Research, Applied Analytics & Statistics

TAX POLICY CENTER
URBAN INSTITUTE & BROOKINGS INSTITUTION

15th Annual IRS/TPC Joint Research Conference on Tax Administration


Tax Simplification

Tax Simplification

Is it possible?

Through the eyes of a taxpayer / tax administrator

There may be other considerations for a tax, but

What Are The Characteristics of a Simple Tax?

I've identified **6 characteristics** based on:

- Over 50 years as a taxpayer
- Almost 40 years in tax administration research
- At least 40 years of listening to regular taxpayers

1. A Simple Tax Must Be Straightforward

A truly simple tax would:

- Be easy to understand;
- Be easy to calculate;
- Be straightforward to administer;
- Make it easy for most people to meet their tax obligation exactly in real time; and therefore
- Cost most taxpayers NO additional money and very little time to meet their tax obligation.

2. A Simple Tax Must Be Based on Individual Income

- All recurring taxes are ultimately paid from people's incomes and should be directly and clearly imposed on that income.
- All taxpayers would be voters (who know how much tax is imposed on them) and would keep their elected representatives (who impose the tax) accountable.
- We say a tax is progressive or regressive relative to individual *income*.
- Ever since the 16th Amendment was added to the U.S. Constitution in 1913, we've gotten used to a personal income tax.

3. A Simple Tax Must Be Manageable

- The tax authority needs to be able to **administer** it.

Counter example: corporation income tax

- Taxpayers need to know **how much** tax they're paying.

Counter examples: corporation income tax, property & sales taxes

- Tax authority must verify eligibility for tax benefits without taxpayers needing to **reveal private information**.

Counter examples: claiming offsets to income or offsets to tax

4. A Simple Tax Must Be Permanent

- Not changing every year
- It must be stable and predictable.
- A moving target frustrates everyone.
- The costs of change & uncertainty are high.

5. A Simple Tax Must Be Limited

- Limited in its capacity to generate revenue
  - Simple for taxpayers should not mean easy to raise taxes.
  - Making the tax completely visible to the voters who pay it will help.
  - Having just one tax bracket would help to moderate the rate.
- Limited in its capacity to manipulate behavior
  - Incentives and disincentives greatly complicate a tax.
- Limited in its capacity to collect personal information
  - Income offsets and tax offsets are the biggest culprits.

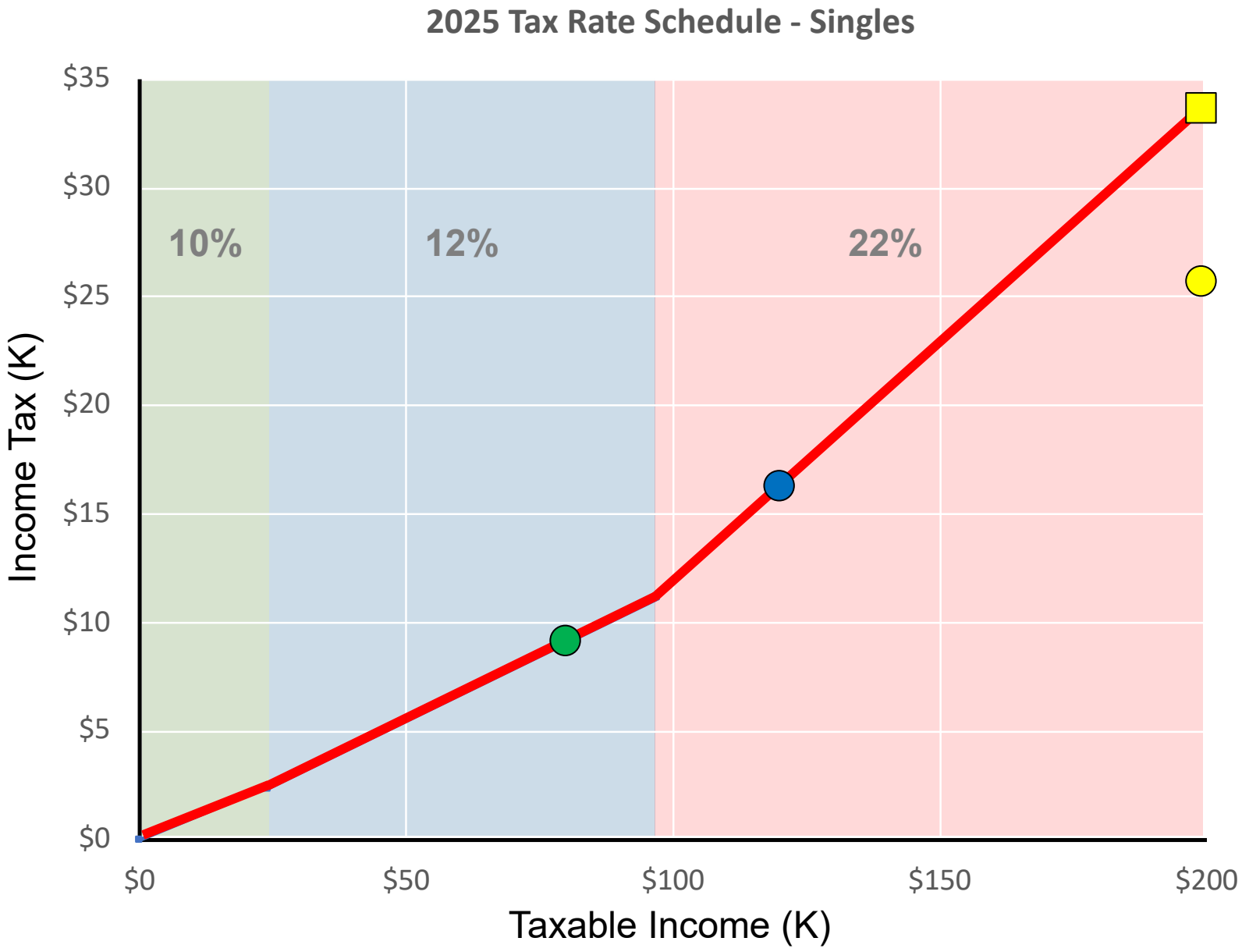
6. A Simple Tax Must Be Equitable

- Everyone must be treated equally (fairly).
  - Inequities undermine both simplicity and voluntary compliance.
- Every dollar of income should bear the same tax rate.
  - No exemptions, adjustments or deductions to reduce taxable income and no tax credits to reduce tax
  - No graduated tax rate structure
  - Neither progressive nor regressive
  - For most people, it would be like our current Medicare tax (except that applies only to earned income)

Do Progressive Tax Rates Really Cause Complexity?

- **Yes.** Imagine a tax system that deviated from these principles only due to a progressive tax rate structure.
- Examples of complexity:
  - Someone with 2^+ sources of income (another job, pension, investment income, etc.): paying tax at the source depends on knowing the income from other sources, which requires tradeoffs between accuracy, simplicity, and privacy.

Withholding Tax From 2 Concurrent Jobs



The withholding system treats each job as if it were the only job.

	Job 1
Income	$120K
Tax withheld	$16,228

The second job should have been withheld at the marginal rate of the first job.

The employee(s) need to make an adjustment to their withholding.

2025 Form W-4

Step 2: Multiple Jobs or Spouse Works

Complete this step if you (1) hold more than one job at a time, or (2) are married filing jointly and your spouse also works. The correct amount of withholding depends on income earned from all of these jobs.

Do **only one** of the following.

(a) Use the estimator at *www.irs.gov/W4App* for the most accurate withholding for this step (and Steps 3–4). If you or your spouse have self-employment income, use this option; **or**

(b) Use the Multiple Jobs Worksheet on page 3 and enter the result in Step 4(c) below; **or**

(c) If there are only two jobs total, you may check this box. Do the same on Form W-4 for the other job. This option is generally more accurate than (b) if pay at the lower paying job is more than half of the pay at the higher paying job. Otherwise, (b) is more accurate . . . . . ☐

Complete Steps 3–4(b) on Form W-4 for only ONE of these jobs. Leave those steps blank for the other jobs. (Your withholding will be most accurate if you complete Steps 3–4(b) on the Form W-4 for the highest paying job.)

Step 3: Claim Dependent and Other Credits

If your total income will be $200,000 or less ($400,000 or less if married filing jointly):

Multiply the number of qualifying children under age 17 by $2,000 $ _____

Multiply the number of other dependents by $500 . . . . . $ _____

Add the amounts above for qualifying children and other dependents. You may add to this the amount of any other credits. Enter the total here . . . . . **3** $

Step 4 (optional): Other Adjustments

(a) Other income (not from jobs). If you want tax withheld for other income you expect this year that won't have withholding, enter the amount of other income here. This may include interest, dividends, and retirement income . . . . . **4(a)** $

(b) Deductions. If you expect to claim deductions other than the standard deduction and want to reduce your withholding, use the Deductions Worksheet on page 3 and enter the result here . . . . . **4(b)** $

(c) Extra withholding. Enter any additional tax you want withheld each **pay period** . . **4(c)** $

Does a Progressive Tax Rate Really Cause Complexity?

- **Yes.** Imagine a tax system that deviated from these principles only due to a progressive tax rate.
- Examples of complexity:
  - Someone with 2^+ sources of income (another job, pension, investment income, etc.)—paying tax at the source depends on knowing the income from other sources, which requires tradeoffs between accuracy, simplicity, and privacy.
  - Withholding tax from sequential or part-year jobs
  - Graduated marginal rate brackets generate incentive to understate income—particularly near bracket thresholds.
- Same problems with a standard deduction & a "flat" rate

Vertical "Equity"

- **The rationale:**
  - Those with higher incomes have the ability to pay a higher % of their income.
  - The poor have virtually no ability to pay.
- **"From each according to his ability, to each according to his need."**
  - Basic tenant of socialism is now enshrined in U.S. tax law.
  - **Problem:** government decides your abilities and needs.
  - **Problem:** government redistribution of income undermines personal responsibility of both the recipients *and* the donors (e.g., discerning and alleviating the root problems).

Vertical “Equity”

“The subjects of every state ought to contribute toward the support of government, as nearly as possible, in proportion to their respective abilities; that is, in proportion to the revenue which they respectively enjoy under the protection of the state.” — Adam Smith

“The moment you abandon... the cardinal principle of exacting from all individuals the same proportion of their income or their property, you are at sea without rudder or compass, and there is no amount of injustice or folly you may not commit.” — John Ramsay McCulloch

“I do not believe that the government should ask social legislation in the guise of taxation. If we are to adopt socialism, it should be presented to the people of this country as socialism and not under the guise of a law to collect revenue.” — Calvin Coolidge

What Would a SIMPLE Tax Look Like?

Characteristic	How?
Straightforward	Withhold exactly at source; 3rd-party information reporting; everyone treated the same
Income-Based	All realized personal income, net of expenses incurred to generate business income (no other taxes)
Manageable	No indirect taxes; no offsets to income or tax; ignore losses
Permanent **L**imited	Constitutional Amendment specifying the tax base, allowing Congress to change: (1) the tax rate by normal procedures; and (2) the definition of net income, but only by supermajority of both houses
Equitable	Every dollar of income subject to the same tax rate

Practical Considerations

- Can’t be implemented piecemeal.
- Must be by popular demand.
- What about “winners” and “losers”?

At the very least, I hope I've caused you to think objectively about why and how to make taxes simpler.

Questions?

Research, Applied Analytics & Statistics

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Statistics of Income Division
RESEARCH APPLIED ANALYTICS & STATISTICS

June 12, 2025

Characteristics of Amended Returns and Amended Return Filers

Amanda Eng

IRS-TPC Research Conference, 2025

What are amended returns?

- Taxpayers file amended returns to correct previously filed returns.
- Individuals use Form 1040-X to report original values, changes, and corrected values.
- Tax units filing Form 1040-X for a credit or refund generally must file within 3 years of filing their original return.

Why study amended returns?

- SOI estimates do not include amended returns. We'd like to understand how amended returns affect our estimates. This work updates previous work by Dennis et al. that focused on 2013 amended returns.
- Beginning in 2020, taxpayers could e-file Form 1040-X for tax years 2019 onwards. This change provides new opportunities to understand why taxpayers file amended returns and gain insights into the adoption of e-file options.
- IRS is interested in improving processing of amended returns, which requires knowledge of amended return filing patterns.

Research Questions

- What are the characteristics of tax units who file an amended return?
- What are the characteristics of tax units who e-file an amended return?
- How do amended returns affect tax liability?

Preview of Findings

- What are the characteristics of tax units who file an amended return?
  - Tax units who have higher income on their original return have a higher propensity to file an amended return.
- What are the characteristics of tax units who e-file an amended return?
  - In TY 2020, amended return filers who were younger and had higher income on their original return were more likely to file electronically than older or lower income groups.
- How do amended returns affect tax liability?
  - Amended returns overall decrease tax liability, but there is significant heterogeneity across tax units.

Data

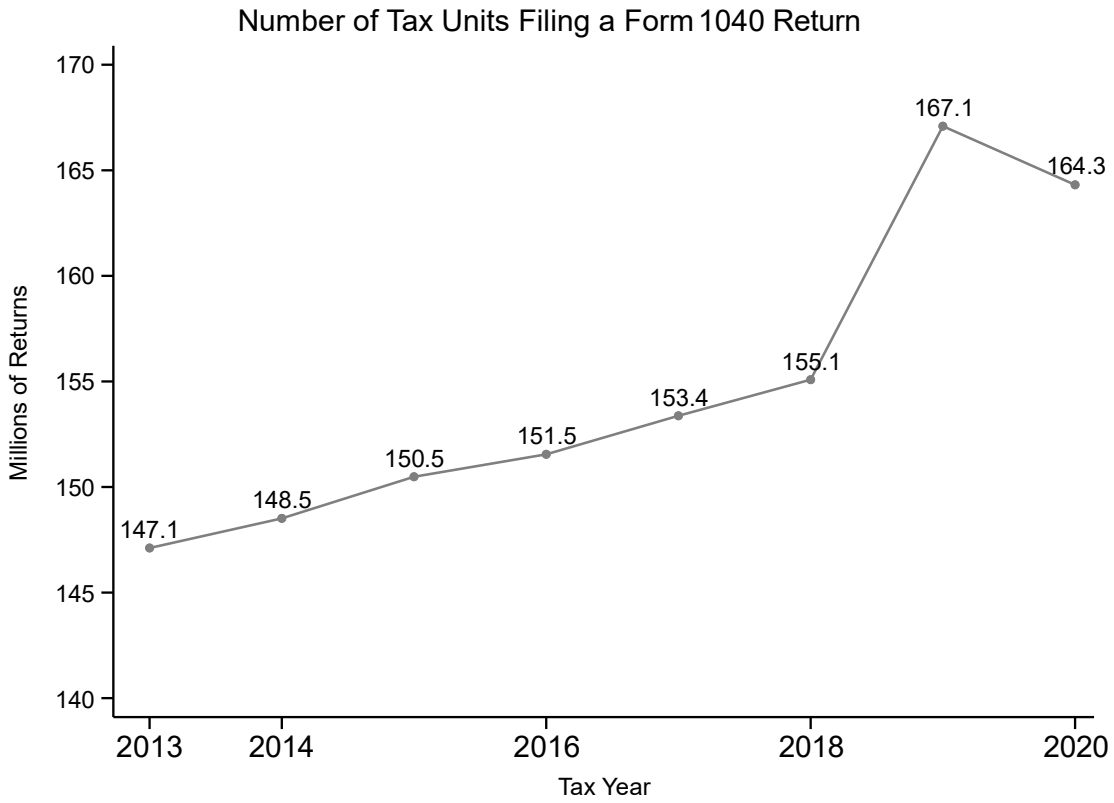
- Population tax data held at IRS (not the perfected SOI sample) for tax years 2013-2020
- Amended returns and subsequent tax changes are primarily documented in the Individual Master File (IMF).
- I link these records to:
  - Originally filed Form 1040
  - E-filed return (if it exists)
  - DM-1 to attach taxpayer DOB

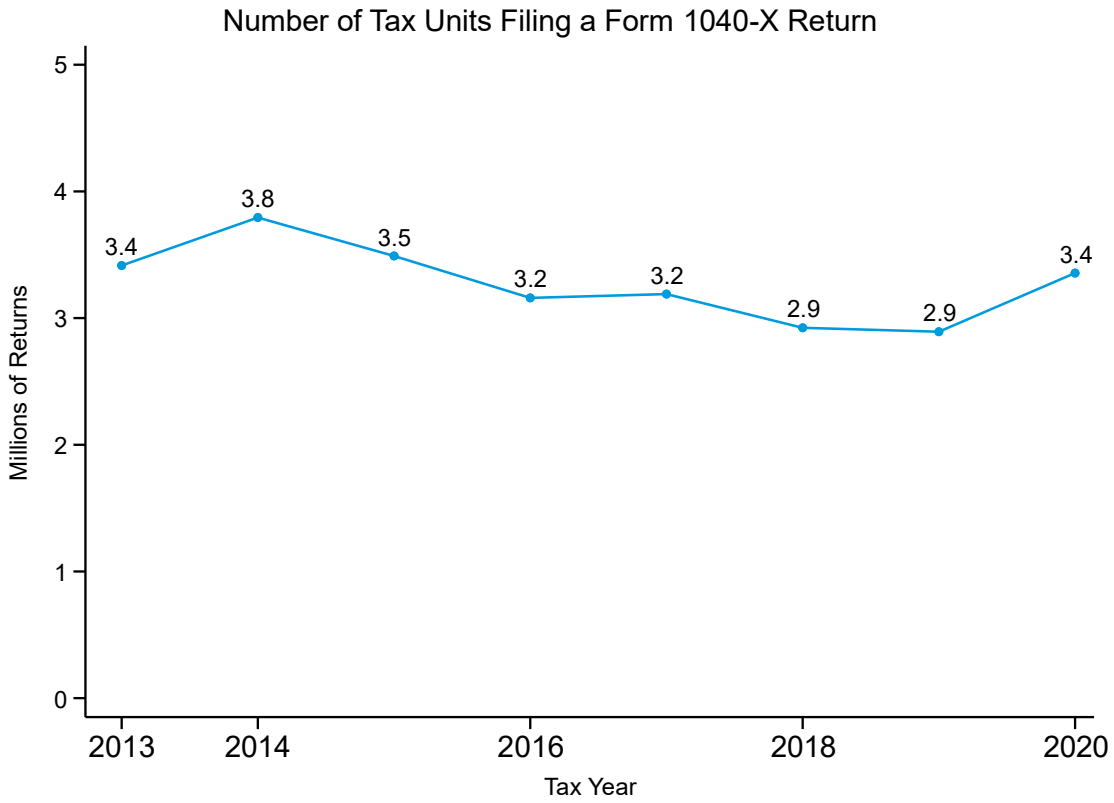
Assumptions

- Only count amended returns that show up no more than 60 days before the original return
- For tax changes, only count if:
  - The record is dated after an amended return
  - AND either:
    1. There is an amended return date associated with the tax change record
    2. There is a record of the amended return being sent to Examination

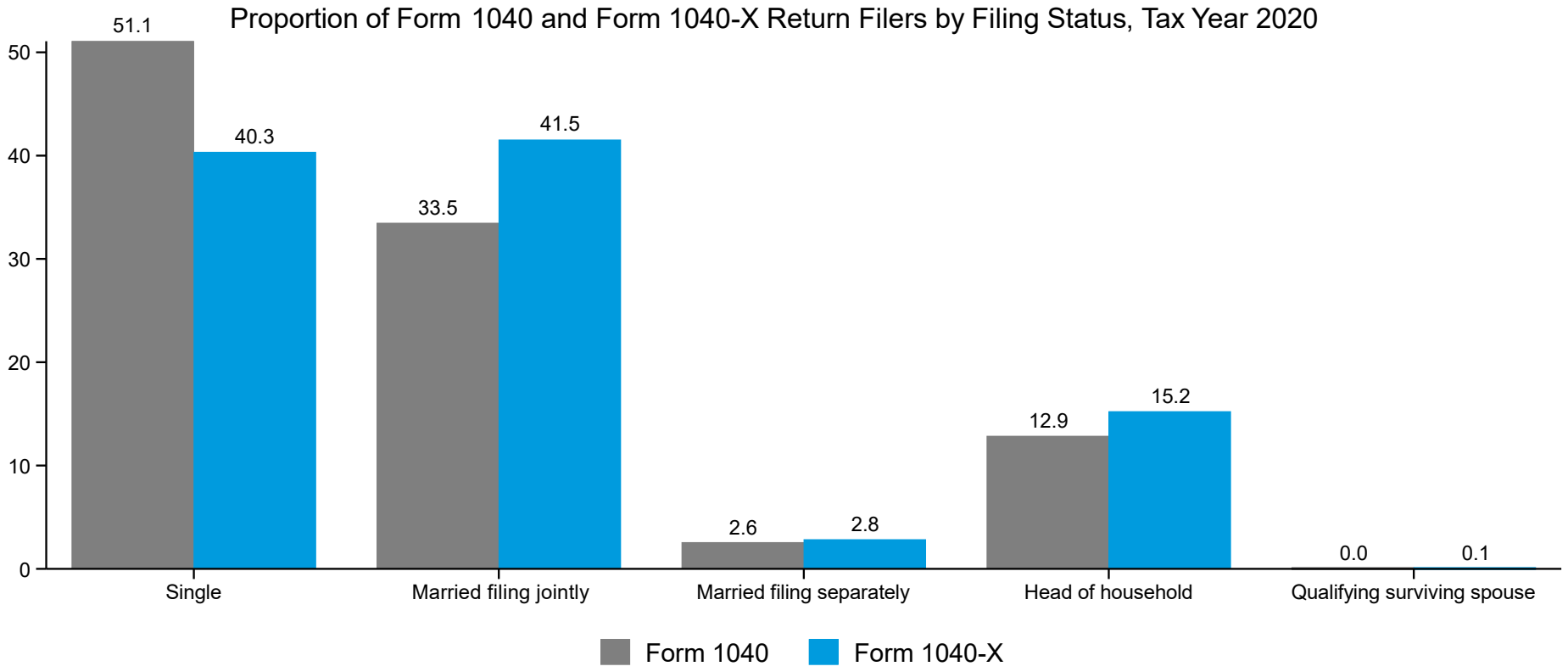
Patterns of Amended Return Filing

For TY 2013-TY 2020, an average of about 3 million tax units per year filed an amended return.

