for these two groups

Return Values

	Average Value on F1040		Annual Change		Annual % Change	
	Joined GPC	Stayed GPC	Joined GPC	Stayed GPC	Joined GPC	Stayed GPC
Total Income	$40,937	$41,337	$4,538	$1,005	11%	2%
Adjusted Gross Income	$40,320	$40,774	$4,442	$1,040	11%	3%
Withholding Amount	$3,902	$4,138	$367	$198	9%	5%
Refund Amount	$4,291	$4,294	$797	$64	19%	1%
Earned Income Credit	$2,712	$2,884	$78	-$79	3%	-3%

Established IRS Risk Measure

	Joined GPC	Stayed GPC
Total Returns	1933	1956
Returns in 95% of DIF Distribution	16%	17%
No Change	1651	1681
Joined 95%	172	147
Net Change	61	19

Concluding Remarks

- Ghost Preparers are a significant challenge.
- We have demonstrated network analytics can identify suspected ghost prepared returns.
- Results are promising, however, as we receive feedback and refine these approaches the results will improve.

The Offshore World According to FATCA:

New Evidence on the Foreign Wealth of U.S. Households

Niels Johannesen (University of Copenhagen)
Daniel Reck (University of Maryland)
Max Risch (Carnegie Mellon University)
Joel Slemrod (University of Michigan)
John Guyton (Internal Revenue Service)
Patrick Langetieg (Internal Revenue Service)

IRS/TPC Conference, June 2023

Introduction

- Globally, households hold an estimated $7 trillion in offshore accounts (Zucman, 2013):
    - **Loss of tax revenue**: offshore assets are largely untaxed
    - **Regressivity**: offshore assets are highly concentrated among the very wealthiest (e.g. Alstadsæter et al, 2019, Guyton et al 2021)

- Policy innovation: FATCA requires all foreign banks to report U.S.-owned accounts to the IRS
    - Extends third-party information reporting to foreign financial income and assets

This Project

- U.S. administrative data: **FATCA forms**, income tax returns, business-owner links (K-1 information reports)

- **Questions:**
  1) What do FATCA reports reveal about offshore holdings?
  2) Does automatic third-party reporting on foreign accounts induce tax compliance?

- Today, descriptive analyses from the micro data (linked **F8966**)
  - Aggregate asset reporting: amount, where and how they are held (households or entities)
  - Who holds the assets: where in the income distribution

- Causal analysis of the effect of FATCA on tax compliance is in progress.

FATCA Reporting Regime

- Foreign financial institutions (FFIs) are required to:
  - **Identify accounts** ”"beneficially owned” by U.S. taxpayers (thorough background check searching for U.S. indicia)
  - **Convey information** about assets and income to the IRS
  - Some exceptions (ex. reporting threshold of $50K in assets)

- Key differences to previous enforcement initiatives:
  - Beneficial (rather than immediate) ownership
  - Automatic (rather than on-request) information exchange

- Non-cooperating foreign banks are subject to 30% witholding on U.S. source income

Reporting of Offshore Wealth

Overview: Totals from FATCA Reports

	TY 2016	TY 2017	TY 2018
Assets (billion USD)	3,648	3,233	3,981
No. reporting FFIs	36,056	41,829	45,308
No. of accounts	3,703,159	4,225,689	4,566,774
No. of identified U.S. owners	1,223,115	1,296,462	1,477,183
No. accounts w/out identified owners[1]	1,318,291	1,594,459	1,664,587

[1] See TIGTA (2018)

FATCA Reports by Owner Type (2018)

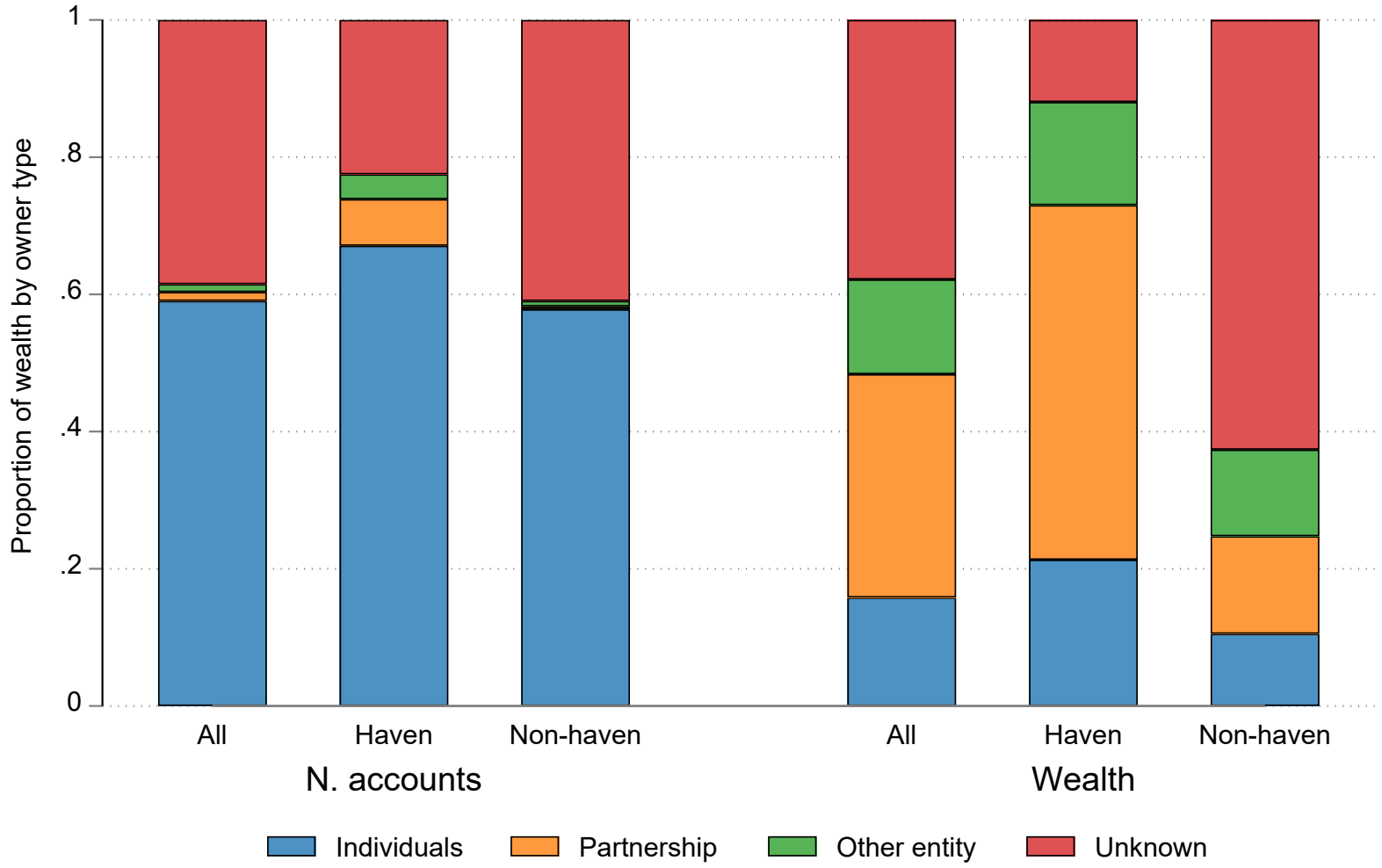
	Account Balance		No. of accounts	
	Total (Billions USD)	Share	Total	Share
Partnership	1,291.64	32.4 %	55,548	1.2 %
Individual	618.49	15.5 %	2,401,217	55.7 %
C Corp	400.64	10.0 %	18,206	.4 %
Tax exempt entity	48.59	1.2 %	8,777	.2 %
Trust	47.27	1.1 %	9,198	.2 %
Foreign corporation	20.64	.5 %	6,304	.1 %
S corporation	37.18	.9 %	8,041	.1 %
Missing TIN	1,017.58	25.5 %	1,578,472	36.6 %
Unmatched entity	278.78	7.0 %	12,306	.2 %
Ambiguous match	153.74	3.8 %	6,663	.1 %
Unmatched TIN	60.01	1.5 %	62,376	1.4 %
Unmatched individual	7.21	.1 %	143,141	3.3 %