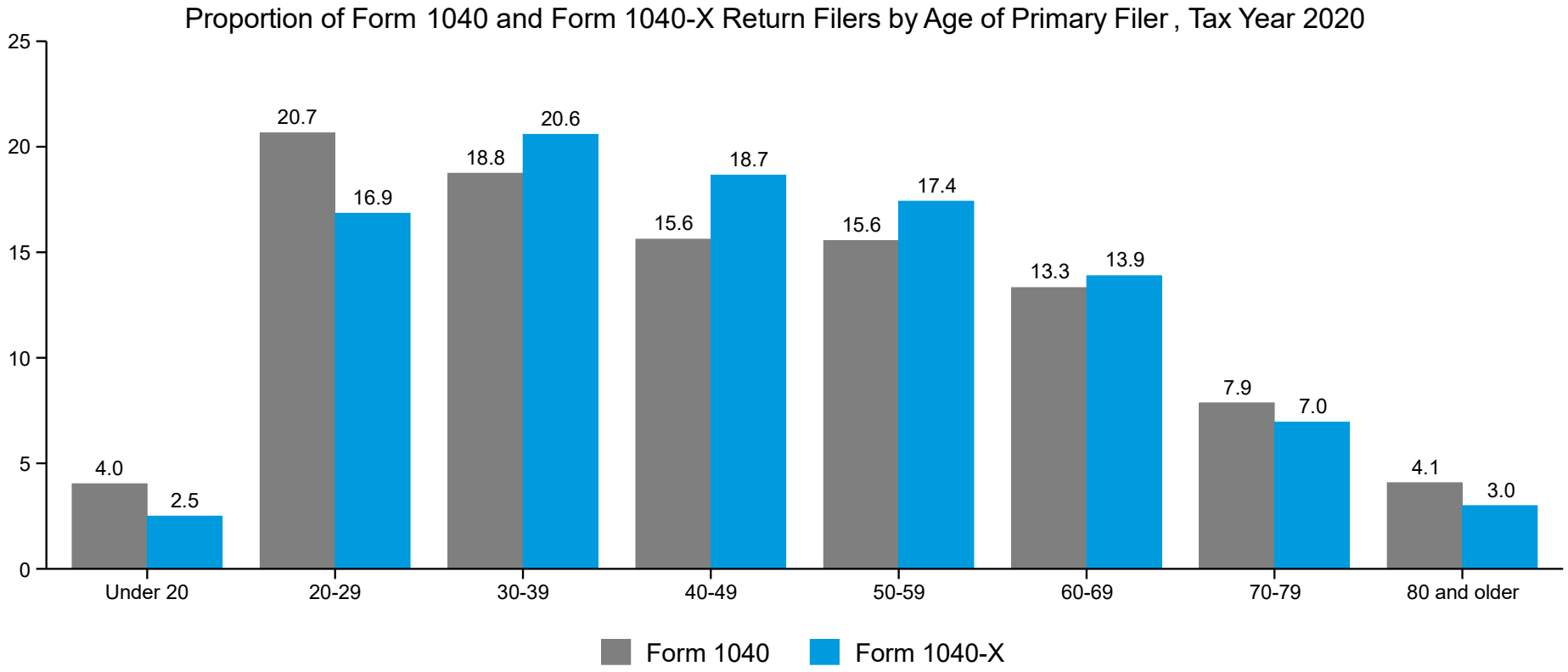


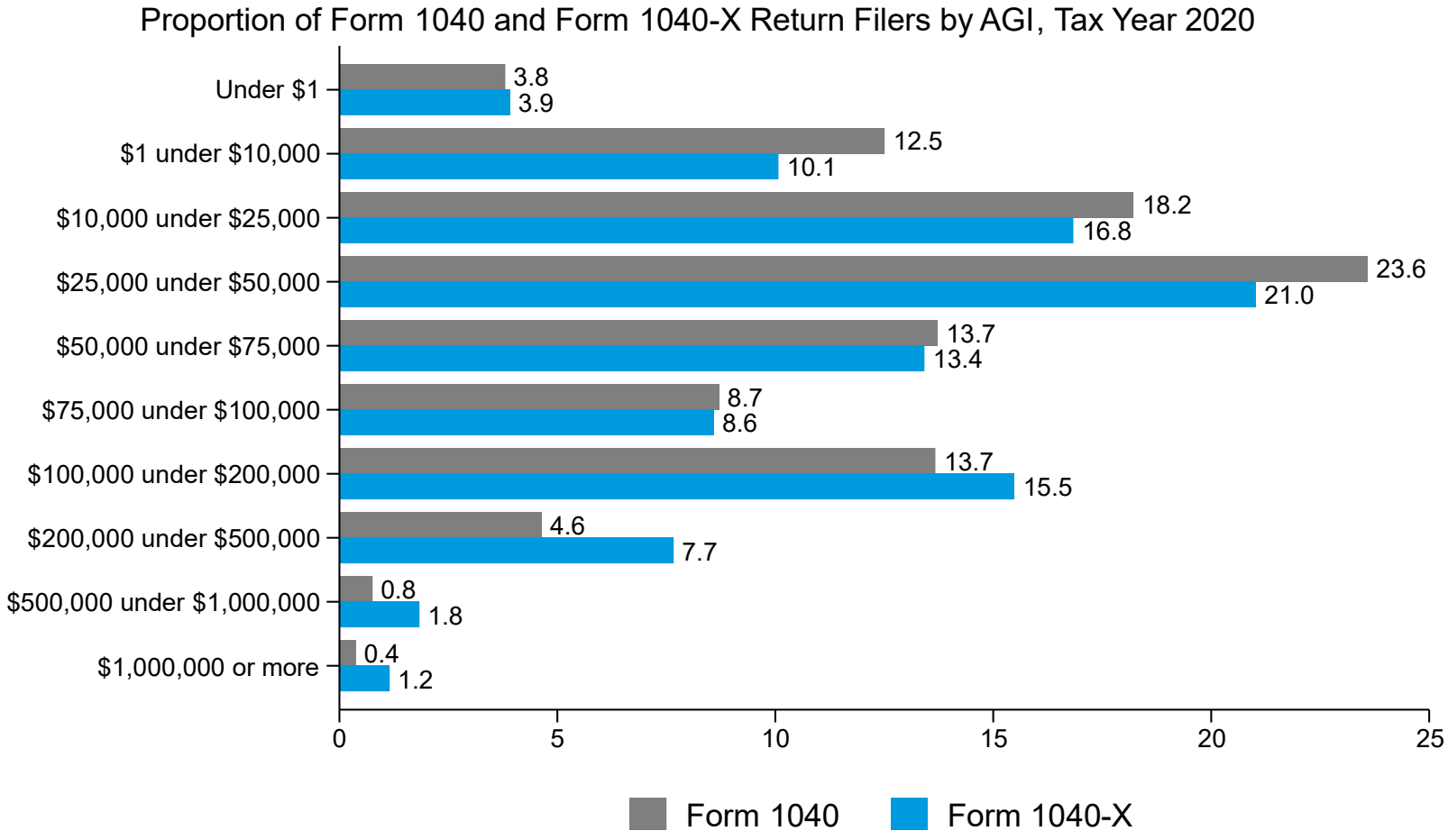


In TY 2020, MFJ tax units made up a larger proportion of amended return filers than Form 1040 filers; single tax units represented a smaller proportion of amended return filers.



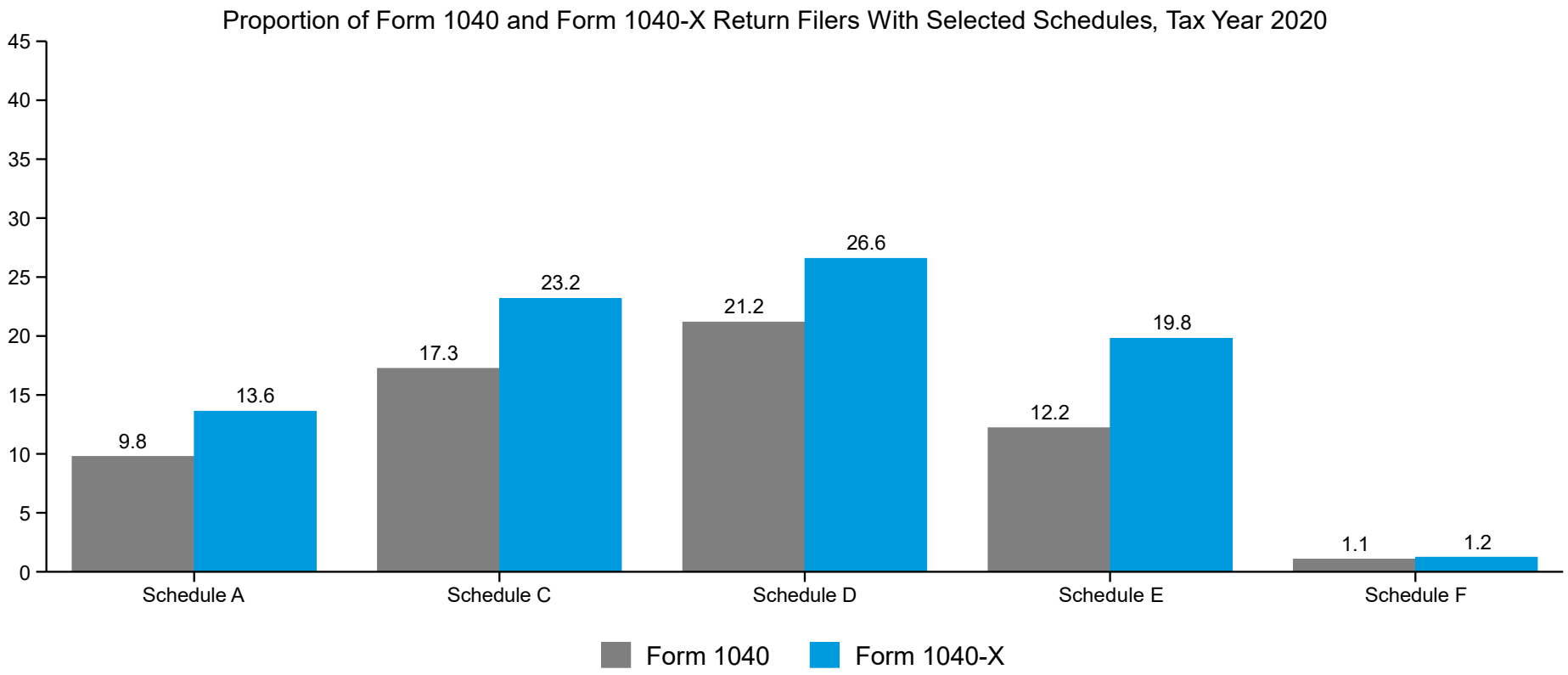
In TY 2020, tax units with a primary filer between the ages of 30 and 69 were somewhat more likely to file an amended return.





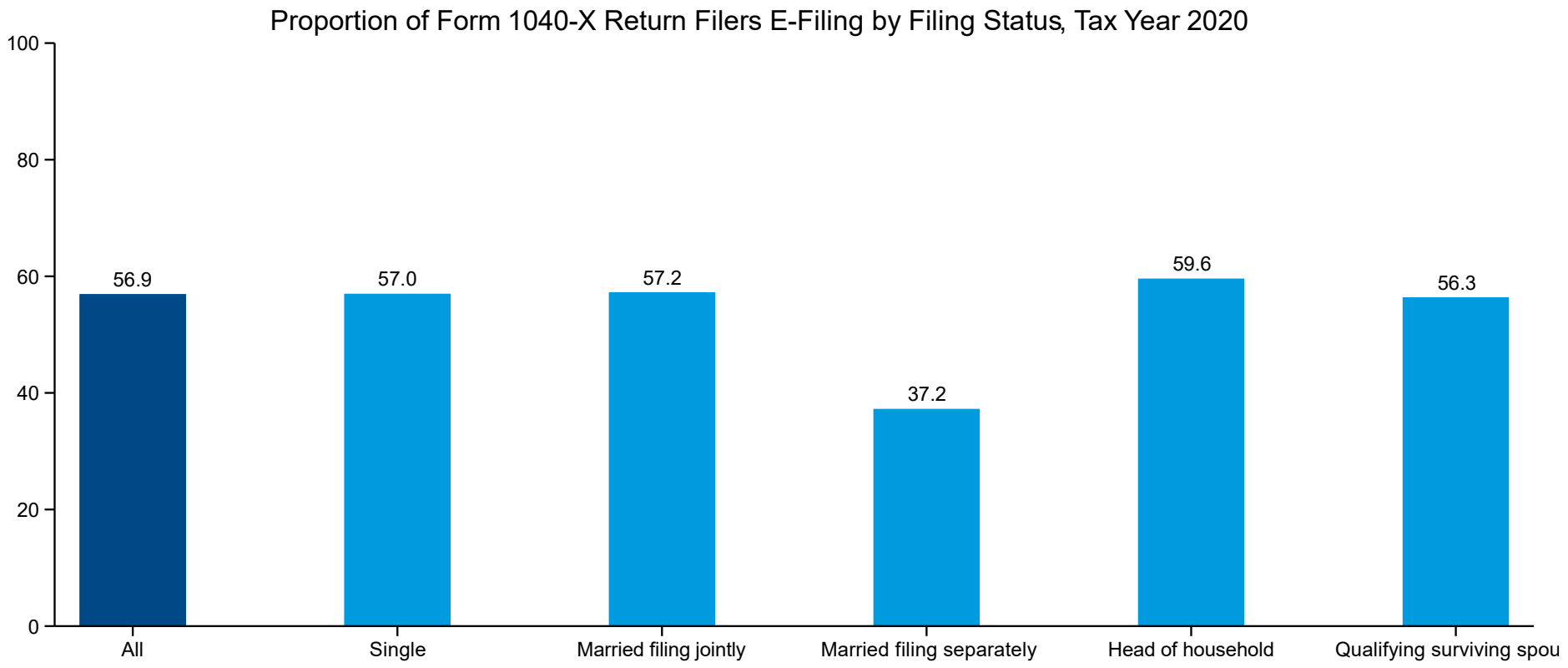
Tax units with AGI over $100,000 on their original return made up about 19% of Form 1040 filers in TY 2020, while they account for about 26% of amended return filers.

Tax units that used Schedules A, C, D, or E were more likely to file an amended return.

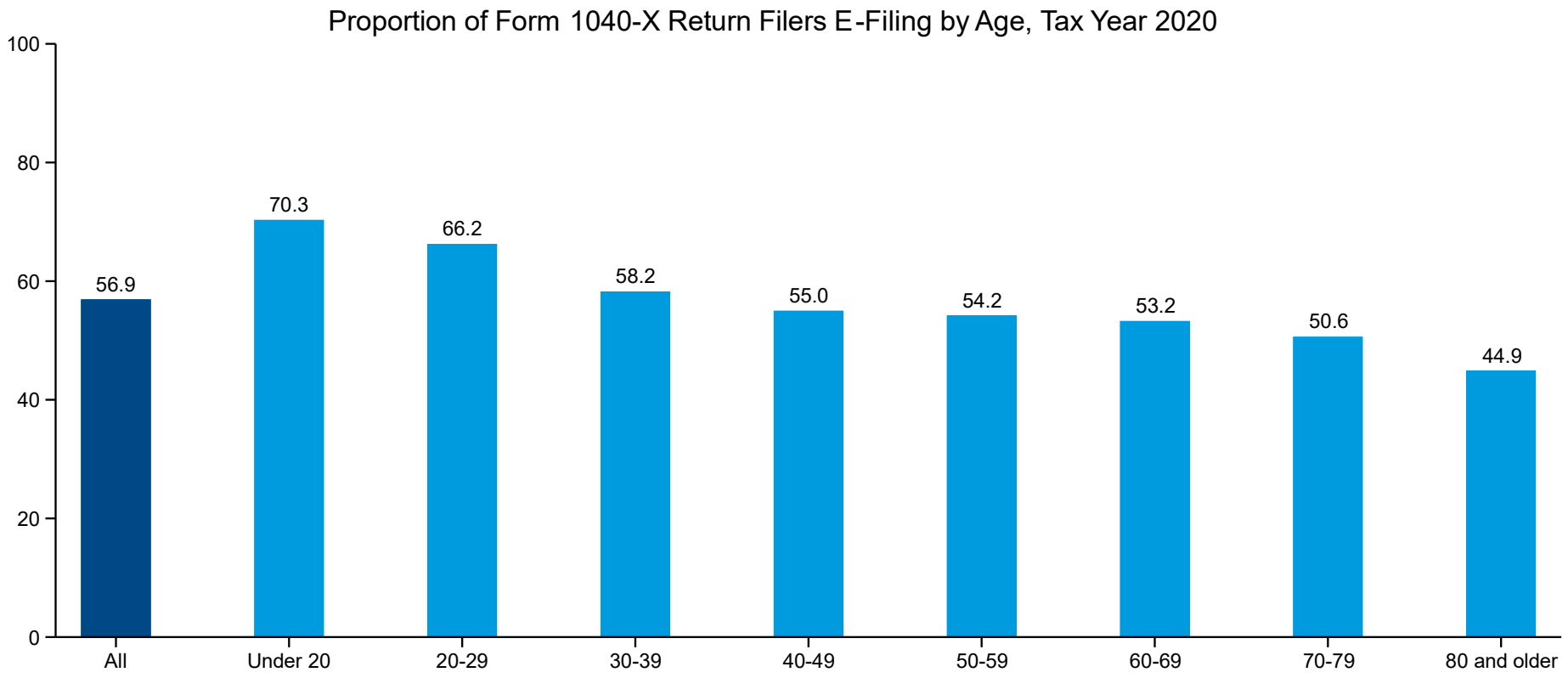


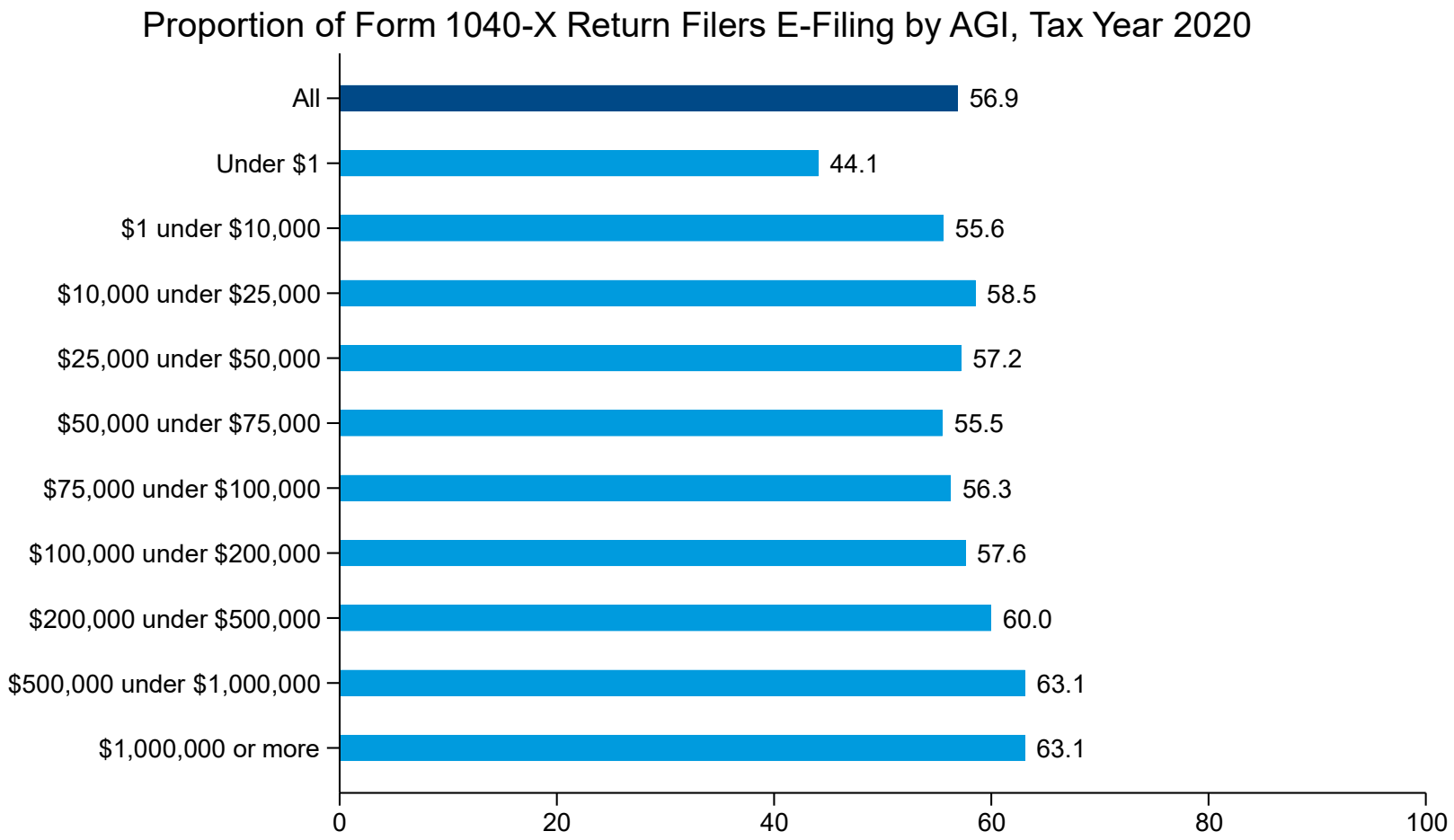
Patterns of Amended Return E-Filing

In TY 2020, 57% of amended returns were filed electronically. Patterns of e-filing were mostly constant across filing statuses.



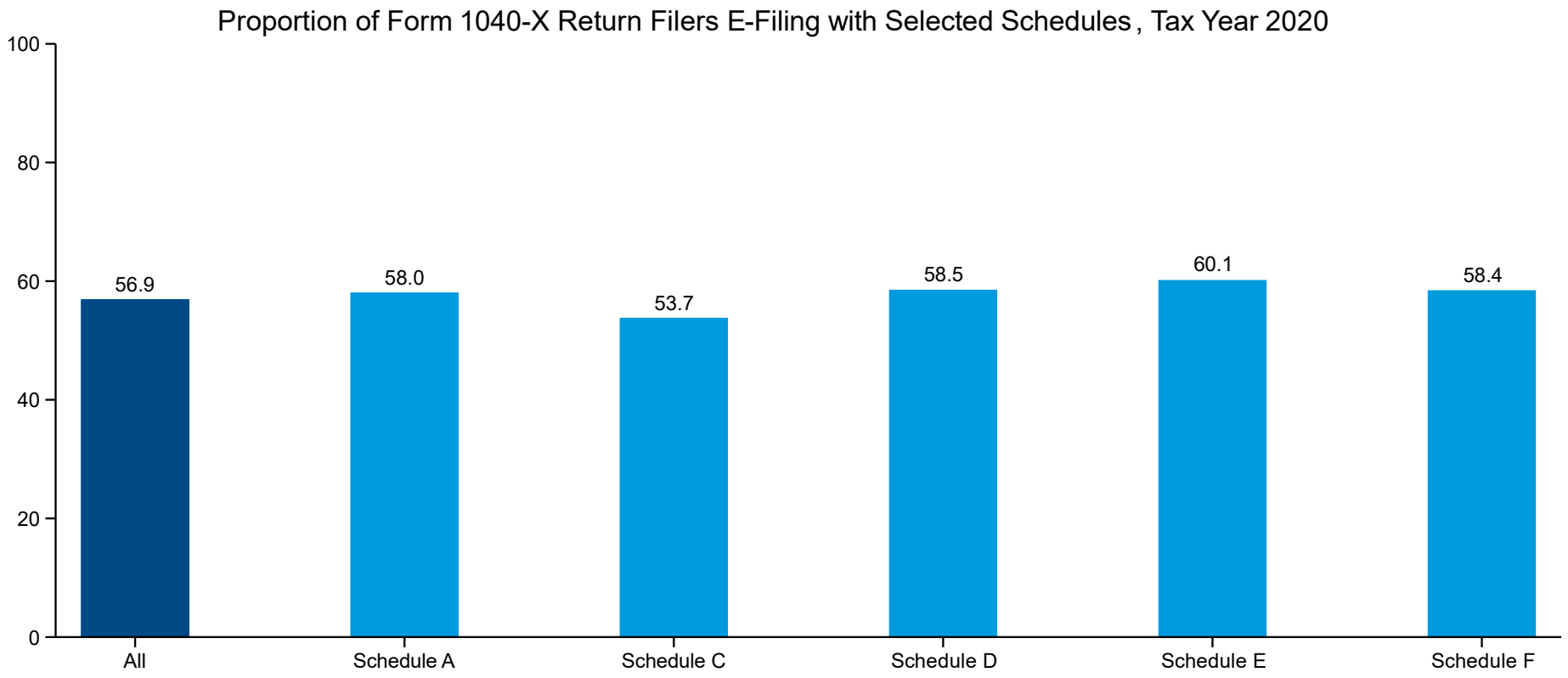
Amended return filers with a primary filer under age 40 were somewhat more likely to e-file.





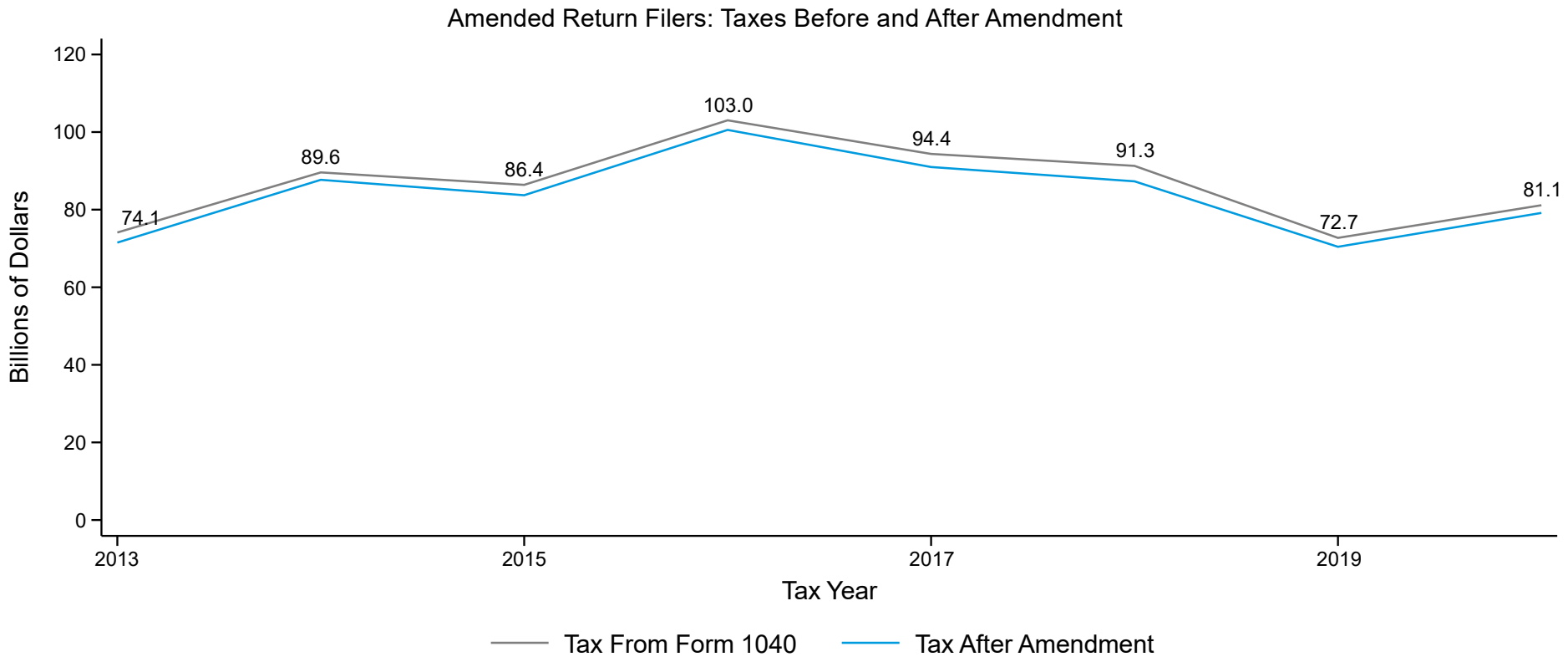
Amended return filers with higher income on their original return were slightly more likely to e-file their amended return.

Patterns of e-filing were mostly constant across types of schedules used on the original return.



Effects of Amended Returns on Tax Revenues

Overall, amended returns decreased tax liability among amended return filers.



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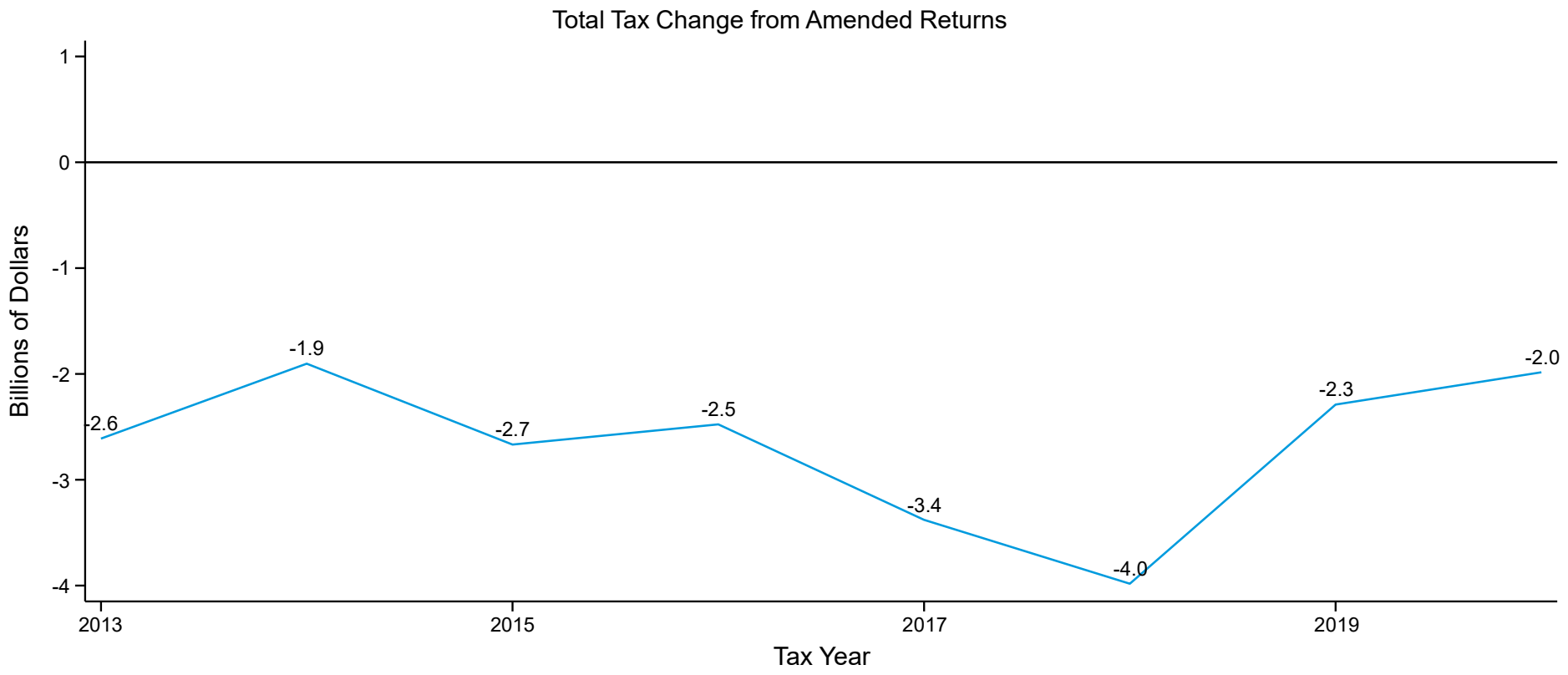
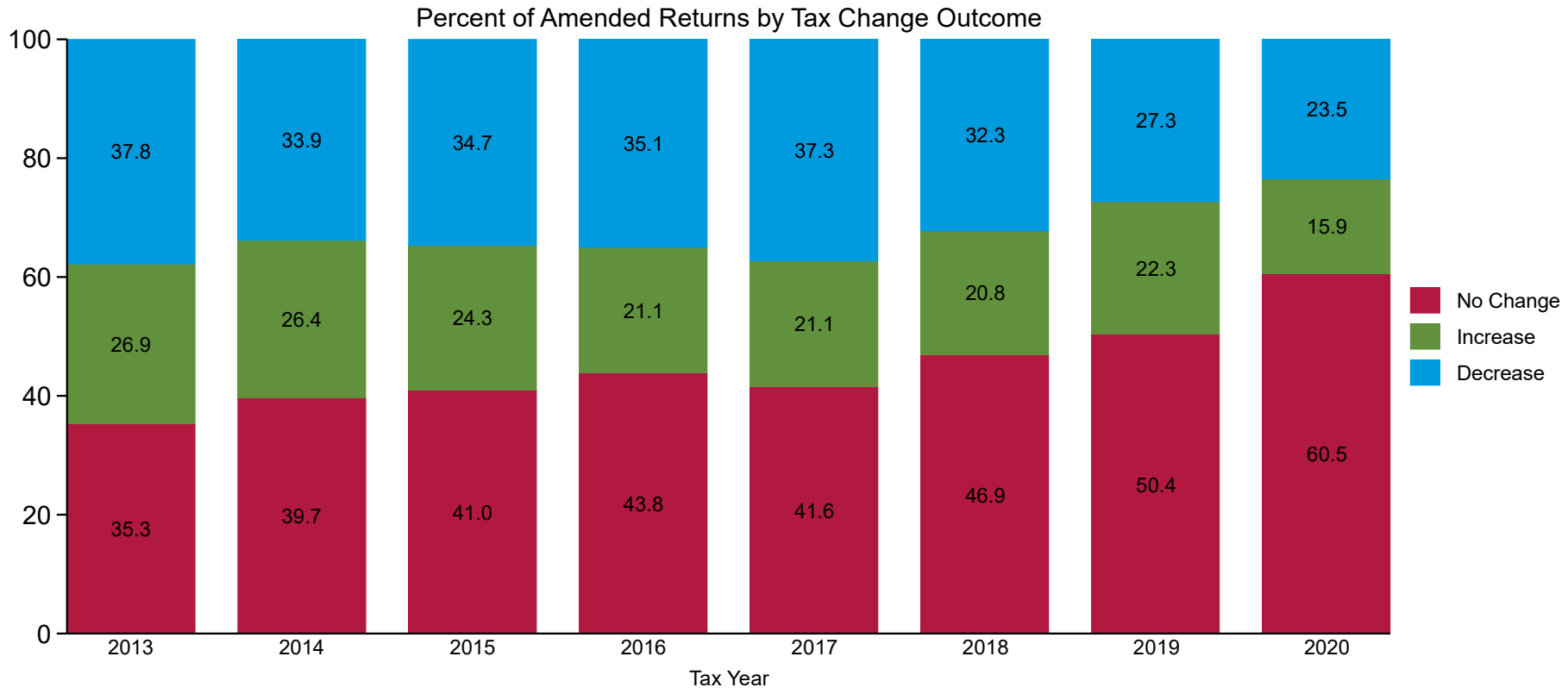
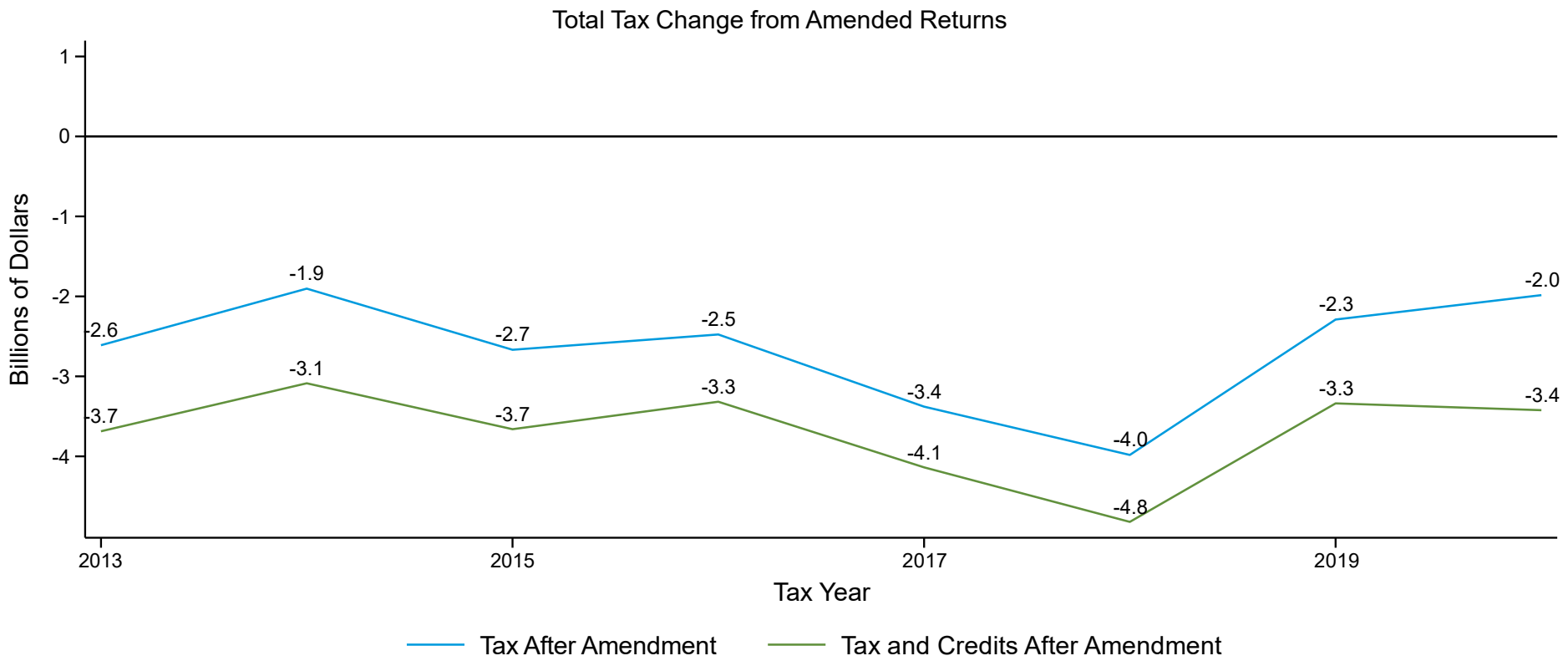


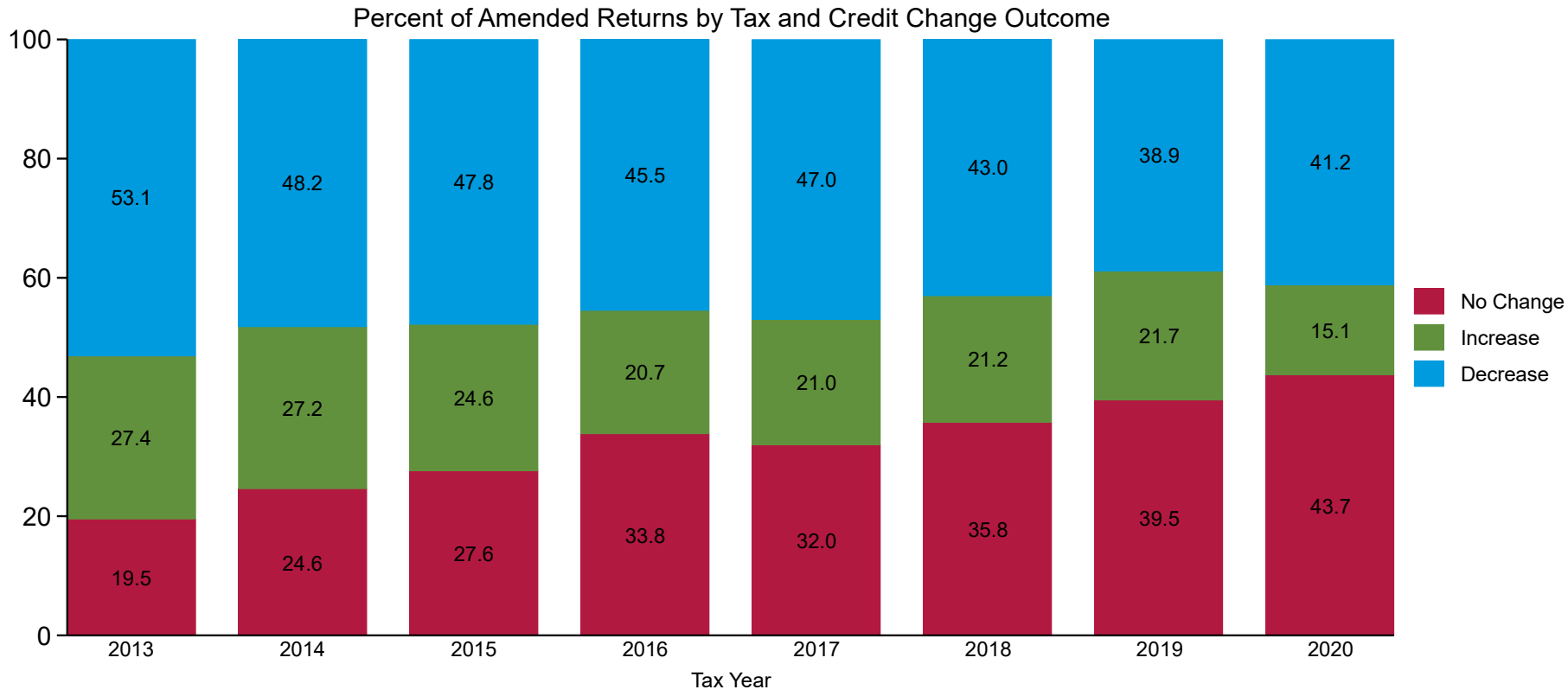
However, the totals hide significant heterogeneity in outcomes.



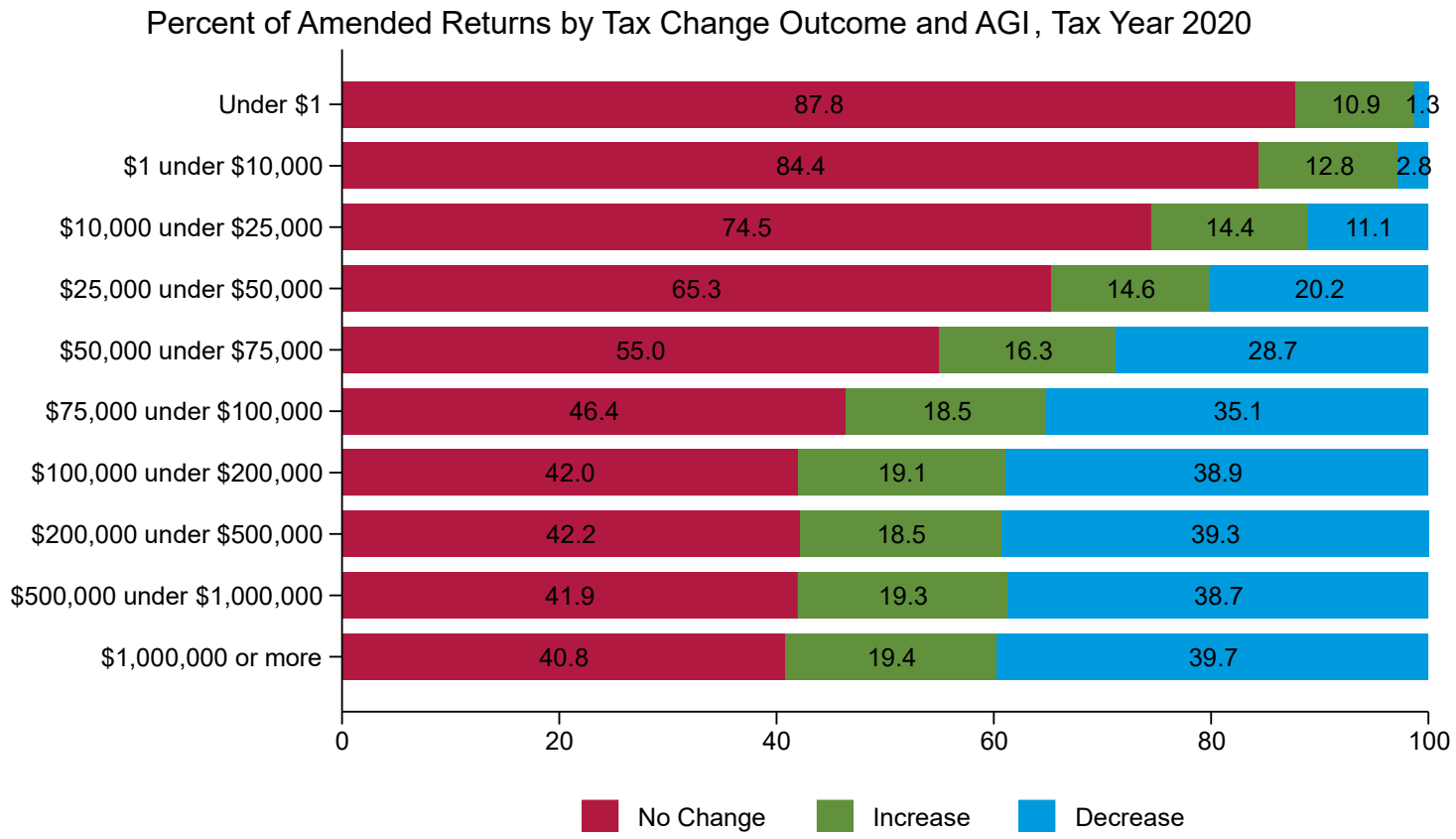
Amended returns also result in changes to refundable credits.