FATCA Reports by Location of Accounts (2018)

	Havens*	Non-havens	Share in Havens
Wealth (billion USD)	1,940	2,041	49%
Accounts	612,406	3,954,216	13%

- * "Havens" is used as a shorthand descriptor of a set of countries that are low tax jurisdictions and serve as financial centers, as is commonly used in the literature
- The **IRS does not have any official designation of haven v. non-haven countries** and there is no such definition in FATCA law or administration. In line with previous literature, we use the list from Johannesen et al. (2020), which is the OECD (2000) list plus, Switzerland, Singapore, Hong Kong, and Luxembourg.
- Future work should refine the countries and institutions that potentially facilitate offshore tax evasion post-FATCA

Reported accounts and wealth by owner type and location (2018)



Comparisons to Previous Literature

- Larger wealth in tax havens than suggested by prior US estimates
  - Our data: **$1.94 trillion/10% of GDP in tax havens in 2018**
  - Alstadsæter et al. (2018): $1.1 trillion in havens/7% of GDP in havens in 2007.

- Comparable rates of ownership of offshore wealth at the top to Scandinavian data
  - Our data: 62% of those in top 0.01% own foriegn assets, 57% own haven assets
  - c.f. 60% of 0.01% of wealth distribution in Scandanavia (Alstadsæter et al. 2019))
  - Other data from leaks/amnesties: dispropotionately number of top-income recipients, but smaller shares of top-income/wealth individuals appearing in data

- Ownership of offshore wealth via partnerships modestly more concentrated than all partnership income
  - 46% of reported offshore partnership assets held by top 0.01%, 80% by the top 1%
  - c.f. 69% of total partnership income received by top 1% (Cooper et al 2016))

What Can We Learn About Rates of Return? (2018)

- Challenges in estimating (nominal taxable) rates of return in offshore accounts:
  - Missing income information for 45% of accounts/41% of wealth
  - Some items are not net taxable income amounts (e.g. "gross proceeds")

- We estimate "quasi-" rates of return, e.g. $\frac{\text{Total Int+Div}}{\text{Total Acct Bal }|\text{Non}-\text{Missing Int or Div}}$

Sub-population	Total reported wealth (billions USD)	Share of wealth with reported interest or dividends	Quasi-rate of return: interest + dividends only
All accounts	3,982	37.7%	2.8%
Non-haven country	2,042	51.3%	1.8%
Haven country	1,940	23.4%	5.0%
Individual owners	626	33.6%	4.6%
Partnership owners	1,292	19.8%	6.4%
Other entity owners	279	37.7%	1.1%
Unmatched owners	1,510	49.9%	1.6%

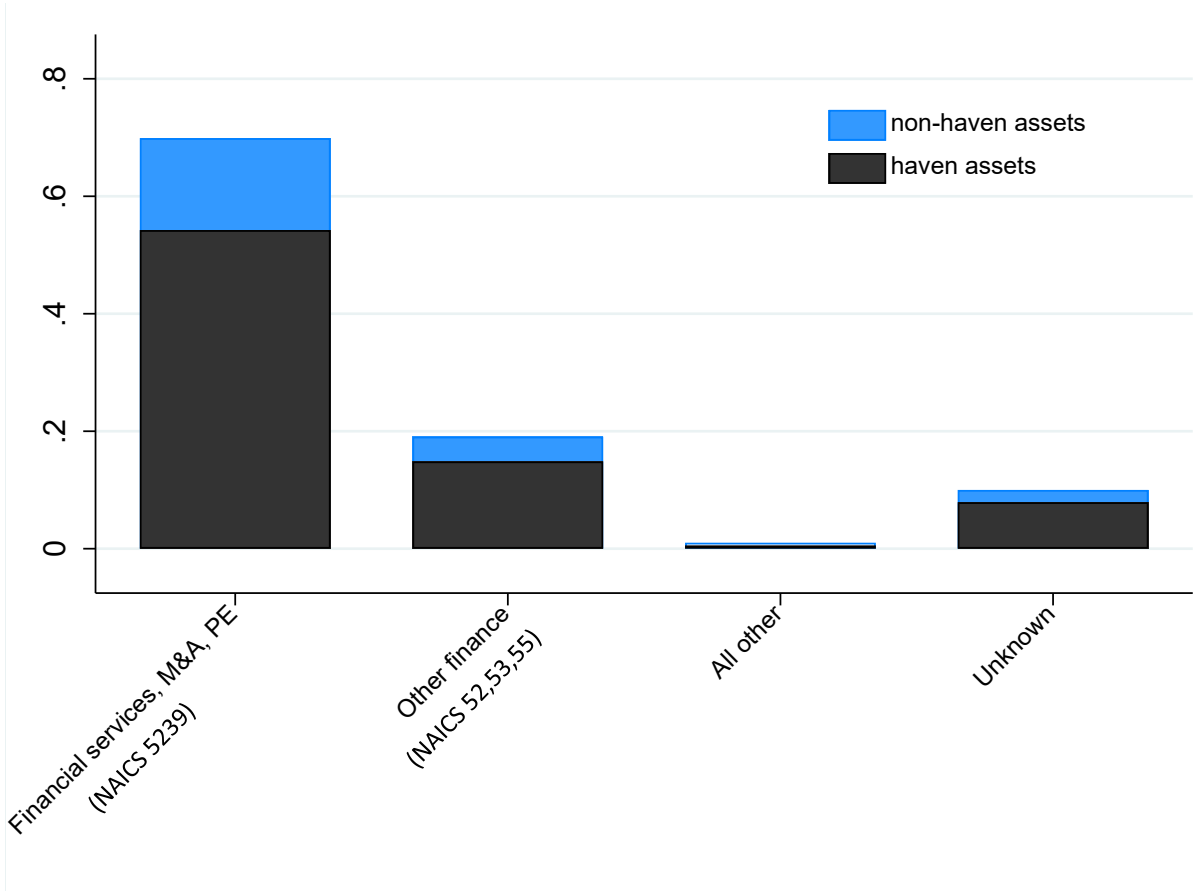
Partnership account owners and their shareholders

Partnerships hold the plurality of offshore assets, 78% of which are in havens. Using the micro data, we can learn about taxable owners

1. Link partnership account owners to the entity income tax return (Form 1065) for partnership information

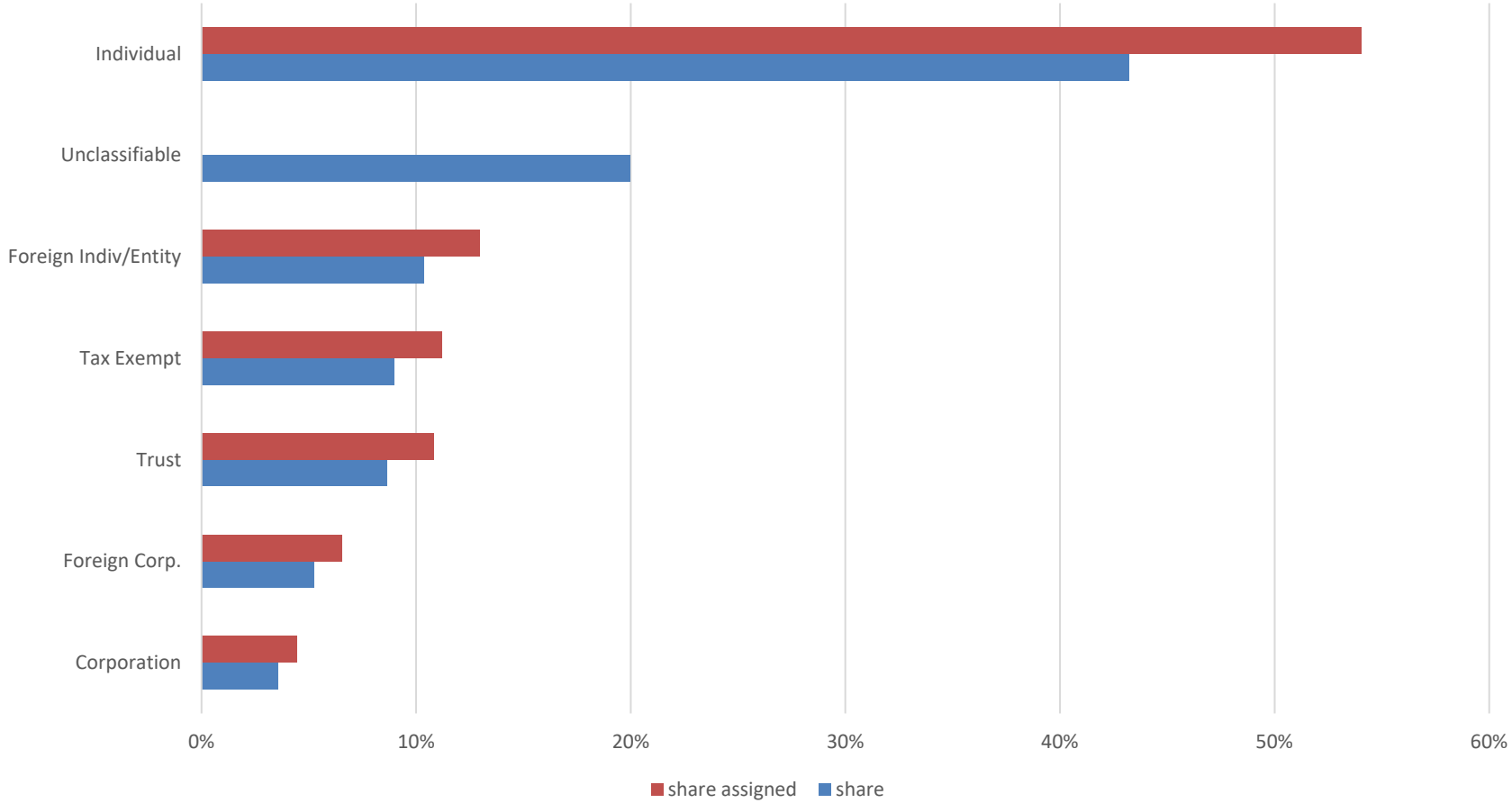
2. Link shareholders to the partnership
   - Distribute foreign assets and income to the shareholders (based on their share of total income distributed on K-1s)
   - Look through levels of pass-through ownership to ultimate taxpayer (Cooper et al. 2016)

Shares of partnership assets by industry and location (2018)



Compare to partnership income from all partnerships in 2011 (Cooper et al 2016): 70% Finance, 11% professional services

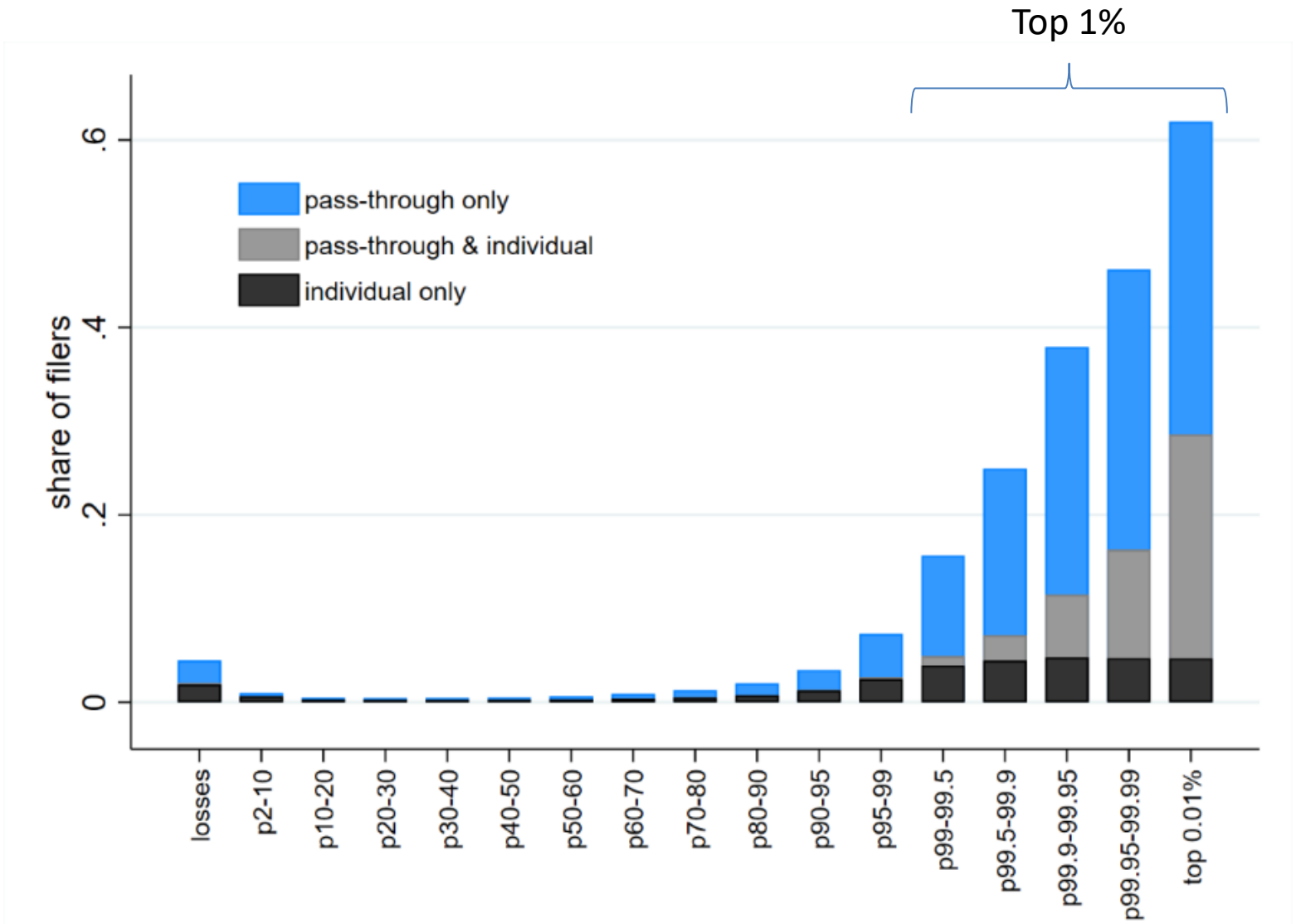
Shares of Partnership foreign assets by beneficial taxable owner type (2018)