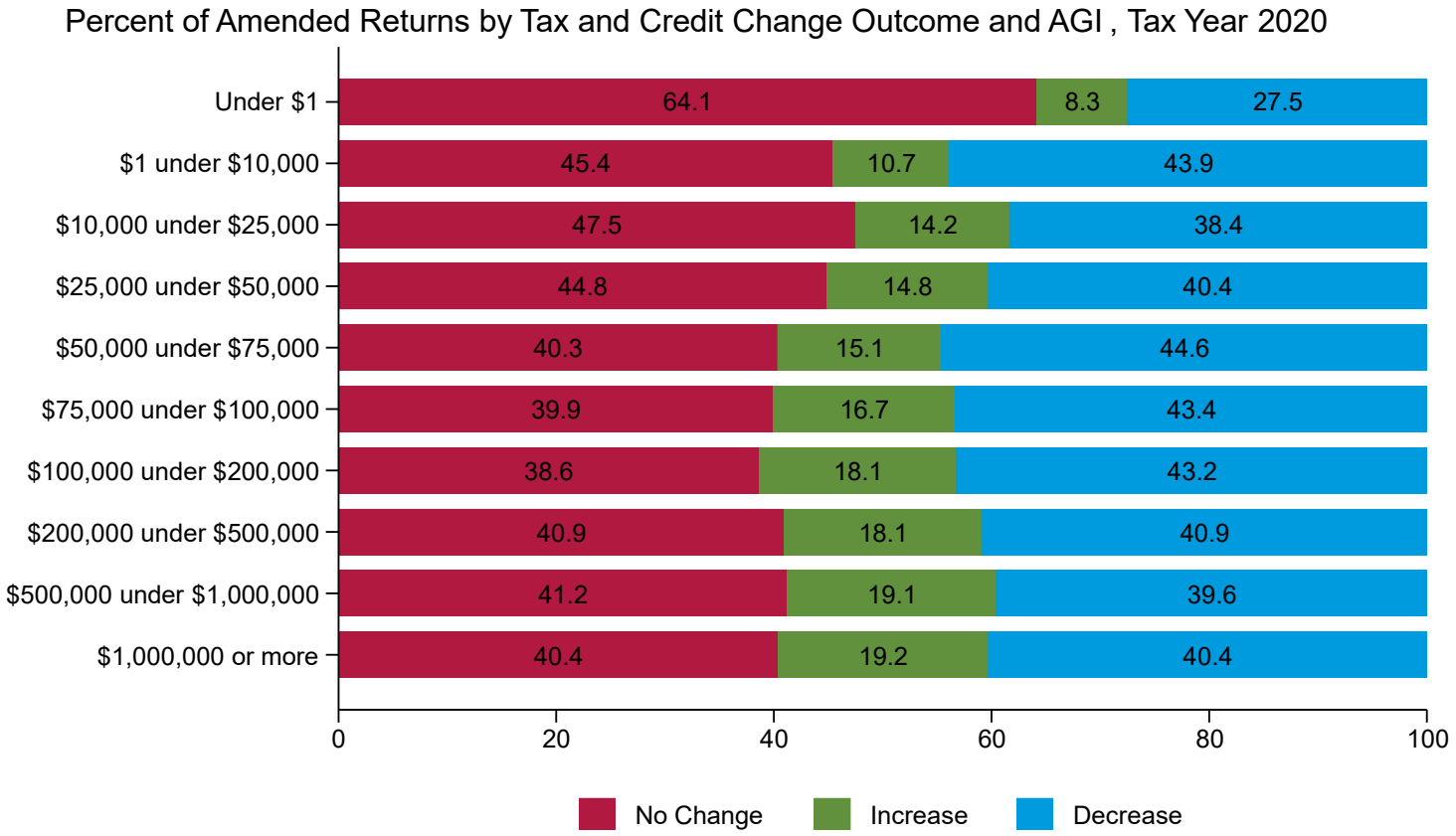
Adding in changes to refundable credits increases the percent of tax units with lower taxes and credits after amending their return.



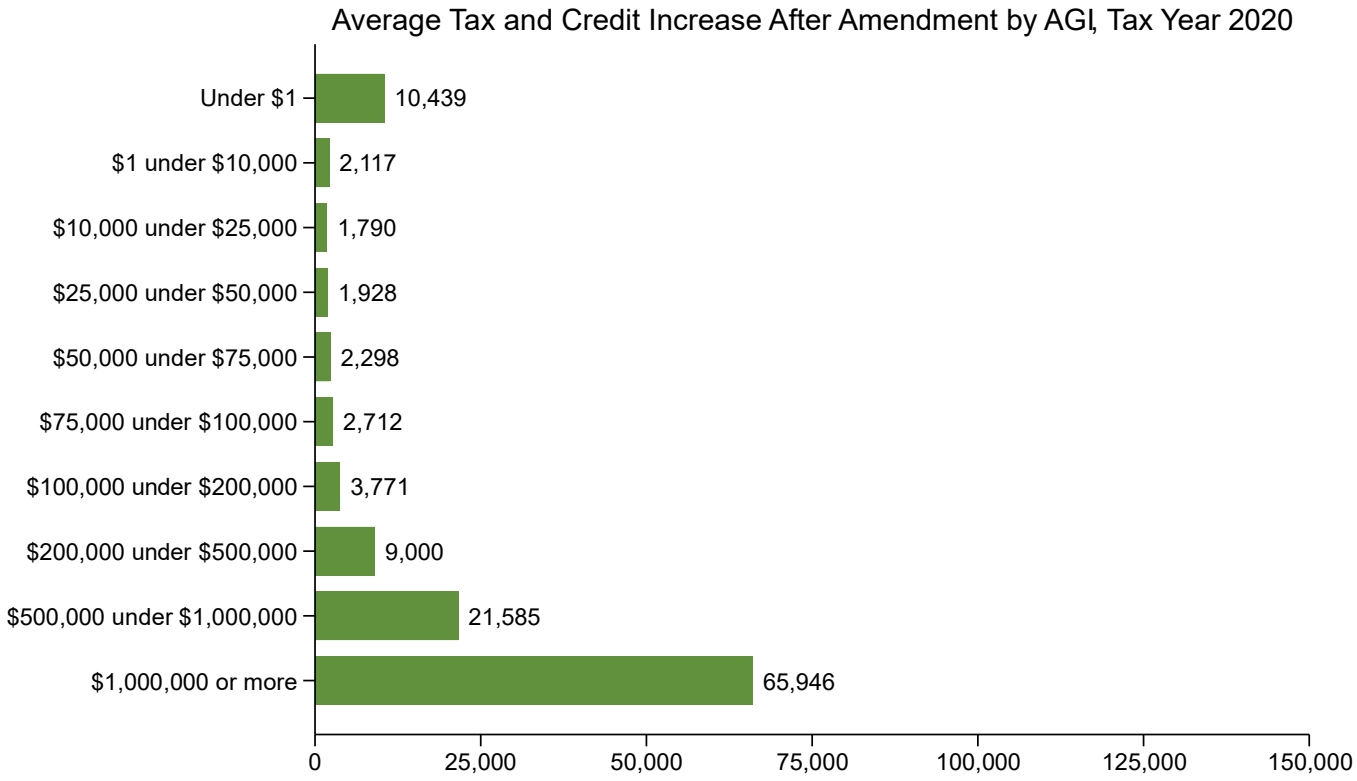
A larger percent of low income returns have no change in tax liability after an amendment.

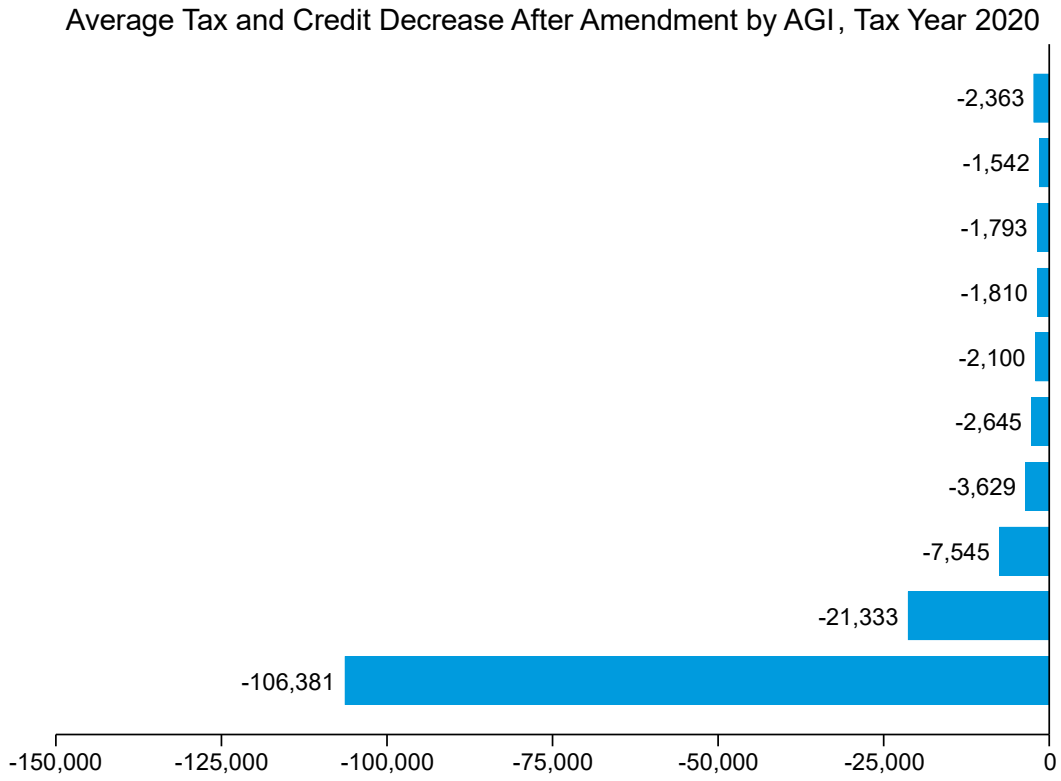


Adding in changes to refundable credits and payments, outcomes are more constant across the AGI distribution.



The highest income returns have the largest average changes in taxes and credits after amendment.





Next Steps

- Linking to the SOI sample
- Descriptive analysis of write-in reasons for filing amended returns

Thank you!

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The Distribution of Underreported Income: What We Can Learn from the NRP

Gerald Auten (Treasury-OTA) & Patrick Langetieg (IRS-RAAS)

Disclaimer. This research was conducted while the authors are, respectively, employees at the U.S. Department of the Treasury and the Internal Revenue Service. 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. Any taxpayer data used in this research was kept in a secured Treasury or IRS data repository, and all results have been reviewed to ensure no confidential information is disclosed.

Background & Research question

- How is non-compliance for individual net business income distributed?
- This paper provides insights from the National Research Program's compliance-adjusted data

Key findings

- Underreporting varies by type of income and degree of information reporting
  - The largest dollar amount of noncompliance is by sole proprietor income
  - Rental and passthrough income are also large contributors

- Individuals reporting negative net business income are responsible for 1/3 ($215B) of unreported business income
  - After adjusting for exam and detection-controlled estimates (DCE):
    2/3 have positive net business income
    2.4% are shifted into the top 10% of the "true" net business income distribution and responsible for $54B of unreported net business income

- The goal of this effort is to enhance our understanding of the drivers of business noncompliance, especially among filers reporting significant business losses.

IRS National Research Program (NRP)

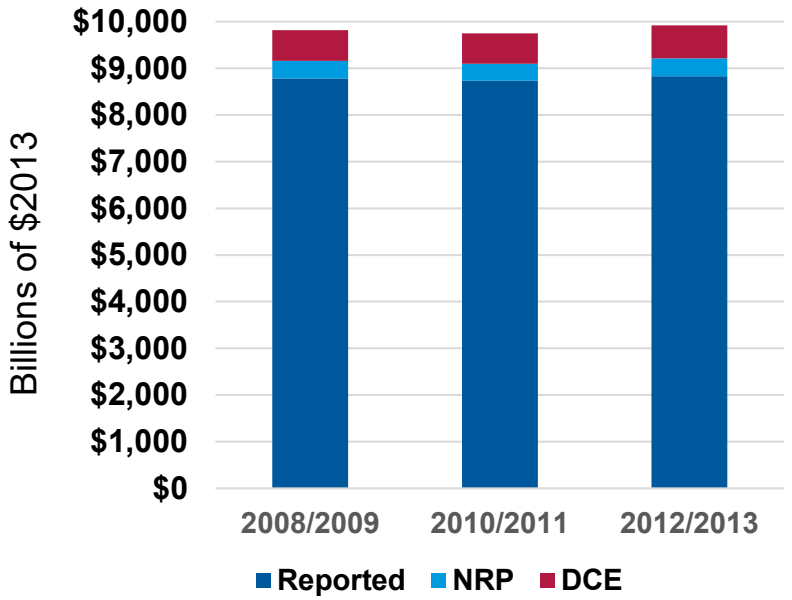
NRP: 2001 & 2006 Forward

Replaced Taxpayer Compliance Measurement Program (TCMP)

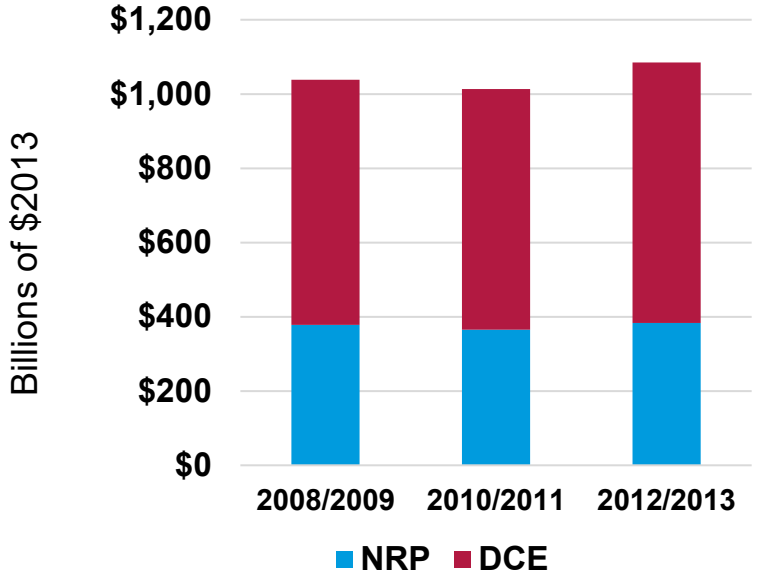
- **Stratified random samples based on exam classes**
- **More comprehensive than regular audits**
  - **Operational audits typically on a few issues**
  - **Theoretically examines everything**
- **Limitations:**
  - **Not all audits comprehensive due to resource limits**
  - **Individual audits can miss entity-level and offshore underreporting**
- **Important benefits for IRS:**
  - **Improve audit selection and procedures**
  - **Identify new compliance issues**
  - **Estimate the Tax Gap**

Total Income: Reported + NRP discovered + DCE added

Reported + NRP + DCE



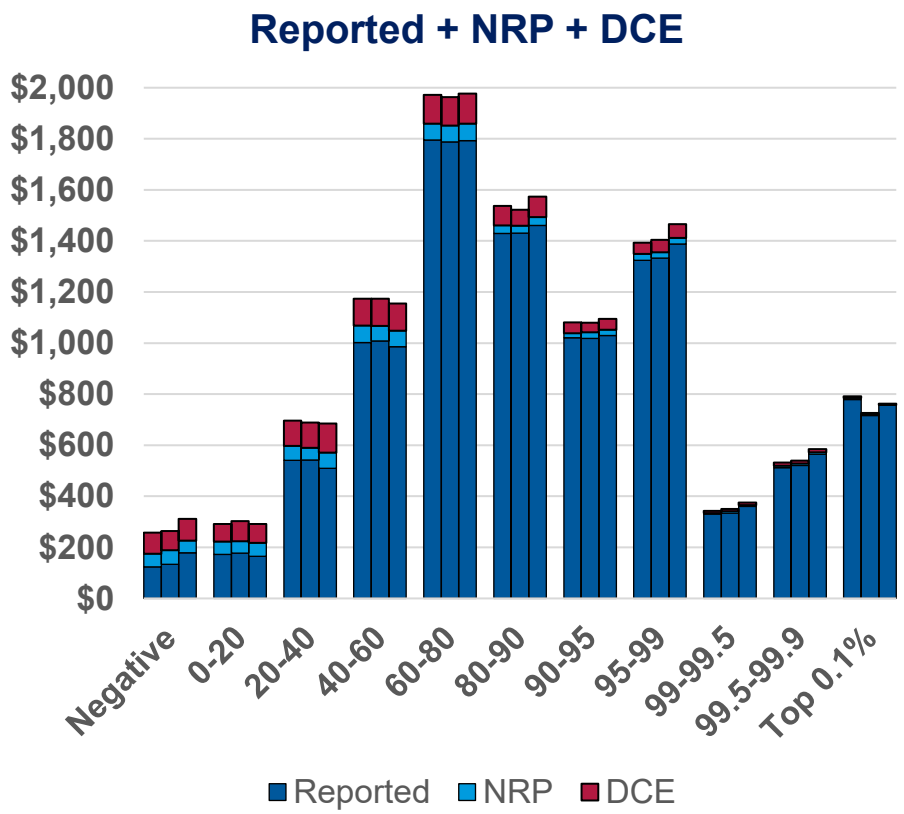
NRP + DCE

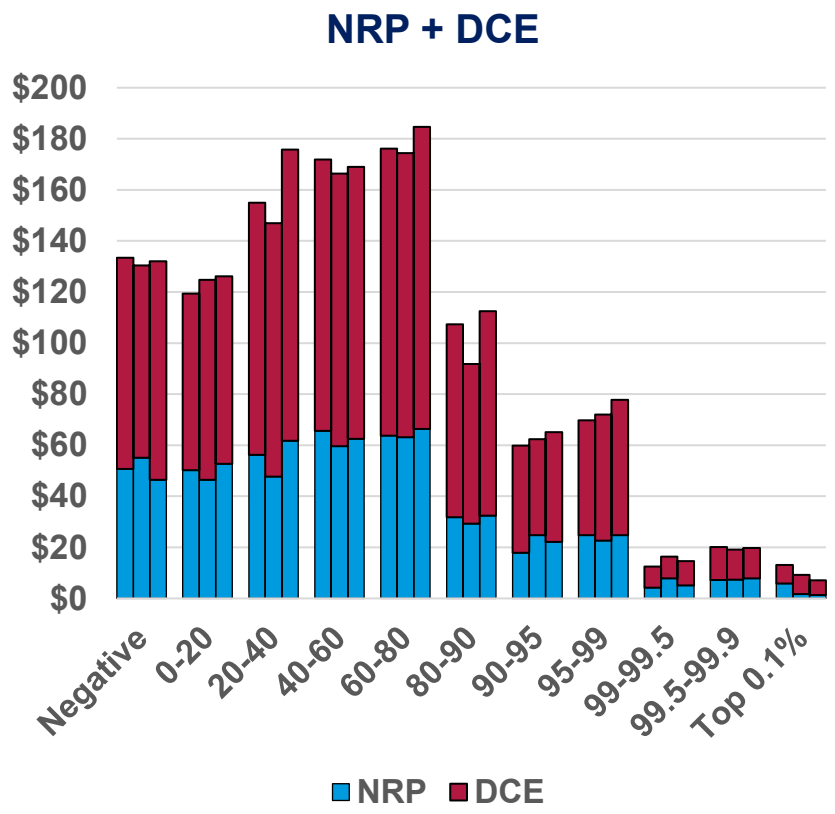


These show the relative magnitude of total misreporting compared to what is reported (left) and the relative size of detected misreporting (NRP) and estimated undetected misreporting (DCE) (Right)

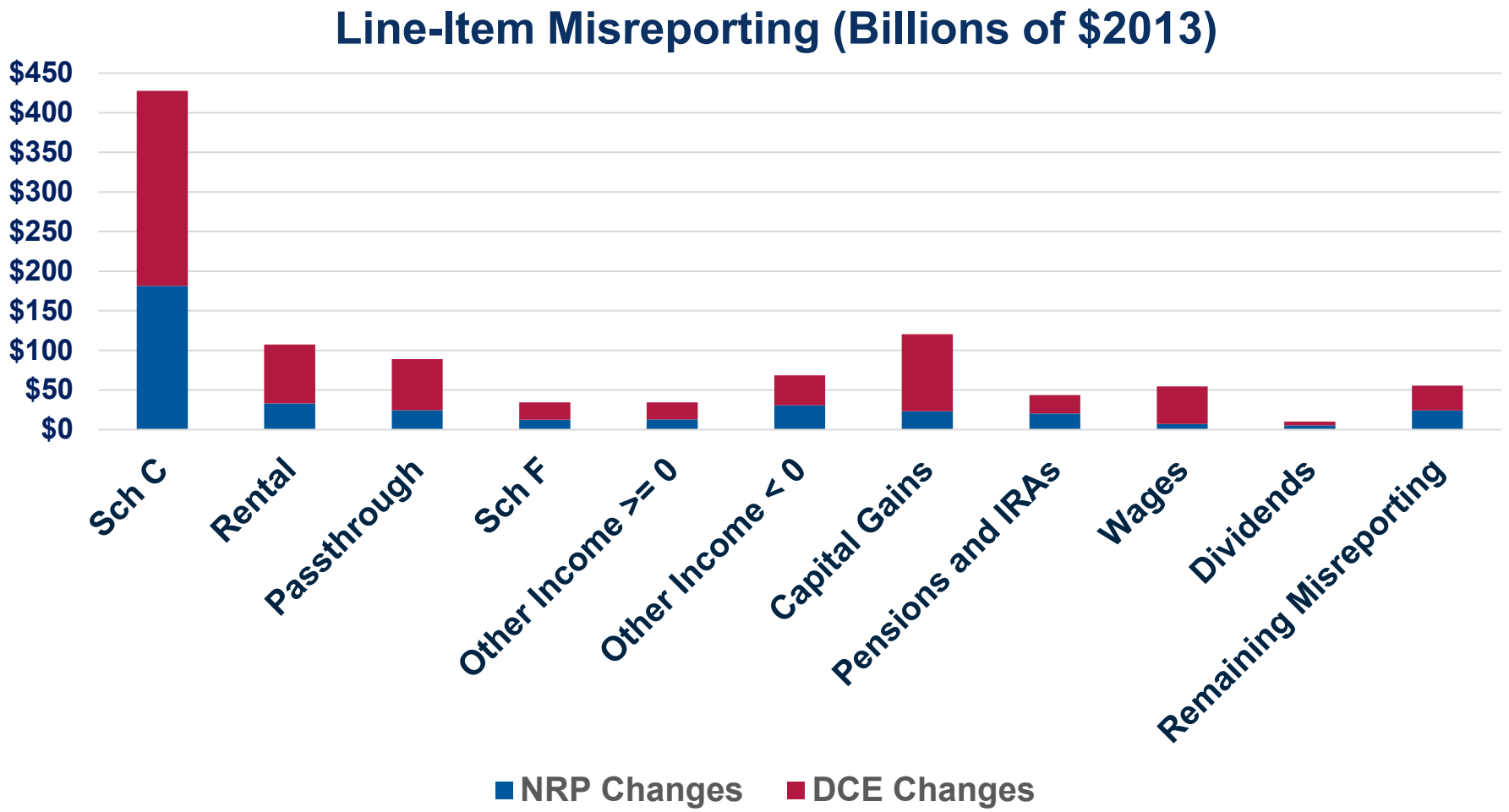
Notes: Results in billions of $2013; DCE = detection-controlled estimation, that accounts for variation in revenue agent skill, essentially "what the best revenue agents did each exam."