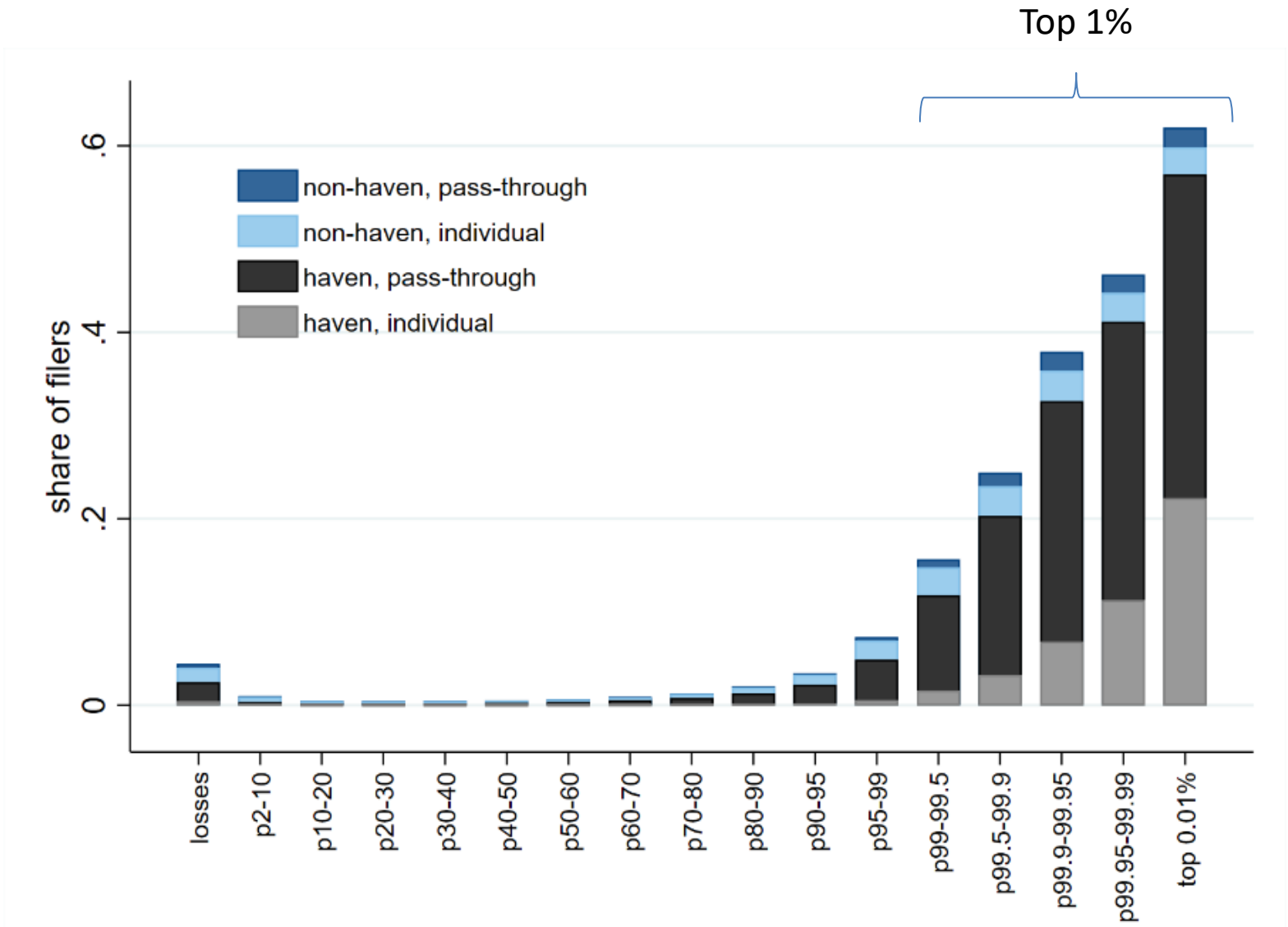
Compare assigned share of partnership foreign assets (red bars) to shares of all partnership income from in 2011 (blue bars, Cooper et al 2016): 20% unclassifiable, 43% individual, 5% tax exempt, 9% foreign, 7% trust, 10% corp

Beneficial individual owners of foreign assets across the income distribution

Share of taxpayers with a foreign account by position in the income (AGI) distribution (2018)



Share of taxpayers with a foreign account by position in the income, haven v non (2018)



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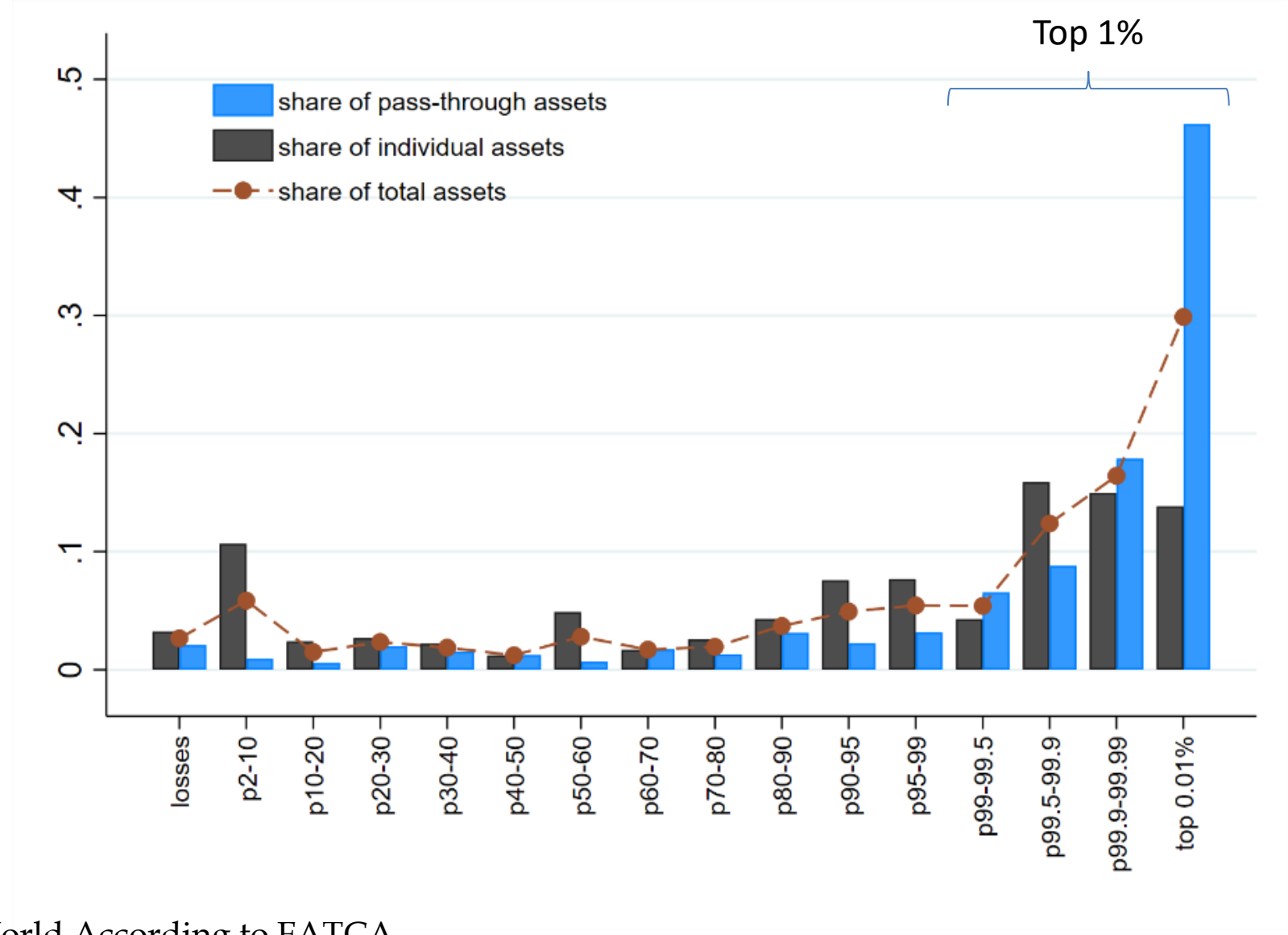
Distribution of assets held directly and held through pass-throughs (2018)