Total Income by Year (Ranked by Reported Total Income)
Reported + NRP discovered + DCE added



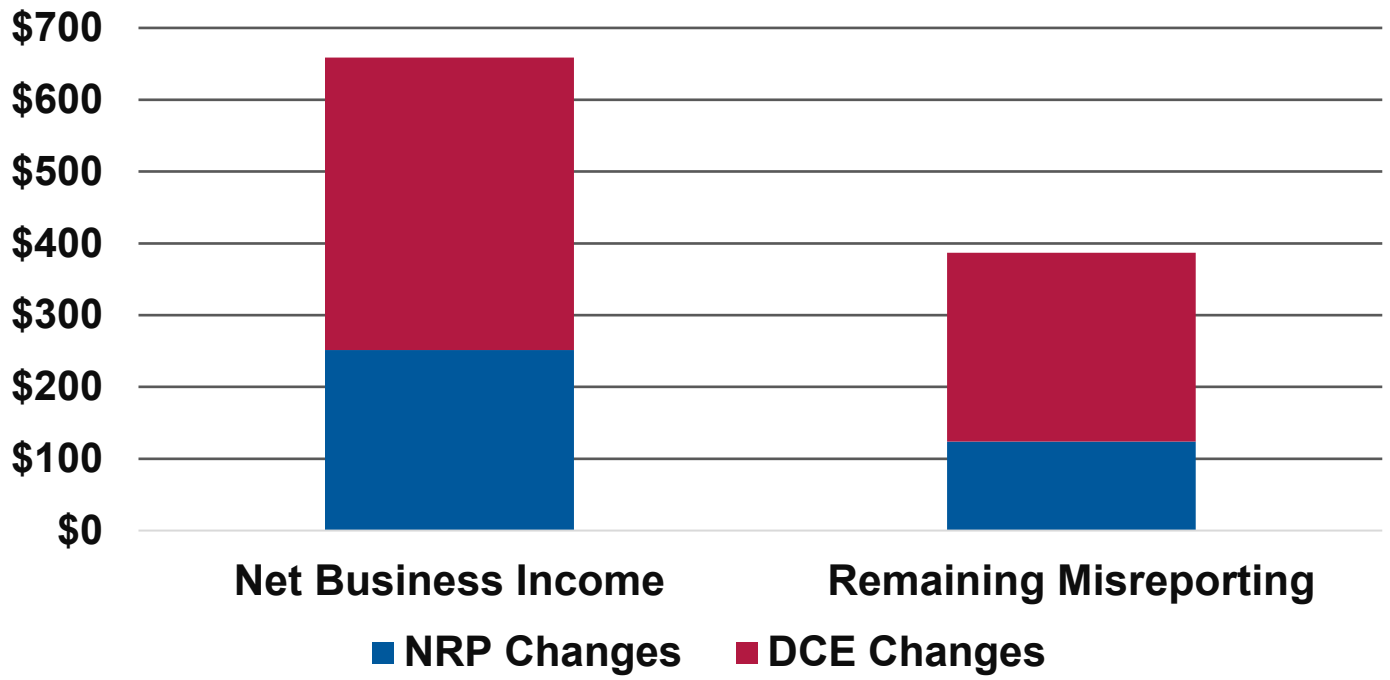


Years: 2008-2009; 2010-2011; 2012-2013 In Billions of $2013



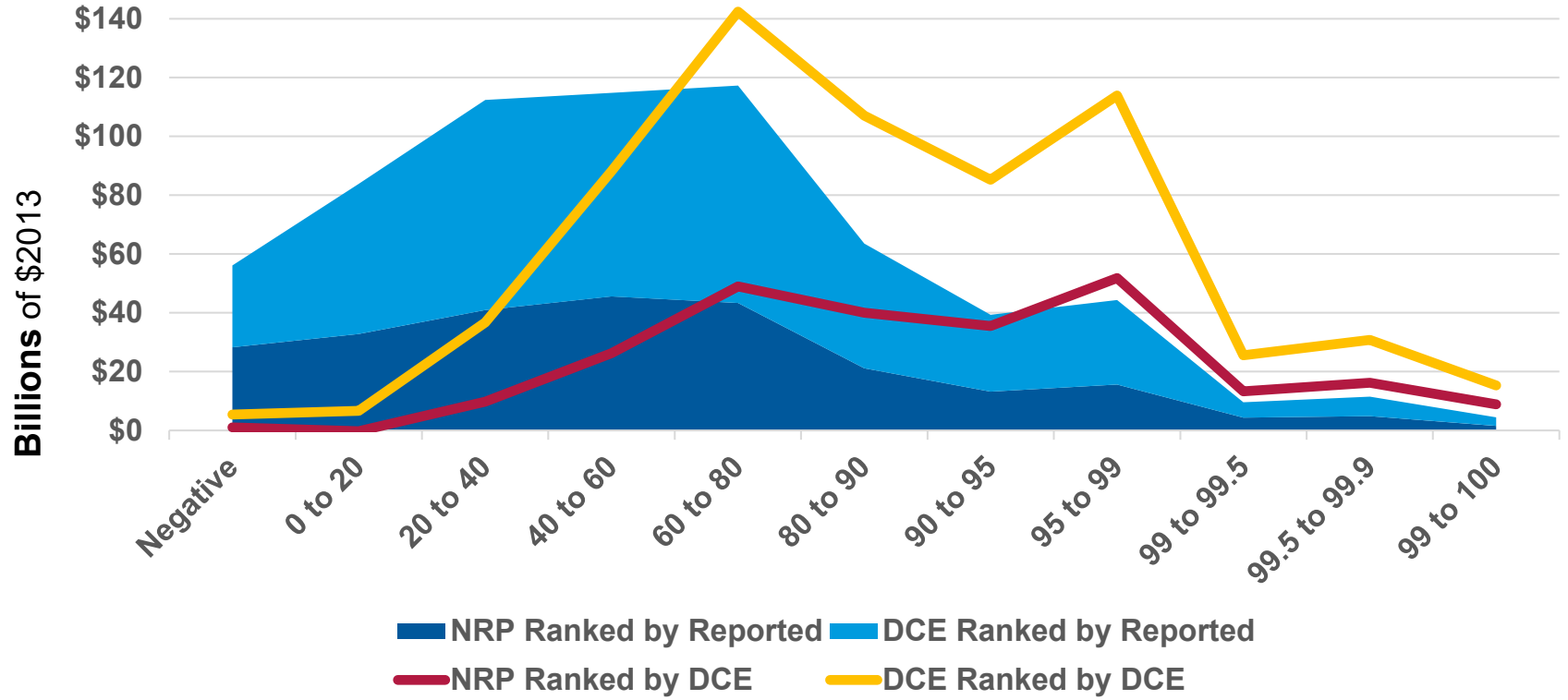
Detected amounts (blue) & estimated undetected (DCE; red) misreporting.

Line-Item Misreporting (Billions of $2013)



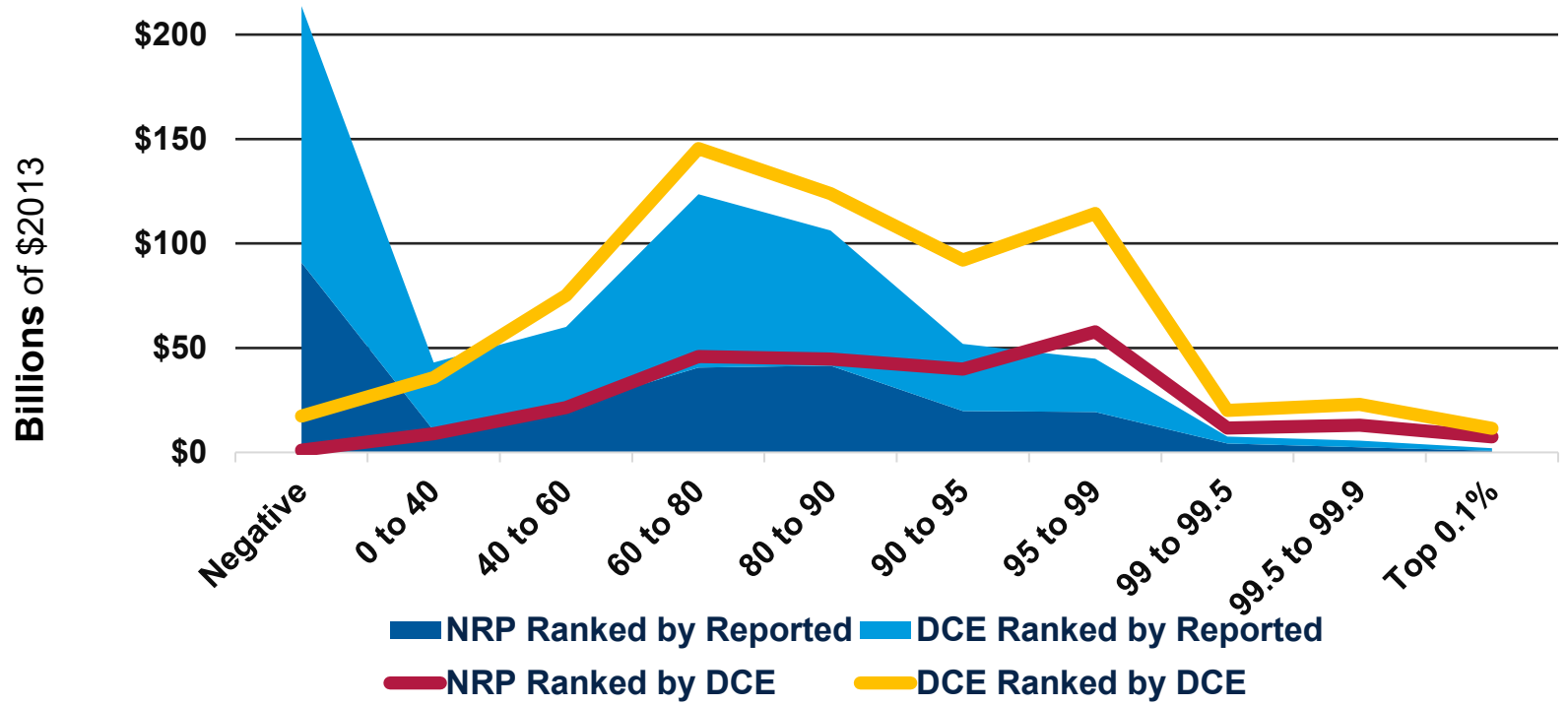
Overall detected (blue) misreporting and estimated undetected (DCE; red) misreporting

Net Business Income (Ranked by Total Income) Misreporting Amounts



Net business income (NBI; includes Sch C, Sch E, Sch F net income). Most misreporting (when ordered by reported Total Income) is located in the middle of the distribution (the light and dark blue portions). When ordering by audit and DCE adjusted NBI (the red & yellow lines), almost all misreporting at the bottom shifts up in the distribution.

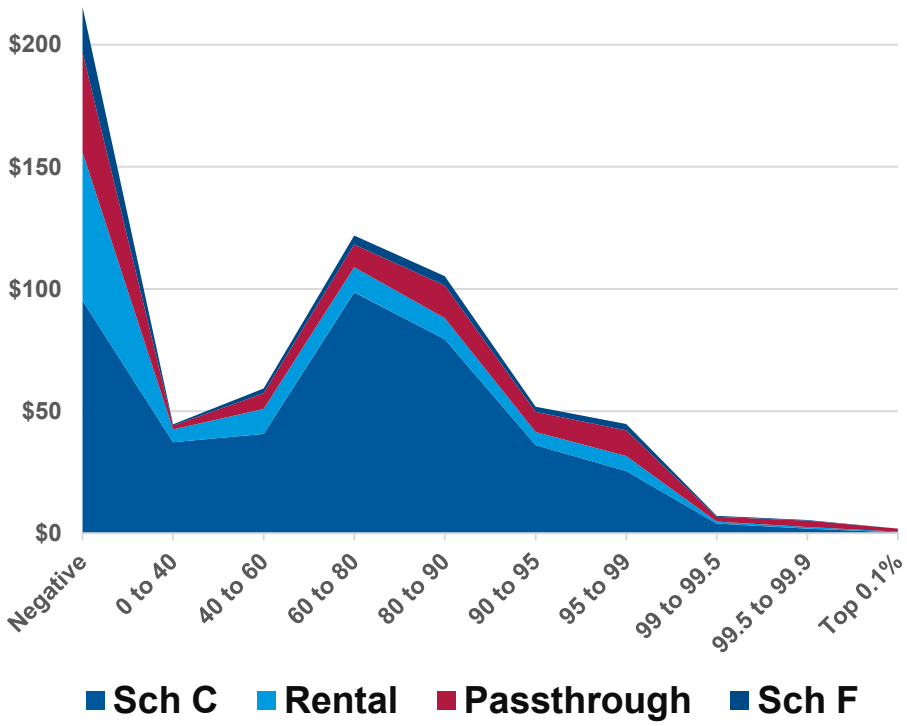
Net Business Income (Ranked by Net Business Income) Misreported Amounts



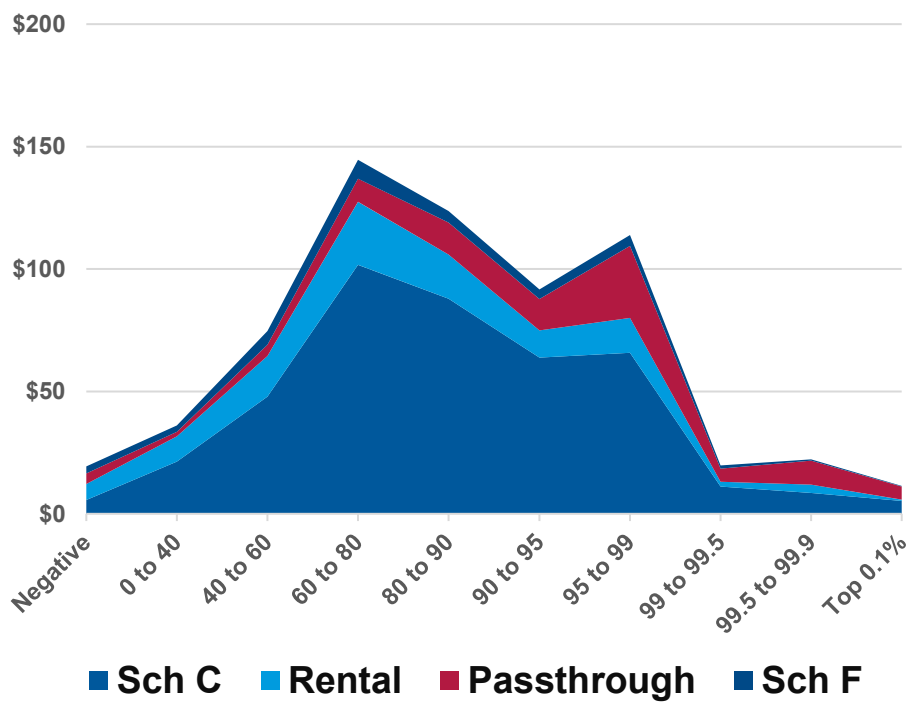
Net business income (NBI; includes Sch C, Sch E, Sch F net income). Most misreporting (when ordered by reported NBI) is located below the 90th percentile of the distribution. Large amounts of misreporting are from overstated business losses (the light and dark blue portions).
When ordering by audit and DCE adjusted NBI (the red & yellow lines), almost all misreporting at the bottom shifts up in the distribution.

Net Business Income Misreporting Amounts – Line-Item Breakdown

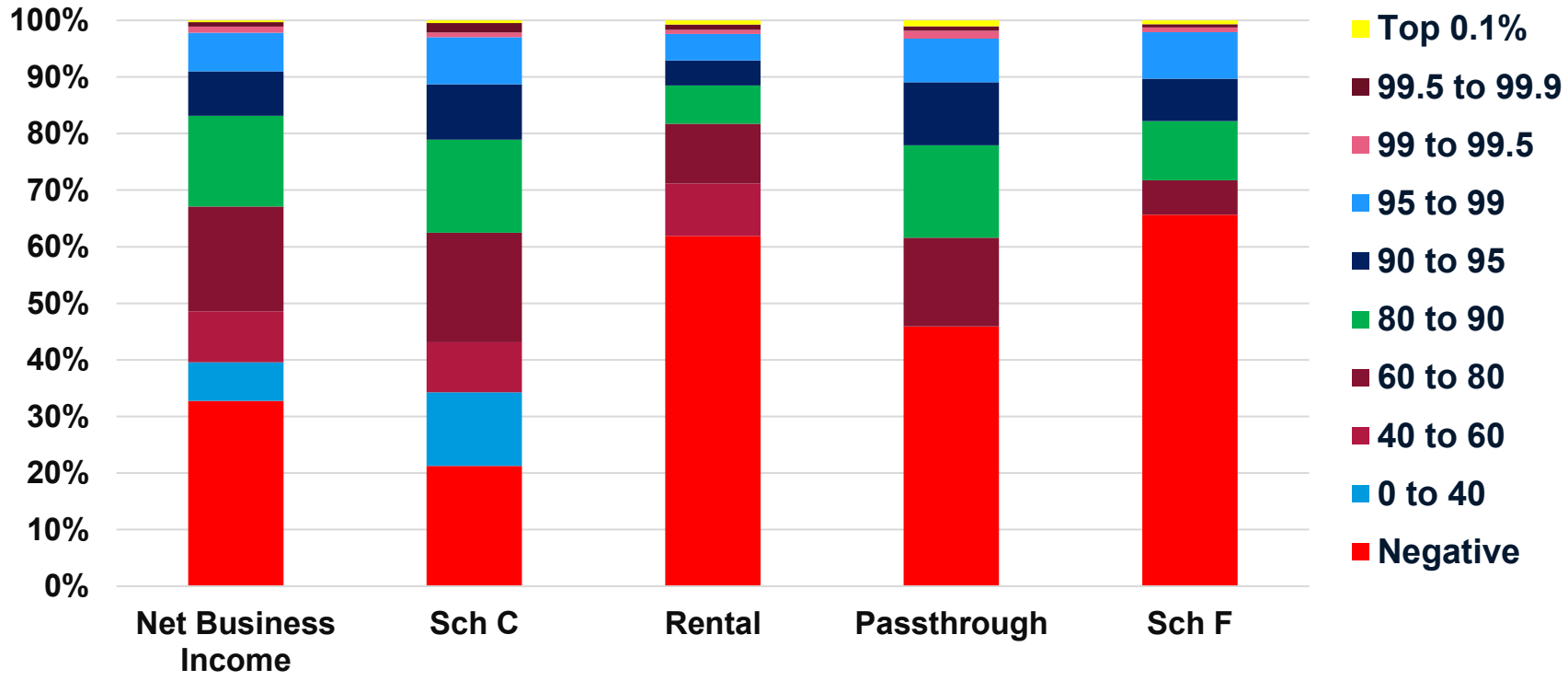
Ranked by Reported NBI



Ranked by DCE NBI

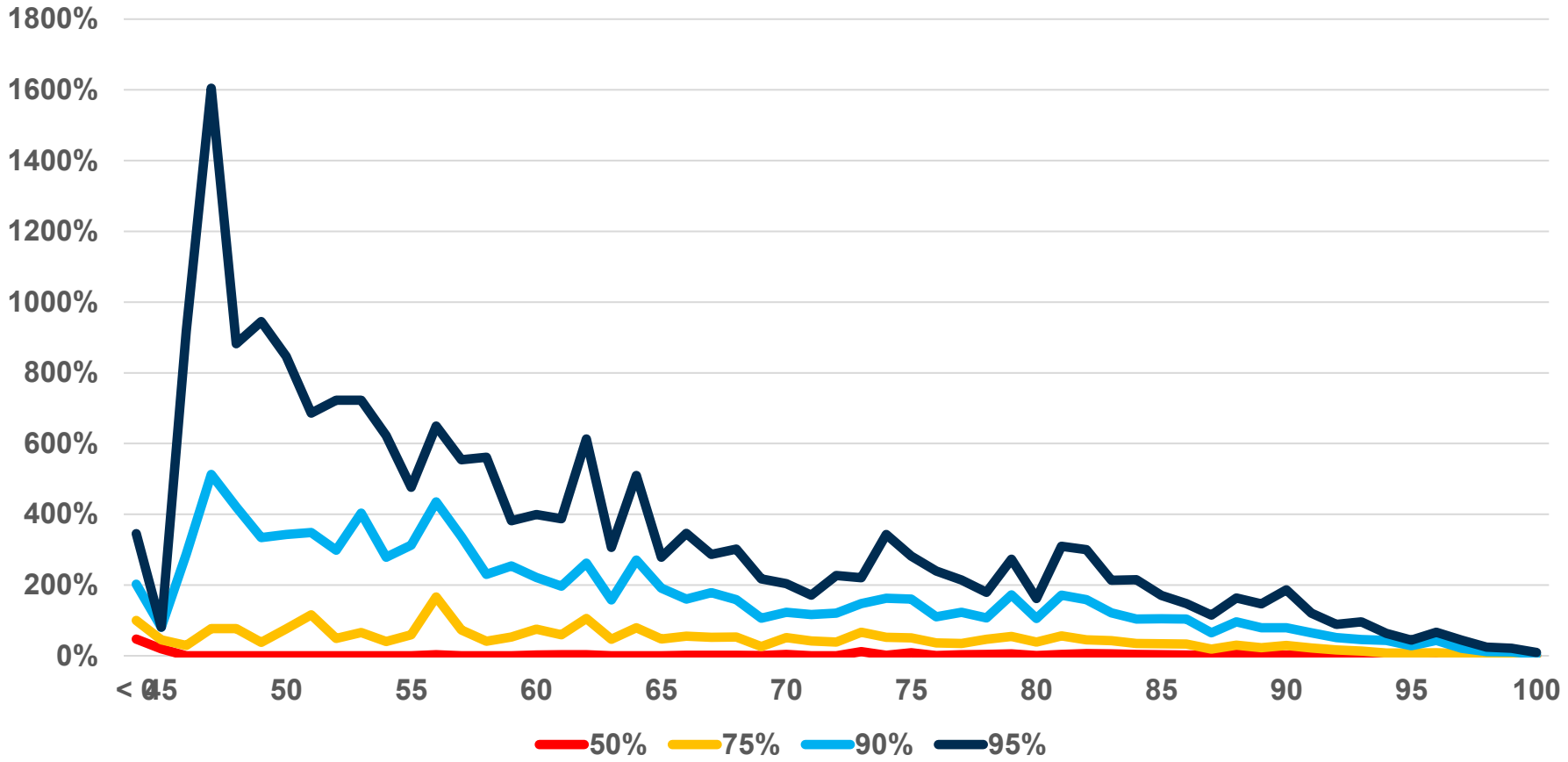


Shares of Misreported Net Business Income by Quantiles of Reported Business Income

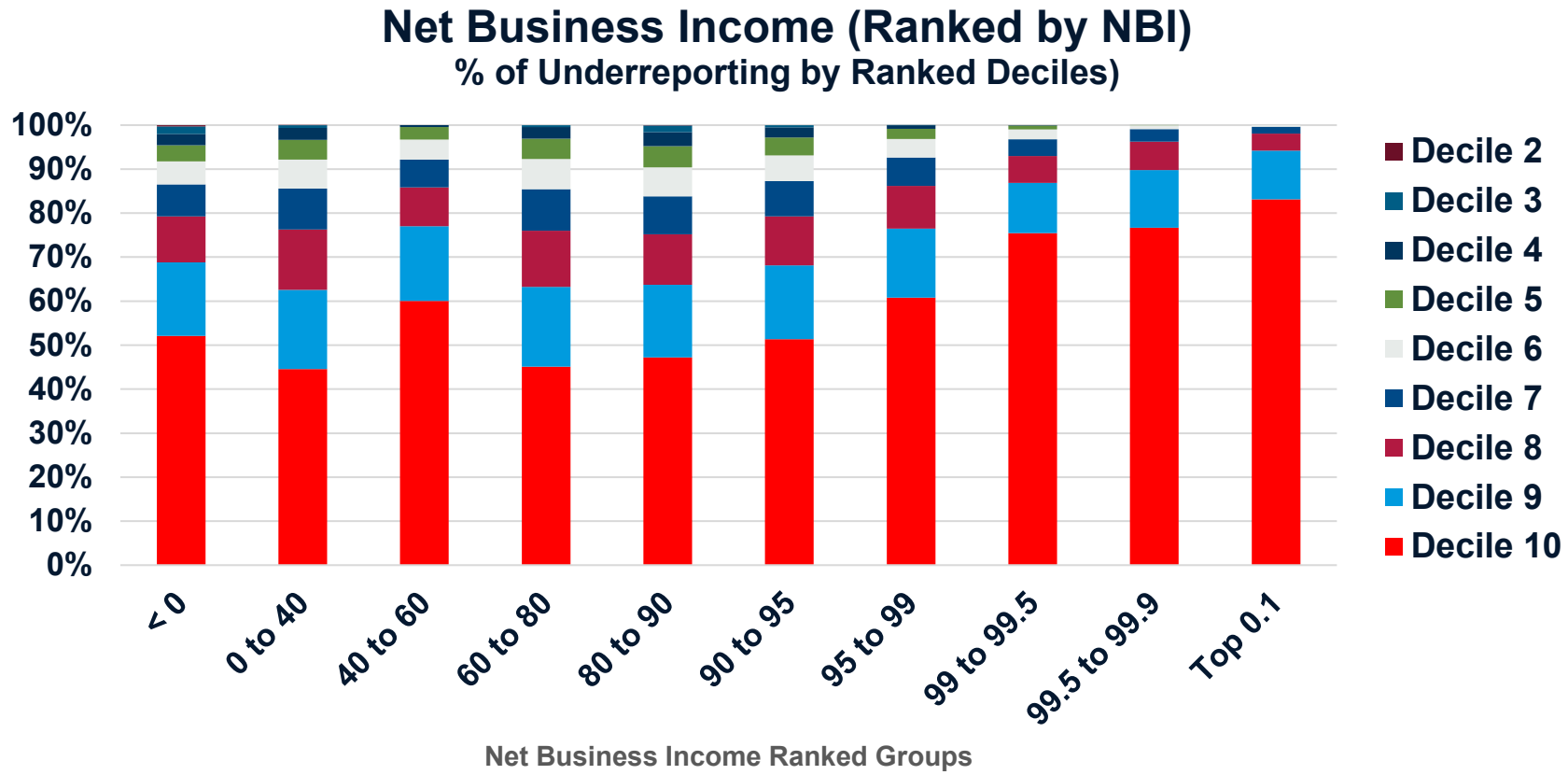


This figure shows the percent of misreporting in each ranked group. Filers reporting a negative NBI are at the bottom and filers with reporting NBI in the top 0.1% are at the top.

Net Business Income (Ranked by NBI)
Distribution of Underreporting Rate (NRP) by Centiles

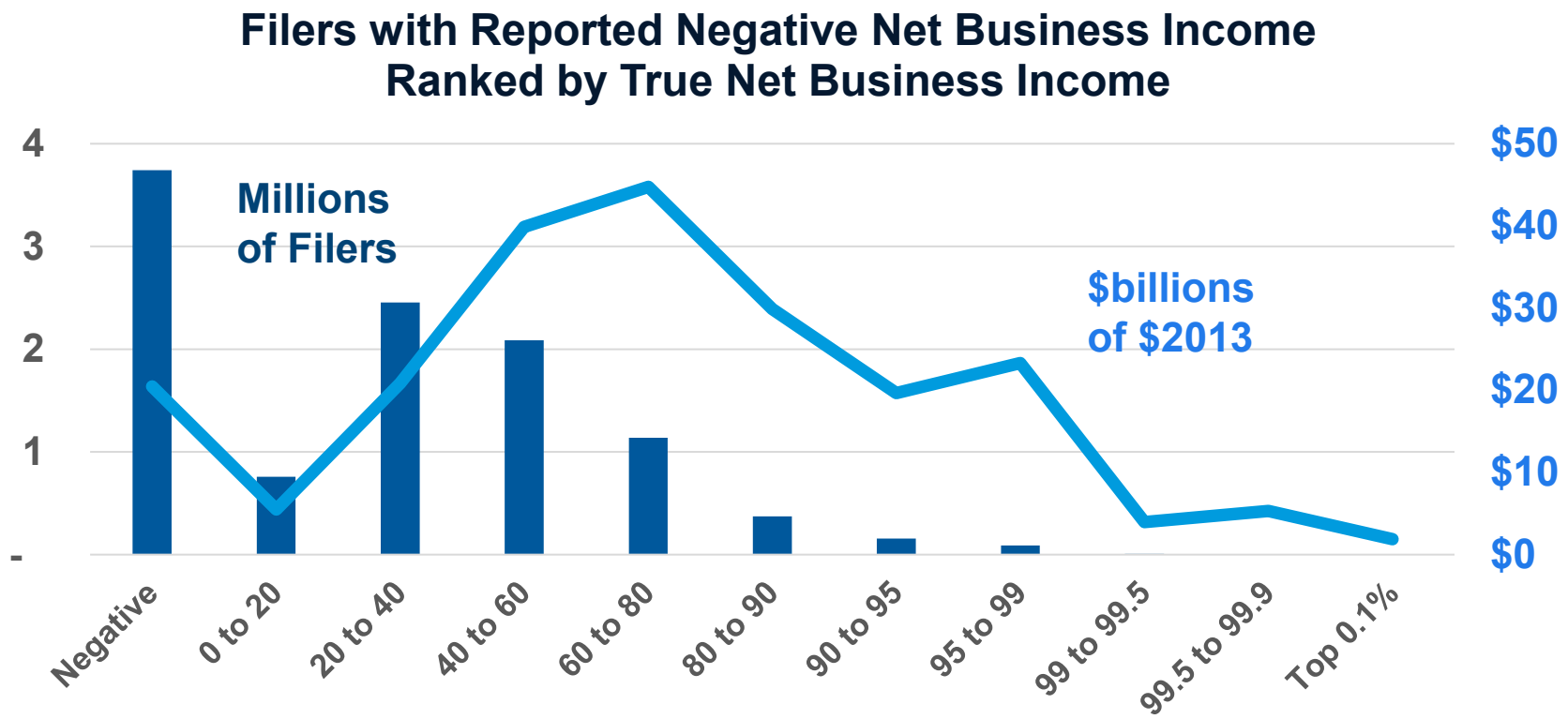


Note – Subset to records where the absolute value of reported NBI is in excess of $1k



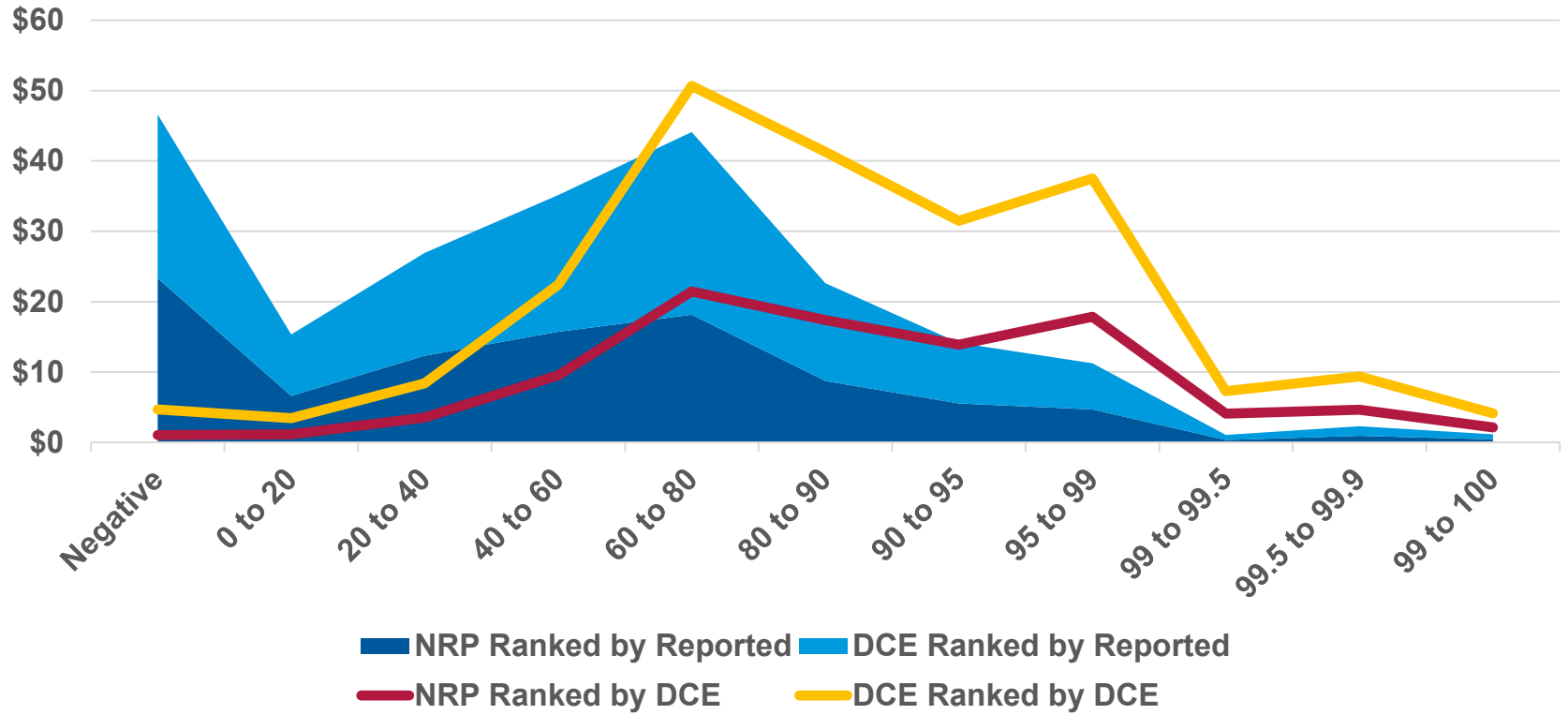
Most of the underreporting is attributed to the top two decile groups within each ranked group.

Where do filers with net business losses end up in the distribution of true net business income?



This shows where filers with negative NBI end up after correcting for audit and DCE adjustment. As seen on the previous slide, most underreporting is shifted well up in the income distribution.

Where is net business loss misreporting in the distribution of Total Income?



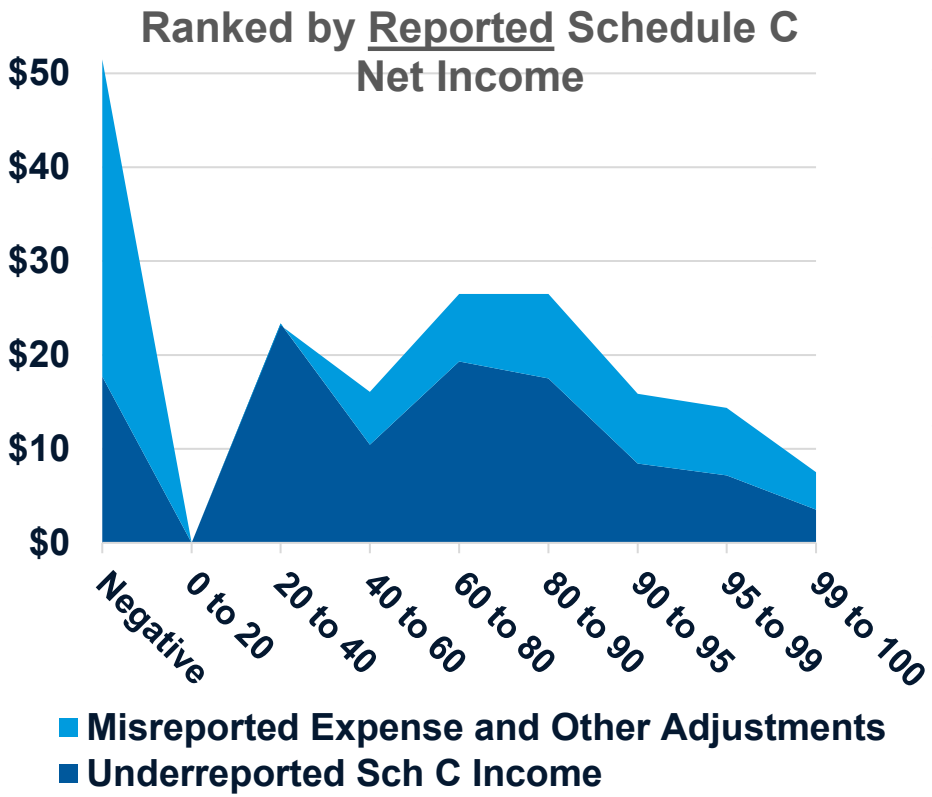
This shows where negative NBI filer misreporting are in the total income distribution ranked by reported total income and ranked by DCE adjust total income.

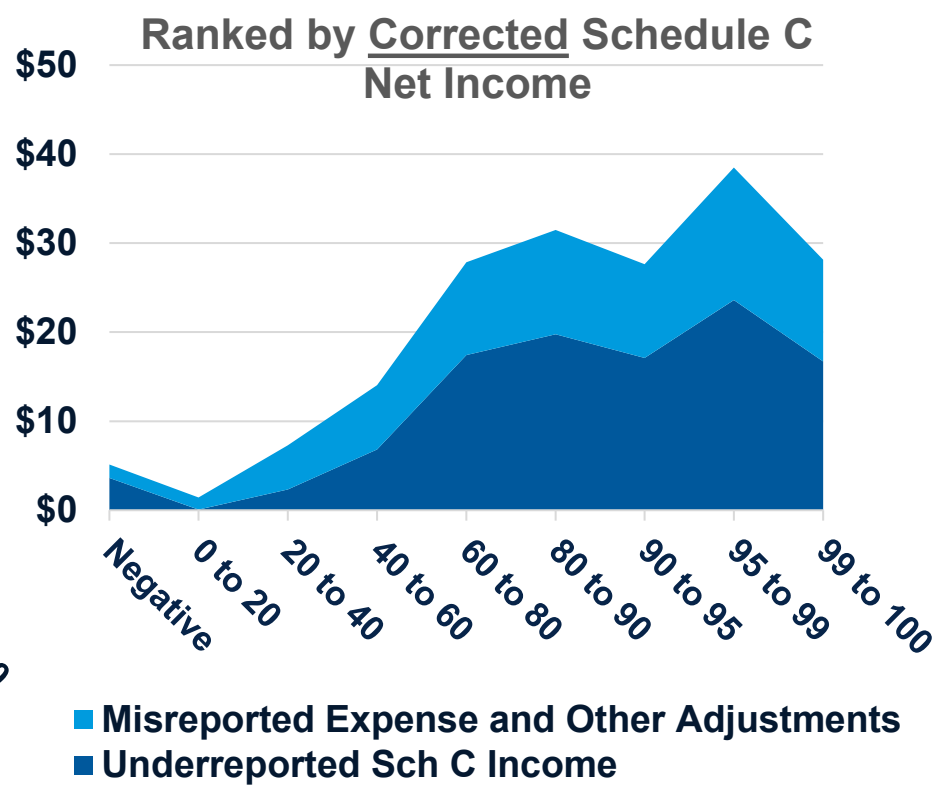
Underreported Business Income

Vs

Misreported Business Expenses and Other Adjustments

Schedule C Net Income Misreporting Amounts
Underreported Income and Other Adjustment Breakdown





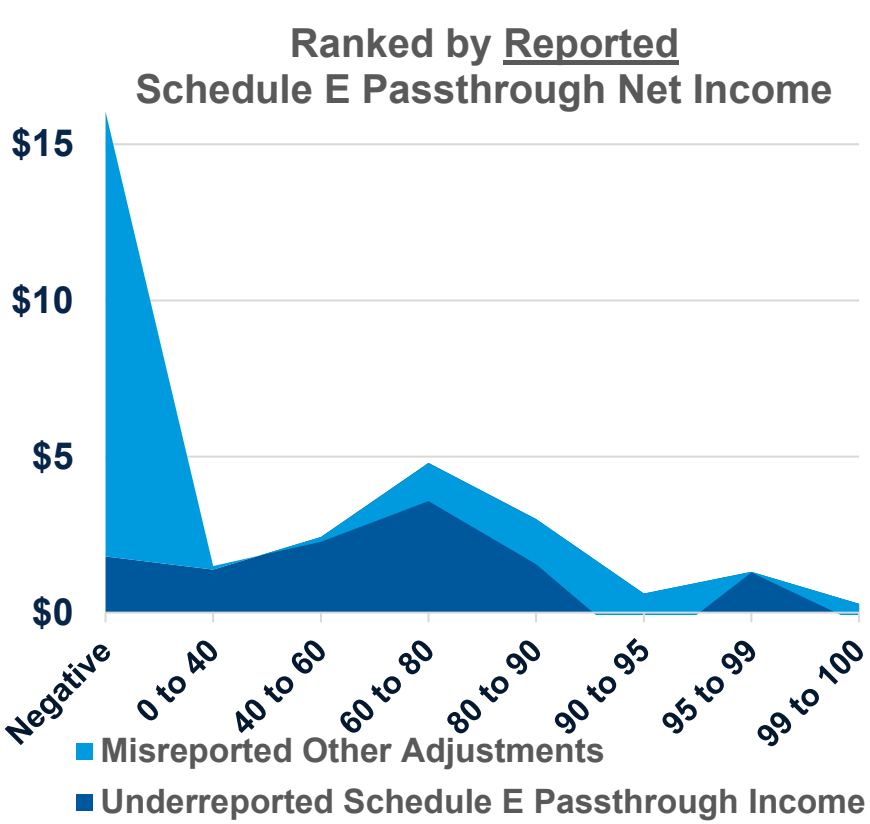
Note – These figures only include detected misreporting and do not include DCE adjustments. Underreported income is the positive changes to the income line items on Schedule C. Overstated expenses and other adjustments is the difference between total Schedule C Net Income Misreporting and underreported income