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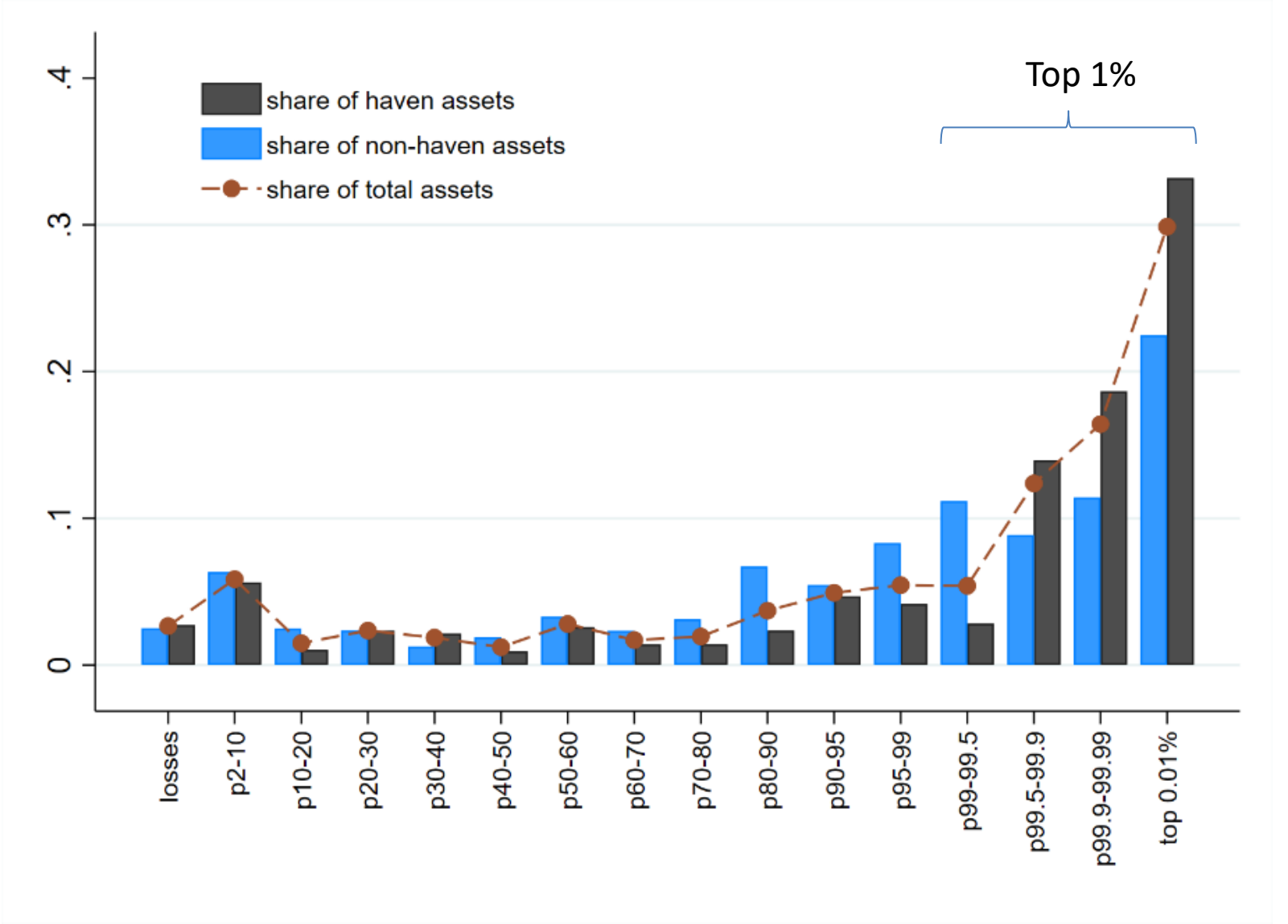
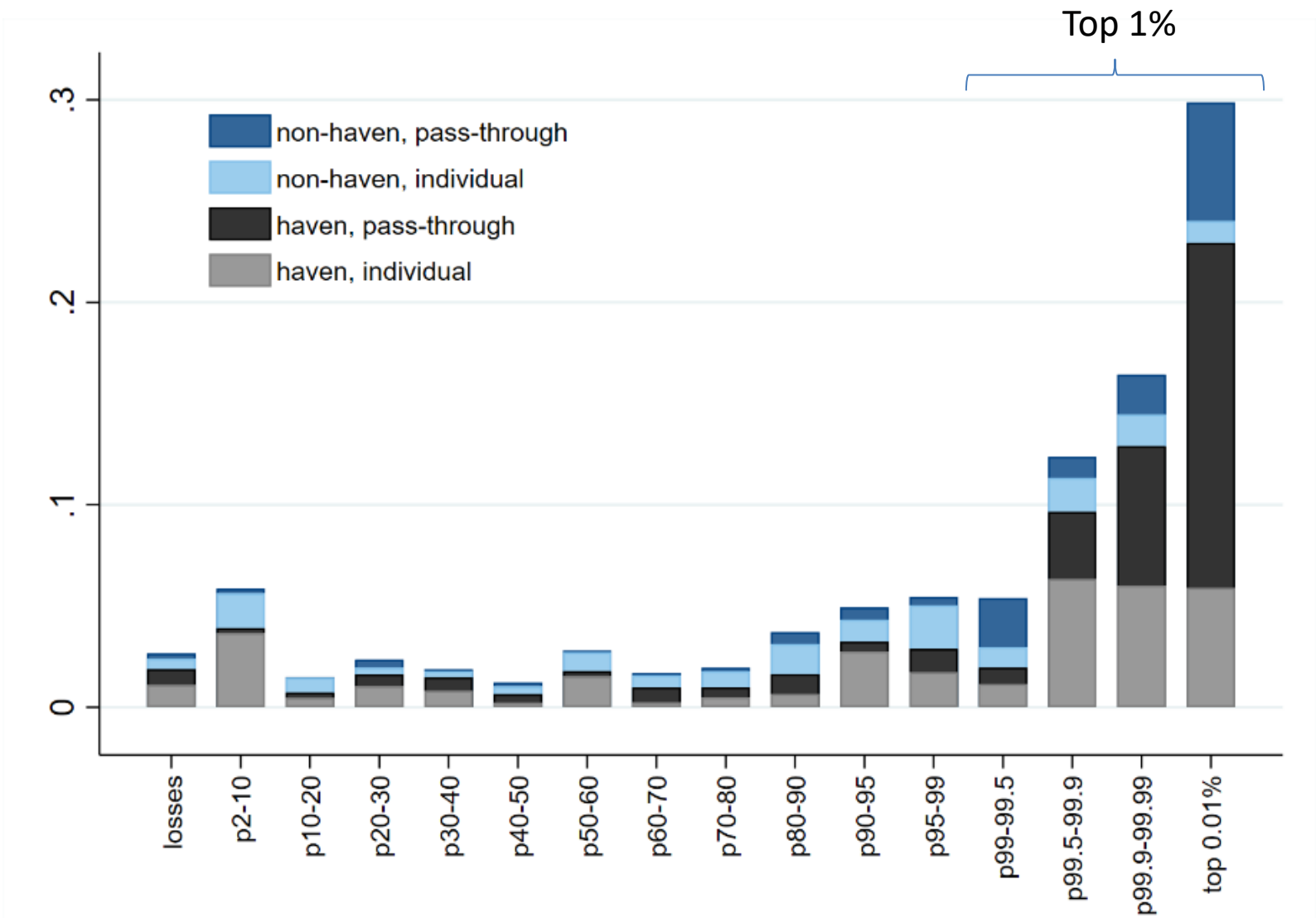
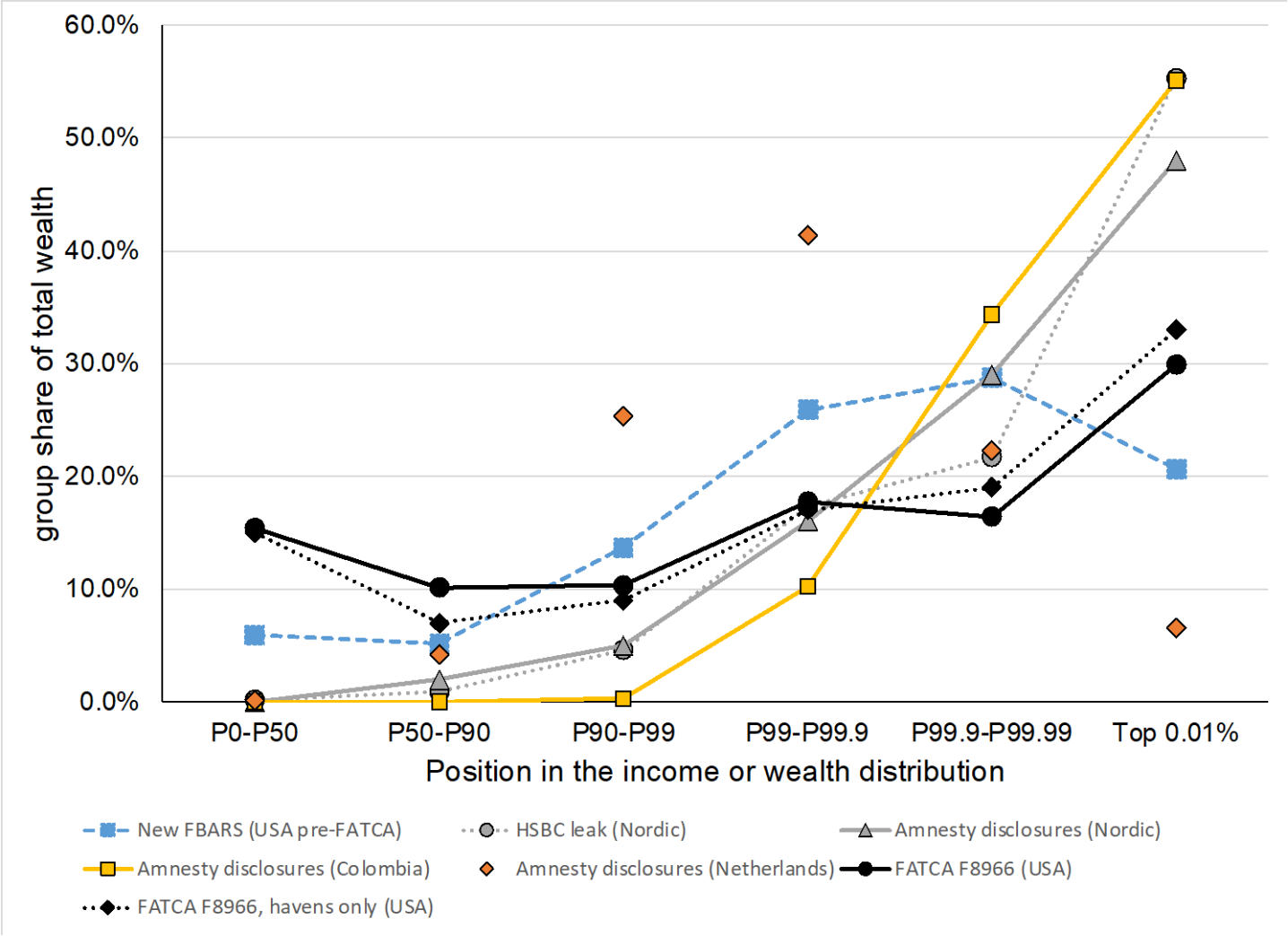
Distribution of assets held in havens and held in non-havens (2018)



Distribution of total assets (2018)



Comparisons: Concentration of Offshore Wealth



- All non-US data rank by wealth; US data rank by income (AGI)
- Sources: Johannesen et al 2020 (USA pre-FATCA), Alstadsæter et al 2019 (Nordic), Londoño-Velez & Ávila-Mahecha 2020 (Colombia), Leenders et al 2020 (Netherlands)

Takeaways + Next Steps

Takeaways

- FATCA reports provide new micro evidence on offshore holdings
  - $3.98 trillion of financial wealth.
  - $1.94 trillion in tax havens (49%), larger than previous estimates

- A large share of offshore wealth is held **indirectly through entities** (at least 46%), particularly partnerships (at least $1.3 trillion, 32%))
  - Implication: Effects of tax or enforcement policy depend largely on how they affect these entities and how they respond

- FATCA accounts, and especially offshore wealth, are **highly concentrated**
  - 62% of households in the top 0.01% of the income distribution have an account identified by FATCA reports
  - 64% of foreign assets are owned by the top 1% and 30% by the top 0.01%
  - 77% of top 0.01% for. assets held through pass-throughs (61% of top 1%)
  - 77% of top 0.01% foreign assets held in havens (74% of top 1%)
  - Implication: Tax or enforcement policy disproportionately affect assets held by extremely high-income taxpayers

Further Research/Work In Progress

- Find scope for a substantial compliance response ($4 trillion held at top of the distribution, mostly in havens and through partnerships)

- **Open question**: To what extent do the income and assets reported through FATCA yield new tax compliance?
    i) Are they tax compliant post-FATCA?
    ii) Were they tax compliant pre-FATCA?
    iii) Was there an additional compliance effect from those who chose to repatriate?

- Challenges: (i) Long lead-up b/w announcemet (2010) and full FFI reporting (2016). (ii) Control group

- Cost-Benefit Debate: FATCA has received public criticism for additional compliance costs on foreign banks and Americans abroad (e.g. Taxpayer Advocate, 2016, Oei, 2018).