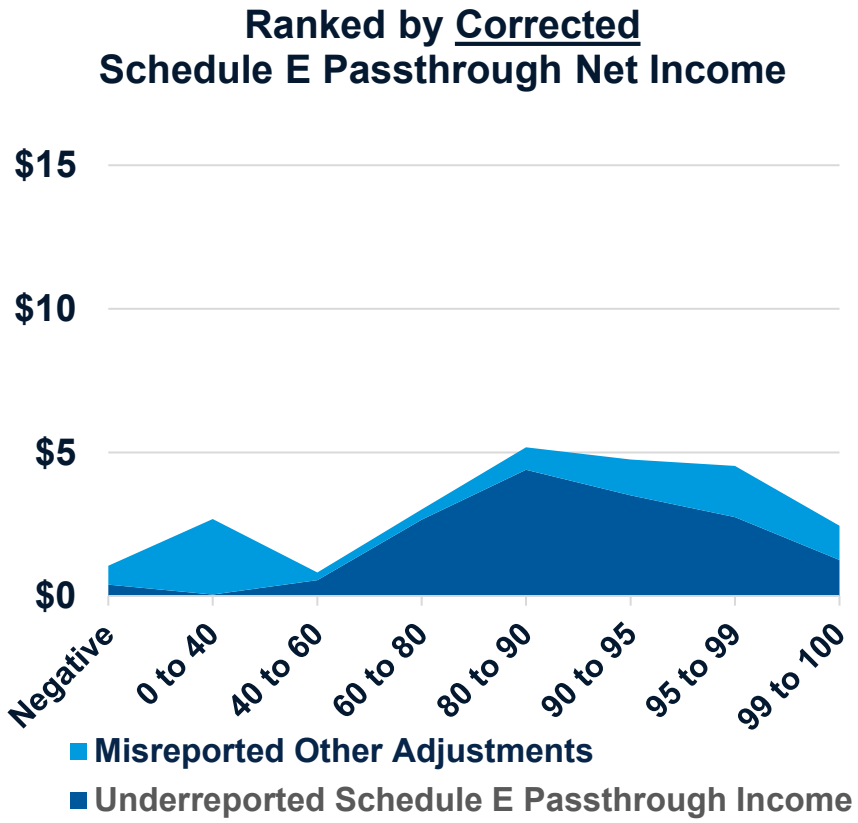
Schedule C Misreporting Percents

Underreported Income and Other Adjustment Breakdown
Ranked by Reported Net Schedule C Income

	Underreported Schedule C Income			Expenses and Other Adjustments		
	Reported ($B)	Misreported ($B)	% Misreported	Reported ($B)	Misreported ($B)	% Misreported
Negative	$151	$18	12%	$204	$34	17%
0 to 40	$32	$23	74%	$32	$0	-1%
40 to 60	$67	$10	16%	$55	$6	10%
60 to 80	$142	$19	14%	$95	$7	8%
80 to 90	$167	$17	10%	$116	$9	8%
90 to 95	$174	$8	5%	$126	$7	6%
95 to 99	$252	$7	3%	$165	$7	4%
99 to 100	$236	$4	1%	$148	$4	3%
Total	$1,222	$108	9%	$939	$74	8%

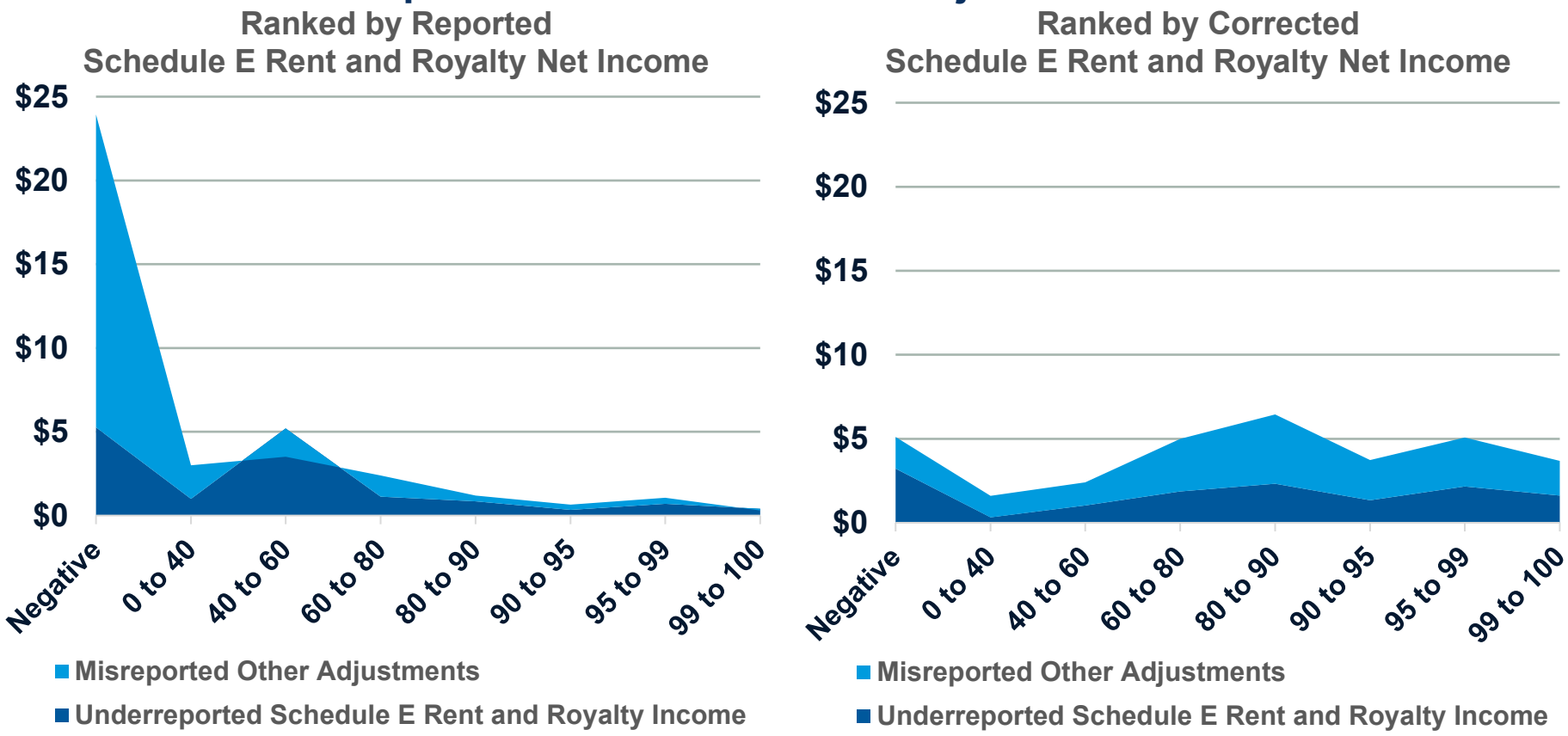
Schedule E Passthrough Misreporting Amounts
Underreported Income and Other Adjustment Breakdown





Note – These figures only include detected misreporting and do not include DCE adjustments.

Schedule E Rent and Royalty Misreporting Amounts
Underreported Income and Other Adjustment Breakdown



Note – These figures only include detected misreporting and do not include DCE adjustments.

Limitation: Individual Audits Don't Capture All Underreporting

Individual tax returns audits can miss entity-level noncompliance

Few entity-level audits of pass-thru income

- Joulfaian: If exec cheats, small C corp also usually cheating
- 2003 NRP study: small S corp underreporting similar to Sch C
- Implicit in DCE analysis
- Sch E only part of pass-thru K-1 income: interest, dividends, rent, gains, deductions, etc on other lines/forms

Individual audits appear to identify a low number of offshore income cases

Complex non-compliance schemes (micro-captive insurance)

Some "mis-reporting" is wrong line (we correct some)

Some is wrong year – so no net underreporting

However: Not all tax adjustments are collected

Tentative conclusions

- **The largest dollar-weighted area of noncompliance is in sole proprietor income**
  - **Rental and passthrough income are also large contributors**

. A small percentage of business returns report less than 5% of corrected business income.

- **Ratio of unreported to reported incomes generally declines at higher reported incomes**
- **Overstated business losses especially important.**

Research, Applied Analytics & Statistics

TAX POLICY CENTER
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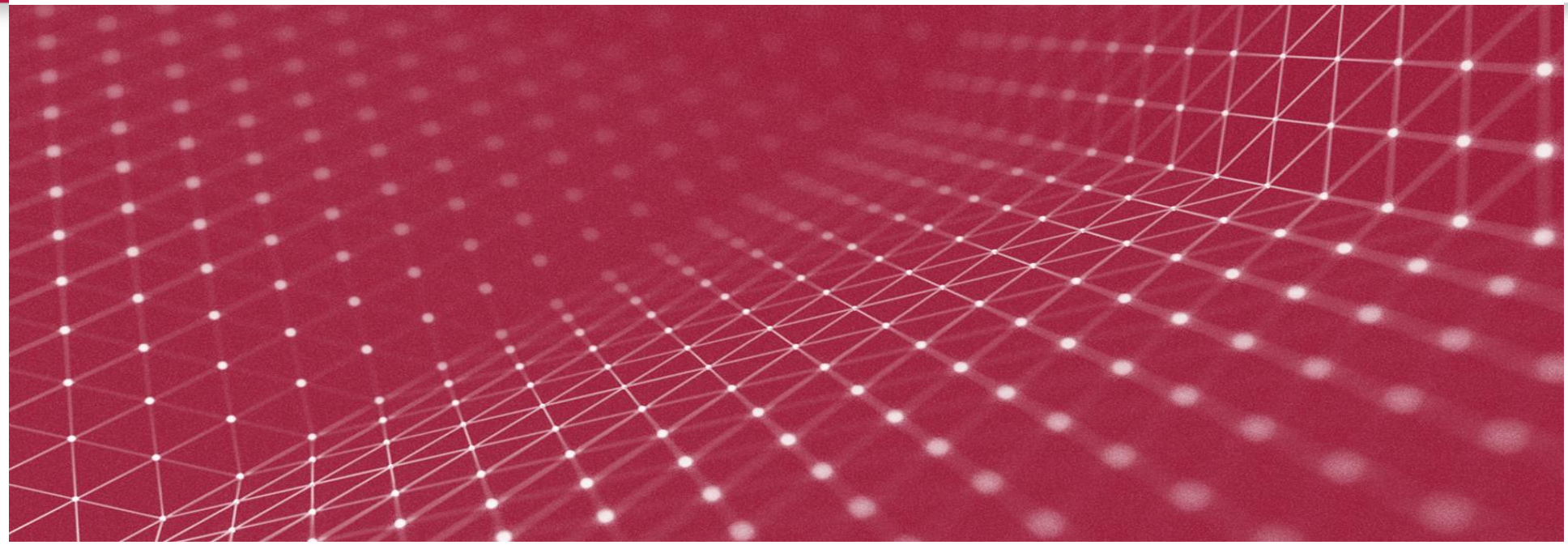
15th Annual IRS/TPC Joint Research Conference on Tax Administration



Research, Applied Analytics & Statistics

Modeling voluntarily paid tax and tax administration cost: a preliminary study on linkages between service and revenue

Michael Udell, Natalie Rico, Danyal Choudhry, Max Hodal, Rosemary Foley, Brittany Beebe, Kyle Richison

June 12, 2025

Agenda

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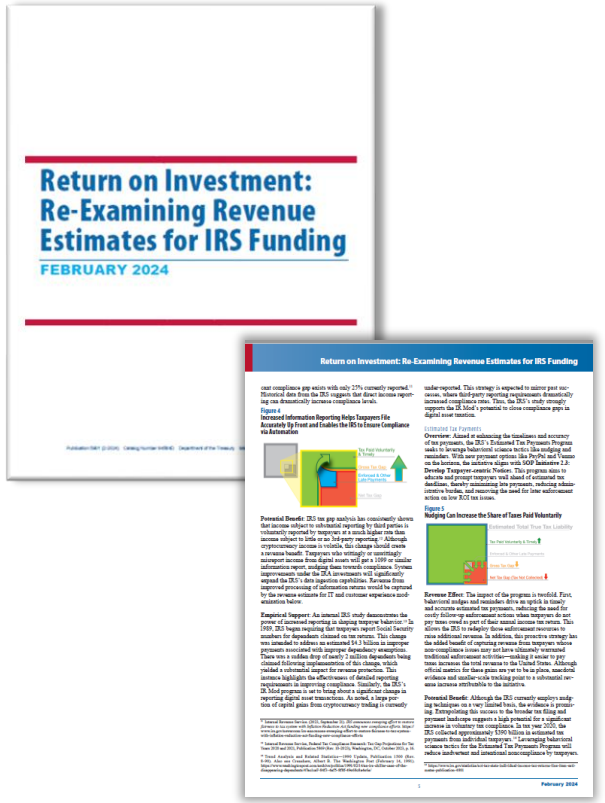
Summary and motivation

In February 2024, the IRS and Treasury identified limitations to the current process of revenue estimation for both baseline and investment activities. Previous IRS estimates **were limited to revenues generated by direct enforcement activities resulting from higher enforcement staffing**. This narrow focus **does not capture the full range of ways that the technology, data, and service improvements** contribute to revenue.

The purpose of this effort is to understand the relationship between service and revenue:

1) Investment changes and their impact to revenue (i.e. $$+/-)
2) How efficiencies effect return on investment (i.e. improvement in technology)

This work directly supports implementation of the Evidence Act of 2018 and OMB Memorandum M-19-23.



Path Forward

What is the relationship between service and revenue?

For next steps we will refine and mature the model to better understand how our operations link to revenue. For example, this will include identifying costs and associated revenue of the budget account Taxpayer Services.

We want to understand the relationship between voluntary tax payments and variations in IRS resource allocations.

Let the sum of voluntarily paid tax payments be Gross revenues.

Then a simple model might be:

- Gross revenues = f(returns, journeys, IRS costs)

Table 1. Four data types and sources

Data category	Source	Unit of observation
Tax return	Taxpayer and preparers	Return
Tax payments	Taxpayer and third parties	Return
Taxpayer Journeys	IRS - CX Journeys	Return
Cost accounting calculations	IRS - CFO	IRS Activity

Estimating the Cost of Taxpayer Journeys

1. What are Taxpayer Journeys?
2. What are cost accounting calculations of IRS activities by functional area?
3. Aligning Taxpayer Journeys with cost accounting calculations.
4. The data model heuristic for 2019 looks like:

Returns		Bridge		Activities
$3.564 T Voluntary tax payments	→	Taxpayer Journeys	←	$11.825 B IRS budget

Mapping Returns to Taxpayer Journeys

Table 2. Taxpayer Journeys of Individual Income Tax Returns Filed and Non-filers, CY 2019

Journey Cohort - 8 unique activities	Return and Non-filer account Counts	Percent of Returns	No Touch Filer?	Avg Number of Notices
Filing	95,818,618	62.0%	Yes	0
Filing -- Outbound Notice	16,132,149	10.4%	No	1.6
Pre-Filing -- Filing	10,802,186	7.0%	Yes	0
Filing -- Outbound Notice -- Inbound Contact	4,716,586	3.0%	No	2.3
Filing -- Outbound Notice -- Noncompliant	3,706,955	2.4%	No	4.3
Filing -- Return Review	586,570	0.4%	Yes	0
Filing -- Outbound Notice -- Inbound Contact -- Amended Filing	578,453	0.4%	No	2.2
Filing -- Return Review -- Inbound Contact	504,513	0.3%	No	0
Delinquent -- Filing -- Outbound Notice -- Inbound Contact -- Noncompliant	435,062	0.3%	No	10.2
Filing -- Outbound Notice -- Inbound Contact -- Amended Filing -- Noncompliant	409,627	0.3%	No	5.9
Delinquent -- Outbound Notice -- Inbound Contact	3,043	< .01%	No	4.3
Pre-Filing -- Delinquent -- Outbound Notice	2,793	< .01%	No	3.7
Pre-Filing -- Delinquent -- Filing -- Inbound Contact	2,479	< .01%	No	0
Outbound Notice -- Noncompliant	2,339	< .01%	No	6.1
Delinquent	1,976	< .01%	No	0

Source: IRS Taxpayer Journeys data.

Note: This table samples 15 of 225 mutually exclusive and exhaustive taxpayer journeys of all individual returns filed as well as certain non-filed returns for CY 2019

No Touch Taxpayer Journeys

Who is a No Touch filer?

A No Touch filer is a taxpayer who

1) timely files their tax return,
2) does not have an outstanding tax delinquency,
3) does not receive an outbound notice from the IRS, and
4) does not initiate an inbound contact to the IRS.

A Touch filer is a taxpayer who is not a No Touch Filer

No Touch activities include Pre-Filing and Filing, and it limited cases Return Review and Amended Filing.

Touch activities start with No Touch activities but include Outbound Notice, Inbound Contact, Delinquency, and Noncompliant.

Voluntary Compliance Revenues across Five Main Taxes

Table 3. Gross Revenues before Refunds, all taxes, FY 2019 & CY 2019

	Voluntarily paid revenue - Data Book -FY19		CY 2019 returns filed, tabulated (1)
Type of tax	$ billions	$ billions	$ billions
Individual income	1,982	**2,047**	**1,924**
Employment: Estimated (SECA)	66		
Employment: Withheld (FICA)	1,129	1,142	
Employment: Other	13		
Corporate income	277		
Estate and Gift	18		
Excise	81		
Total	**3,564**		

Source: IRS Data Book Table 1 for FY 2019, Compliance Data Warehouse (CDW) tabulations of returns filed CY 2019 and Submission Processing Filing Season Statistics Reports for CY 2019.

Notes:

(1) CY individual collections estimate consists of $1,224 B in withheld income tax, $634 B in estimated income tax, $66 B in SECA tax.

Voluntarily Paid Individual Income Tax Revenues, Taxpayer Journeys, and IRS Costs

Table 4. Gross Revenues, Taxpayer Journeys, and IRS Costs, CY 2019.

Voluntarily paid individual income and SECA tax		Voluntarily paid revenue by Journey	Returns filed by Journey	IRS cost before collection and exam		
Returns filed, CY 2019, $ billions	Type of Journey (1)	$ billions	millions	$ billions	share of IRS budget	Cost per return
1,924	No Touch	tbd	107.6	2.191	19%	$ 20
	Touch	tbd	46.7	4.466	38%	$ 95
Totals, individual income and SECA			154.3	6.658	56%	$ 43

Source: IRS Data Book Table 1 for FY 201, CX Journeys, CFO Cost-Based Performance Estimates, CDW tabulations of individual income tax returns filed in 2019, IRS total budget of $11.825 billion for FY 2019.

Notes:

(1) Taxpayer Journeys are a complete taxpayer history of customer service and account data with respect to a tax return during a calendar year.

Aligning Taxpayer Journeys to Budget Costs for No Touch and Touch taxpayers

Table 5. Journey Costs Applied to No Touch and Touch Returns, CY 2019

Journey number and element name		Journey sub-categories	Cost per journey sub-category	No Touch, Touch
1	Pre-Filing	Filing	$ 20.30	No Touch & Touch
2	Filng			
3	Return Review			
4	Amended Filing	Amended Filing	$ 20.30	
5	Outbound Notice	Outbound Notice	$ 5.92	Touch, w/limited Collection
6	Delinquent	Delinquent	$ 10.60	
7	Inbound Contact	Correspondence	$ 114.90	
		In Person	$ 197.13	
		Incoming Phone Call	$ 83.27	
		OnlineAuth: Athenticated Online Event	$ 1.83	
		Taxpayer Advocate	$ 1,297.00	
8	Noncompliant			
	Collection	ACS - all	$ 274.00	Touch
		Field Collection - all	$ 3,845.00	
		ASFR - all	$ 18.00	
	Exam	AUR - all	$ 143.00	
		Correspondence Exam (5) 95% of recommend	$ 610.00	
		Field Exam (5) 28% of recommend	$ 14,152.00	

Sources: Journey labels from Taxpayer Journeys data and journey costs from CFO Cost-Based Performance Measures reports.

Mapping IRS Cost-Based Measures to Average Outbound Notice Issued and Serviced, FY 2019

Table 6. Cost per Notice (all notices) FY 2019

Item		$ Amount
Production		$91,905,924
Postage		$152,933,395
Downstream (1)		$1,049,802,214
Total Cost		$1,294,641,533
Notices issued		218,640,272
Avg Cost per notice	$	**5.92**
minimum (2)	$	0.17
maximum (3)	$	82.08
median (4)	$	0.93

Source: CFO Notice Cost and Revenue for FY 2019, for 1,088 notice types

Notes:

(1) Downstream is cost of taxpayer communication with IRS associated with each notice.

(2) CP563I - Information about your request for an Adoption Taxpayer Identification Number (ATIN)

(3) CP623 - Installment Agreement Default Notice (Spanish)

(4) LTR0045C - EIN Application Requested/Received (Form SS-4)

Current and Future Research

Current research:

1. Align Cost Accounting Calculations of Taxpayer Services activities with taxpayer journey activities for Pre-Filing, Filing, and Return Review.

2. Disentangle journeys that contain both voluntary compliance activities and enforcement activities as separate journeys.