Appendix

Insights from the literature

- **Pre-FATCA enforcement caused modest increase in compliance**

  Increase in reported foreign accounts around U.S. enforcement efforts in 2008-2009 (Johannesen, Langetieg, Reck, Risch and Slemrod, 2020)

  Decrease in offshore deposits and the value of offshore banks around leaks of customer data (Johannesen and Stolper, 2017)

- **…as well as actions by evaders to circumvent enforcement**:

  More indirect ownership through offshore corporations (Johannesen, 2014; Omartian, 2016)

  Relocation of assets to non-cooperating havens (Johannesen and Zucman, 2014)

- **Indirect evidence that FATCA / CRS boosted tax compliance**

  Decrease in the use of offshore holding companies around implementation of FATCA (Omartian, 2016)

  Drop in foreign-owned assets at activation of automatic information exchange (Menkhoff and Miethe, 2017; Casi et al., 2018; De Simone et al., 2018)

Pre-FATCA enforcement initiatives

Global battle against offshore tax evasion in the past decade:

- Legal action against offshore banks
  (U.S.: case against UBS starts in July 2008)

- Treaties with tax havens: case-by-case information exchange on request
  (U.S.: treaties with Switzerland, Luxembourg, Panama in 2008-2010)

- Automatic Exchange of Information (AEOI) agreements with specific set of countries

- Temporarily reduced penalties for voluntary disclosers of offshore assets
  (U.S.: OVDP starts in March 2009)

- Whistleblowers in offshore banks and tax haven law firms
  (U.S.: Brad Birkenfeld's whistleblowing triggers the case against UBS)

Matched and unmatched owner types (2018)

	Account Balance		No. of accounts	
	Total (Billions USD)	Share	Total	Share
Matched Entity	1,291.64	46.1 %	55,548	2.2 %
Matched Individual	618.49	15.5 %	2,401,217	55.7 %
Missing TIN	1,017.58	25.5 %	1,578,472	36.6 %
Missing, US Entity	886.31	22.2 %	1,215,727	28.2 %
Missing, US Individual	116.00	2.9 %	350,131	8.1 %
Unmatched entity	278.78	7.0 %	12,306	.2 %
Ambiguous match	153.74	3.8 %	6,663	.1 %
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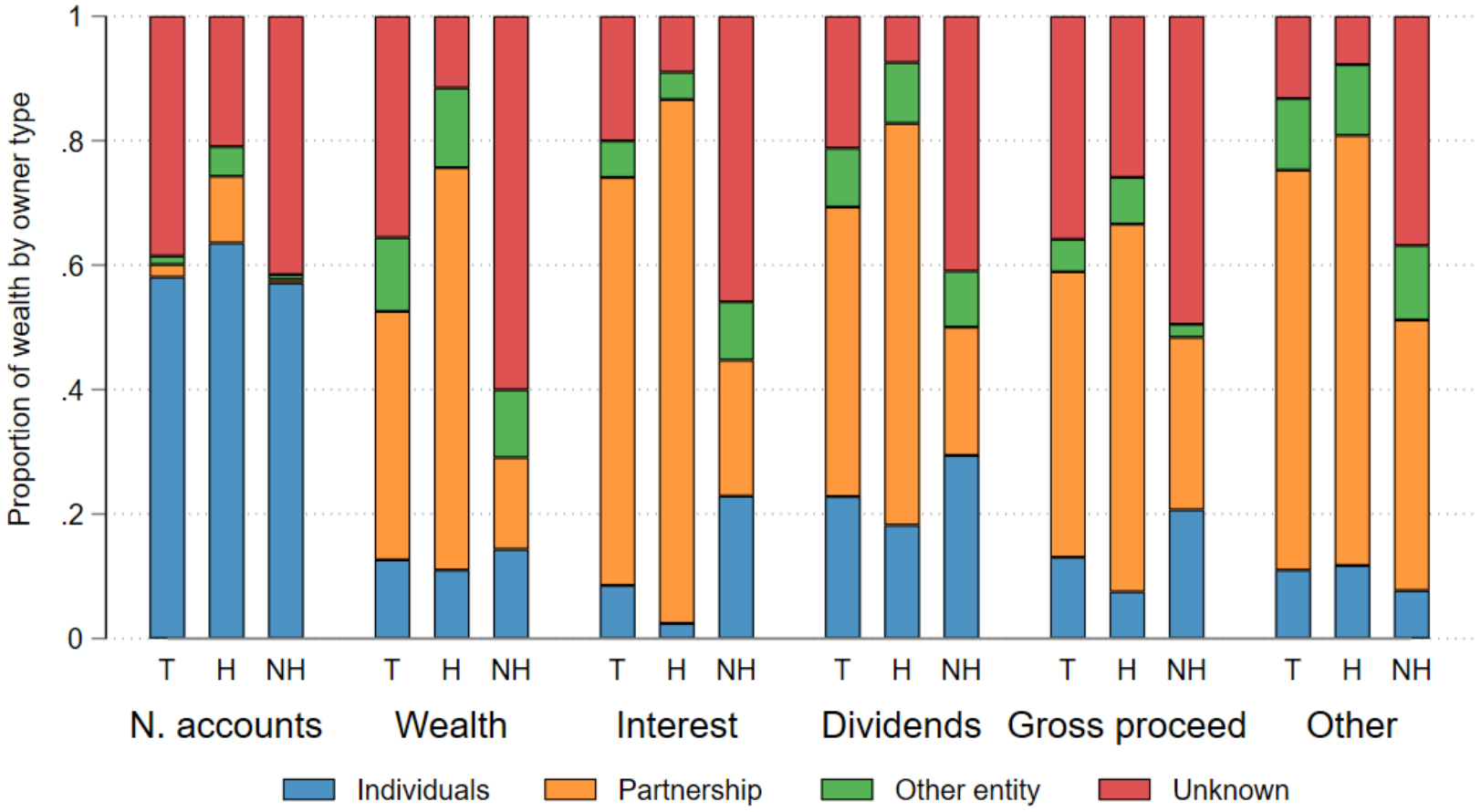
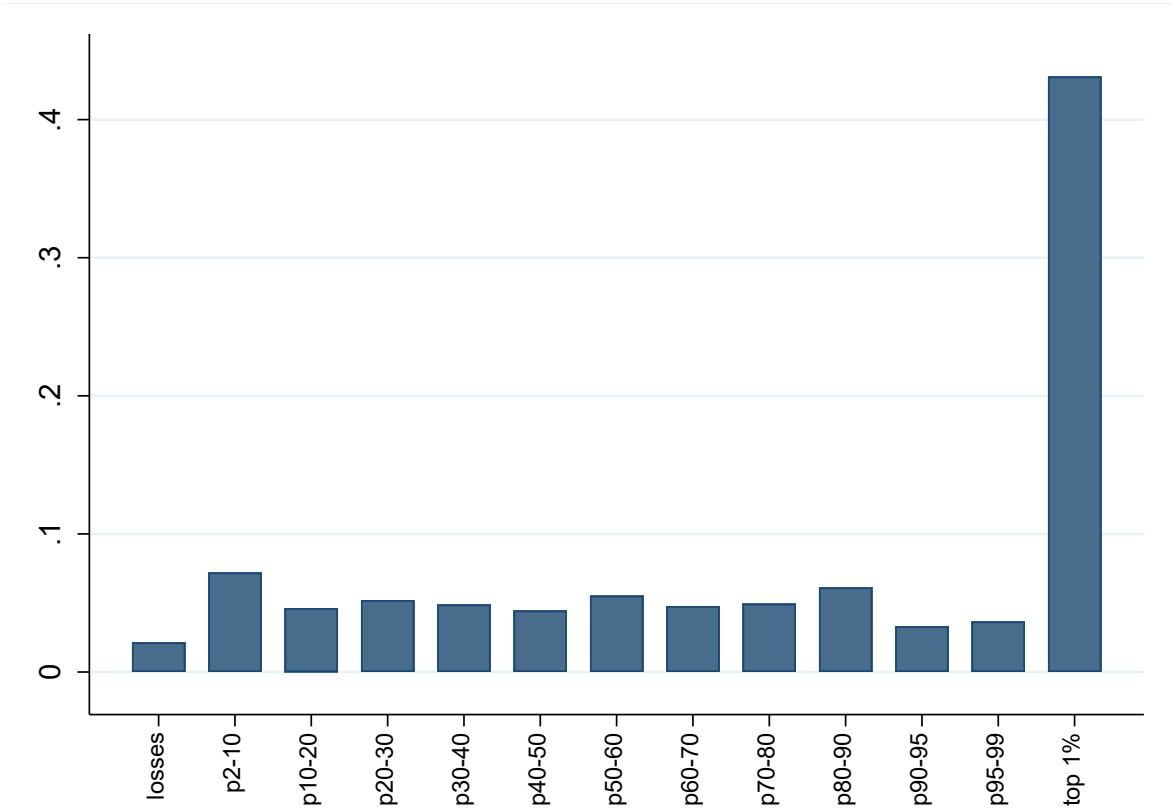
Reported accounts and wealth by owner type and location (2018)



T = total, H= haven, NH = non-haven

(Ad hoc) Robustness to $50K reporting threshold



Hypothetical distribution of foreign assets assuming 10% of households below 90th percentile have $40,000 in foreign assets (i.e. just below the FATCA reporting threshold)

- 42% of assets held by top 1%, relative to observed 64% on FATCA reports (21% by top 0.01% relative to 30%)

Session 4: Hidden Assets, Hidden Networks

IRS-TPC Research Conference

June 22, 2023

Discussant: Paul Organ

Disclaimer

The comments expressed in this discussion are entirely those of the discussant and do not necessarily reflect the views or the official positions of the U.S. Department of the Treasury.

Agenda

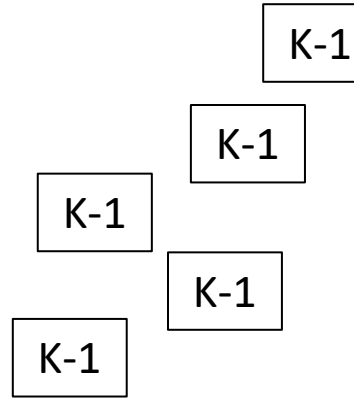
1. Following K-1s: Considering Foreign Accounts in Context
   Wind, Bratt, Graff, and Herlache

2. Application of Network Analysis to Identify Likely Ghost Preparer Networks
   King et al.

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

Three papers that…

- Apply *new methods* to existing data, or existing methods to *new data*
- Are highly operationally relevant *and* of academic interest



Following K-1s: Considering Foreign Accounts in Context

Wind, Bratt, Graff, and Herlache

Things to like about this paper

- Clever idea to look beyond individual taxpayers to their network of connected taxpayers/partnerships
  - Adds to evidence that network information can indicate something about taxpayer behavior (e.g., Agarwal et al. (2021))
  - Also some evidence on networks *influencing* behavior (Boning et al. (2020) in the US; Lediga, Riedel, and Strohmaier (2020) in South Africa)
- Shows how observing one population of taxpayers (here: foreign account reporters) can inform predictions about another population (here: non-reporters that may have foreign accounts)
- Careful consideration of modeling approach/goodness-of-fit

Comments and suggestions

- Take advantage of richness of information about taxpayer networks
- Back-testing prediction quality
- Timing and mechanisms

Richness of network information

- Current model relies on binary: *presence of an RFA payer in the network*
- When collapsing from network to flat file, could capture features of the network more richly:
  - # of RFA payers
  - RFA payers share of total network payers (by count, by $)
- Could lead to tighter predictions and ability to focus on highest likelihoods
- Side note – can you observe tax preparer/accountant of K-1?
  - Perhaps could incorporate this into the networks
  - One potential mechanism for information to propagate/lead to disclosed accounts

Back-testing prediction quality

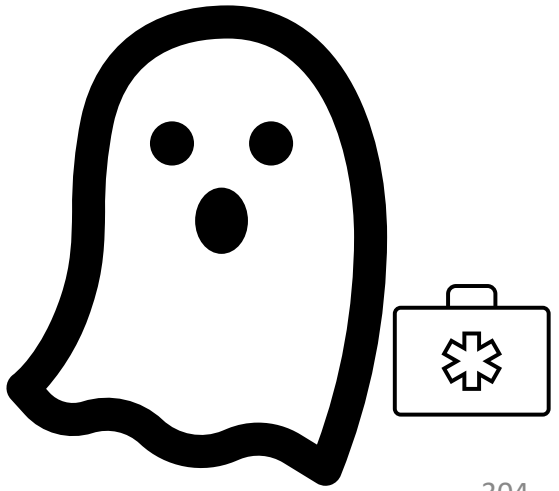
- One goal of the paper is to develop a tool that can help uncover *potentially* undisclosed accounts
- Is there a way to test effectiveness of approach on prior data?
- Observe many new disclosures throughout 2010s; in earlier years would this approach have predicted those disclosers as likely to have undisclosed accounts?
- Of course: not random who discloses, or when. Perhaps NRP can help?
- Side note: what does this say about potential size of undisclosed accounts?
  - How does it compare with Guyton et al. numbers from disclosed accounts?

Timing and mechanisms

- How does *new/first* RFA in network **affect** focal taxpayer reporting?
  - Could be that a partnership decides to report and we all report
  - Could be learning from network associates
  - Other mechanisms (accountants, tax preparers)
- Studying time dimension would help understand mechanisms
- Consider event study framework, where event = first network associate with foreign account reported
  - Understanding that reporting is not random, but can still learn from time patterns
- Some evidence on this already (Figure 6)
  - Effect of current year in-network RFA payer/owner ~ 2.5x prior-year in-network RFA payer/owner

Application of Network Analysis to Identify Likely Ghost Preparer Networks

King et al.



Things to like about this paper

- Exciting new methods
- Great example of taking complex methods and making them accessible to a wide range of technical abilities
- Developing a method that is adaptable to new data and approaches

Comments and suggestions

- How effective are the algorithms?
- Diagram of clustering approaches
  - Information/patterns included

Testing the algorithms

- Use prior identification of ghost preparers to back-test the algorithm
- Fn 3 notes current ghost preparer cases are identified by ad-hoc referrals or in related compliance efforts
  - So, not random
  - BUT – give you a set of identified ghost preparers to test against
- Apply algorithm to earlier filings of identified ghost preparers – does it flag those ghost preparer clusters?

Diagram of cluster approaches

- Summary diagram or table about clustering approaches
  - Would help to see visually how approaches are applied
  - What are the trade-offs in using risk-based vs. top-down vs. label propagation?
- Could also show information/patterns are included in each
  - Which are fixed and which could preparers adapt to?

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

Guyton et al.

Things to like about this paper

- First look at exciting new data
- Careful, detailed linking of accounts to individuals (including through partnerships)
- Will likely spark some follow-on research in coming years

Comments and suggestions

- Can we learn more from the unmatched 40%?
- U.S. citizens abroad
- Excited about causal analysis

Learning about the unmatched 40%

- (38% of wealth and 42% of accounts)
- What can you say about the similarity of unmatched and matched?
- Form 8966 provides some information that might help:
  - FFI that reported the accounts – are whole FFIs unmatched or is it within FFIs?
  - Balances, income, income types
  - Currency codes – foreign accounts held in USD vs. local currencies
- Ideas from other papers in this session…take characteristics of matched accounts, and use that to predict some high-level characteristics of unmatched accounts?

Other comments

- Some of this is U.S. citizens living abroad – how much?
  - Already linked to individual tax filings
  - Infer at least a lower bound from reported addresses
- Natural next question is causal – effect of FATCA
  - Know authors working on this now, excited to see it

Thanks!

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