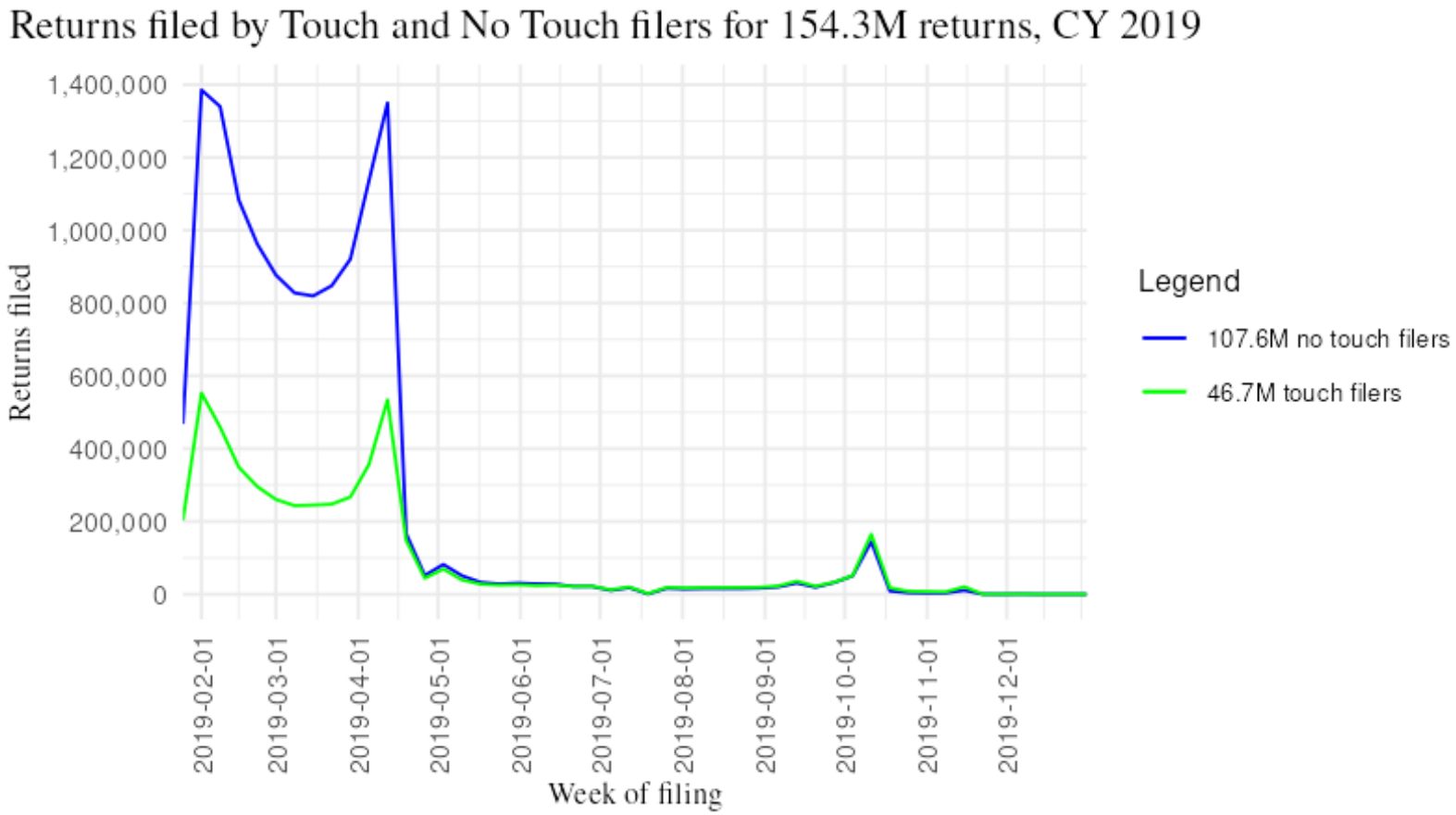
Future Research:

3. Can we assist taxpayers to become no touch?

4. Can we address the cost to taxpayers to become no touch?

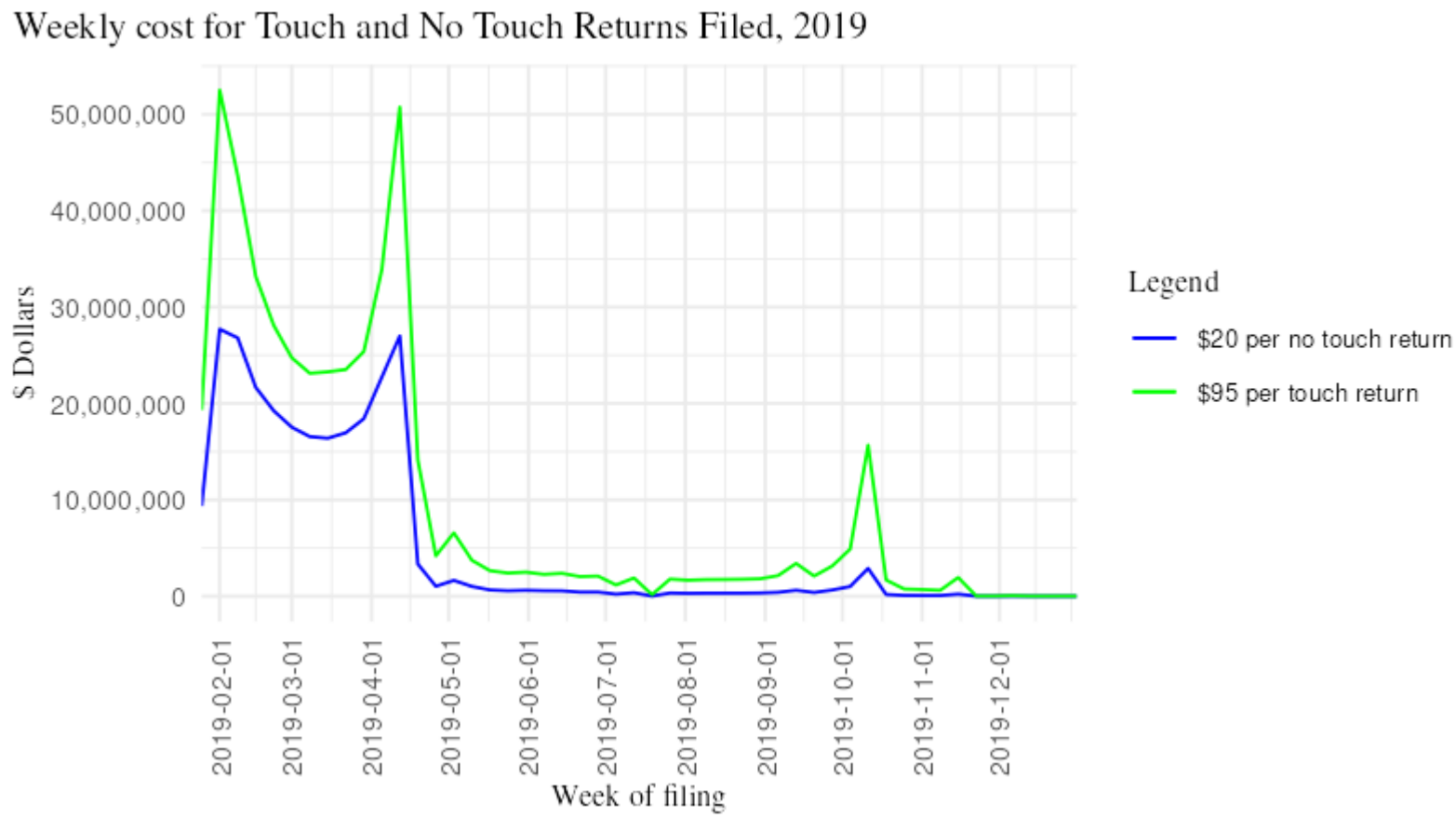
When do No Touch and Touch Journey Taxpayers File Their Returns?

Graph 1



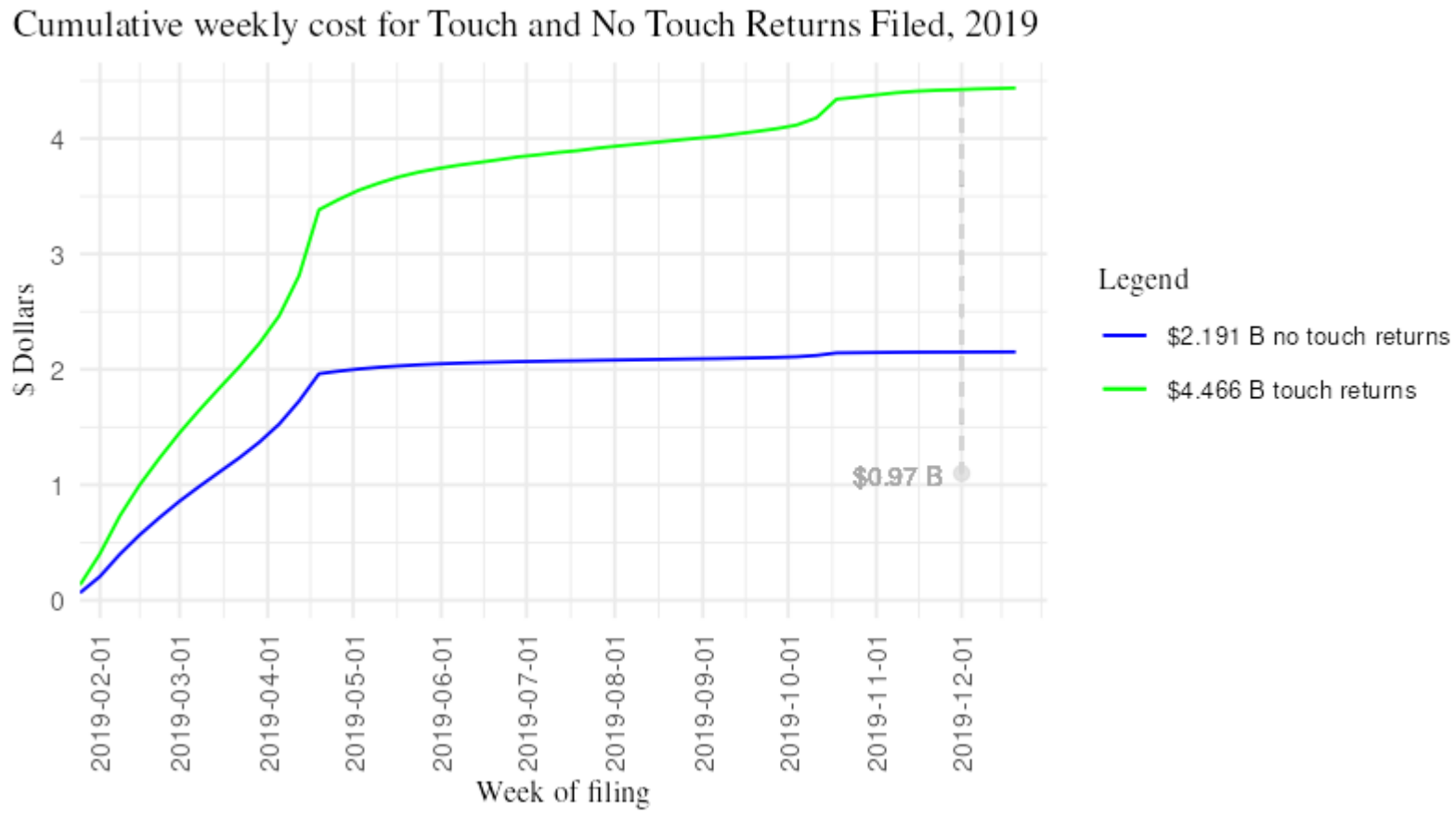
Weekly Cost of No Touch and Touch taxpayer journeys Filing in 2019

Graph 2



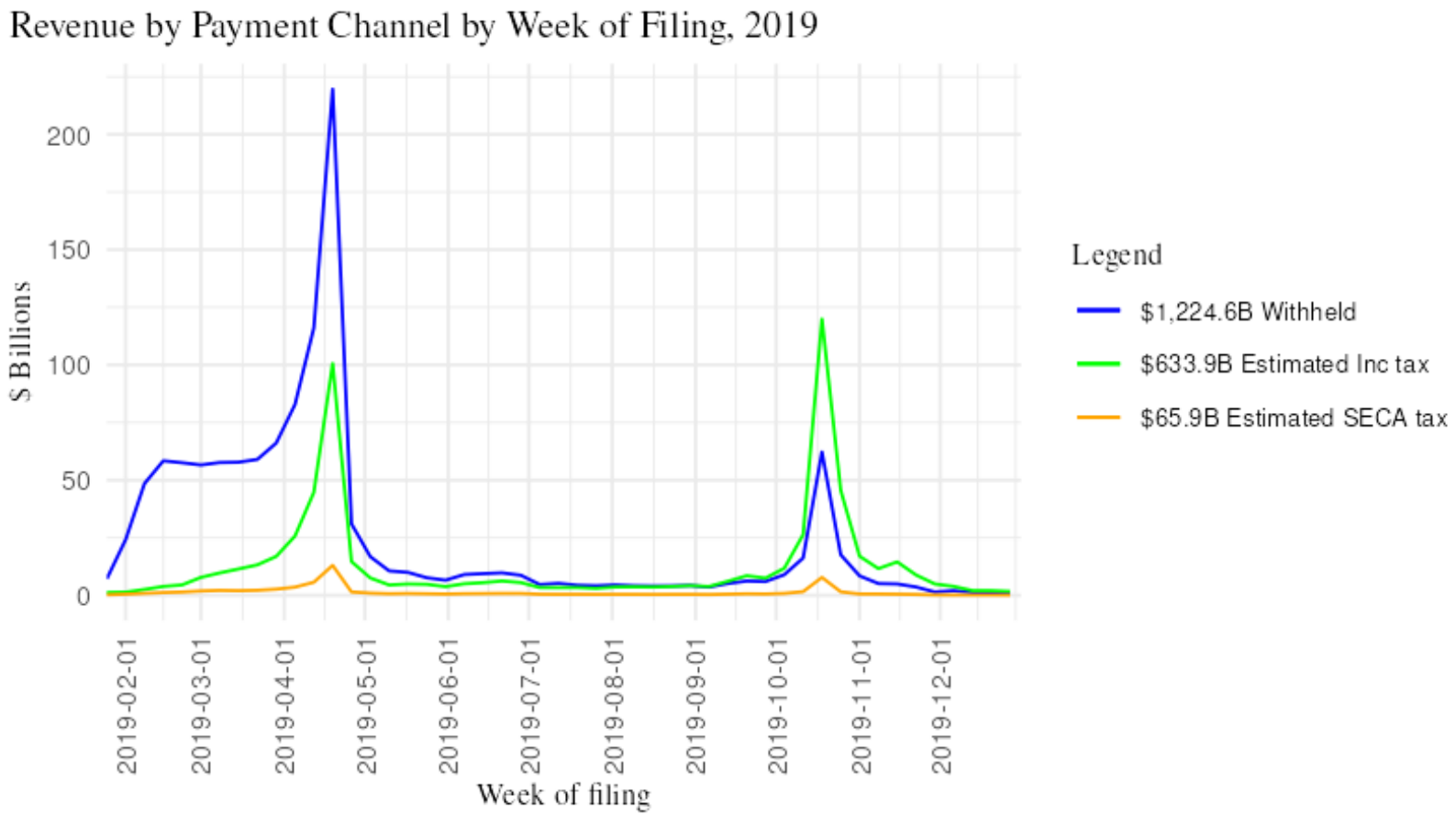
Cumulative Cost of No Touch and Touch taxpayer journeys by Week of Filing in 2019

Graph 3



$1,924.4 B of Voluntary Paid Revenue by Payment Channel by Week of Filing in 2019.

Graph 4



A Vector Autoregression (VAR) model of the filing of individual income tax returns during a calendar year

A Research Effort

Design a micro-data model with 4 phases relating returns filed to payments made to Taxpayer Journeys and to IRS Costs:

Phase 1 Returns ☑	Phase 2 Payments ☑	Phase 3 Journeys	Phase 4 Costs
Individual return filed and posted during calendar year using a vector autoregression (VAR) model.	Voluntarily paid revenues associated with each return through withholding, estimated tax payments, and credit forwarding of prior year refunds.	Linking taxpayer journey elements for the year a return is filed.	Linking budget costs to elements of taxpayer journeys.

When are Returns Filed?

1. Because taxpayers who over paid tax have an incentive to file early, and taxpayers who under paid tax have an incentive to file late, we expect the time-pattern of filing returns to reflect this.
2. Moreover, because complex taxpayer journeys are more likely to reflect under payment of tax, we expect complex journey returns to file late.
3. For these reasons we include the timing of return filing to be part of the unit of observation.
4. We explore when tax returns are filed during a calendar year using a vector autoregression model.

A Vector Autoregression Model of Weekly Returns Filed and Processed

We estimate a Vector Autoregression (VAR) model of individual income tax returns using weekly calendar year data with a 52-week lag structure.

Model: weekly returns received during current calendar year as a function of weekly returns received during the prior year + weekly *cumulative* returns processed during the prior year.

Let $\boldsymbol{Y_{1,T,t}}$ be weekly individual income tax returns received in year T and week t.
Let $\boldsymbol{Y_{2,T,t}}$ be the running total of weekly individual income tax returns processed in year T during week t.

Both $\boldsymbol{Y_{1,T,t}}$ and $\boldsymbol{Y_{2,T,t}}$ use the same underlying data of weekly individual income tax returns filed, but the data generating processes for returns filed and for returns processed are quite different resulting in different weekly volumes throughout a calendar year. The two data series have a correlation of ~ 50%.

Then a VAR equation can be expressed as:

$$\boldsymbol{Y_{1,T,t} = \beta_{1,T,*} + \beta_{11,1} Y_{1,*,t-1} + \beta_{12,1} Y_{2,*,t-1} + \epsilon_{1,T,t}}$$
$$\boldsymbol{Y_{2,T,t} = \beta_{2,T,*} + \beta_{21,1} Y_{1,*,t-1} + \beta_{22,1} Y_{2,*,t-1} + \epsilon_{2,T,t}}$$

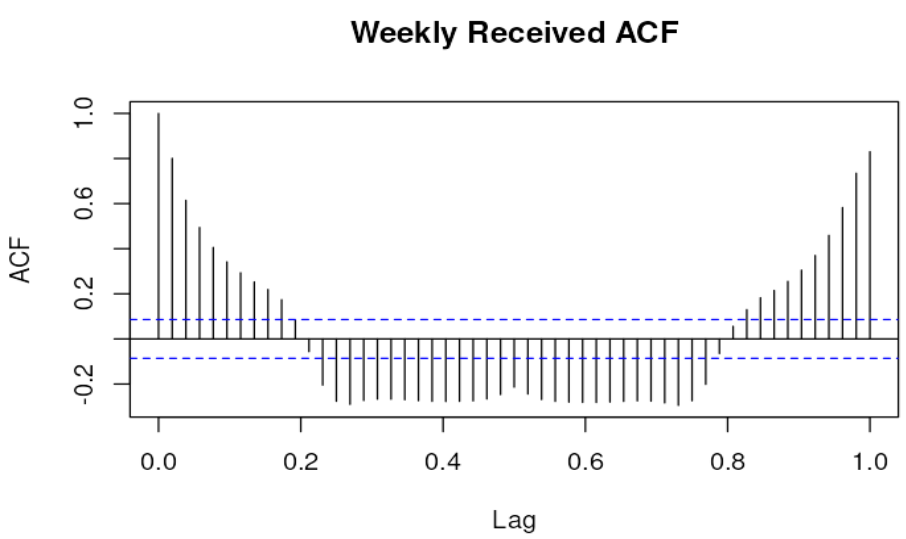
- In this 2-equation VAR model $B_{11,1}$ is the estimated coefficient on weekly returns received in the immediate prior week and $B_{12,1}$ is the estimated coefficient on the weekly *cumulative* returns processed in the immediate prior week.
- The first subscript on each B identifies the dependent variable for each equation – a “1” for weekly received and a “2” for weekly cumulative received.
- The second subscript on each B identifies which variable in the equation it applies to – either a “1” for weekly received or a “2” for weekly cumulative processed.
- The third subscript on each B identifies the number of lagged periods with respect to the dependent variable.
  - For example, when t = the first week in March, t-1 = the last week in February. Because the lag structure for this VAR spans 52 weeks, for most observations there will be two calendar years of weekly data considered.

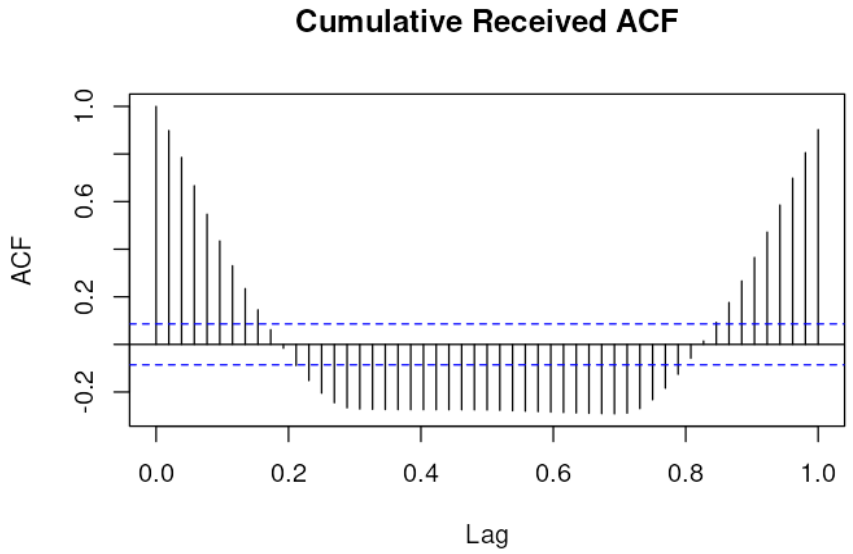
Testing the Lag Structure for Weekly Returns Filed

Data: Individual Income Received and Processed Headquarters (IIRAPHQ) reports.

Appropriate lag structure: The **autocorrelation function (ACF)** indicated lag structures with significance out more than 2-years. We use a 52-week structure shown below.

We tested for lag structures beyond 52 weeks and found significance extending multiple years, but with the added penalty of data instability for least squares estimation. For this first effort we trimmed the lag structure to 52 weeks, which leaves 105 parameters to estimate in each equation (52 weekly, 52 cumulative, and a time varying trend).





VAR Estimation Weekly Returns Filed, CY 2011 - 2019

Table 7. VAR of weekly received in calendar year. The us_week_rcvd average = 2,894,484.

2011 through 2019	Estimate	t value
us_week_rcvd.l1	-0.109	-2.081
us_week_rcvd.l2	-0.234	-4.39
us_week_rcvd.l3	-0.115	-2.096
us_cum_proc.l3	-0.016	-2.258
us_cum_proc.l4	-0.033	-4.645
us_cum_proc.l6	-0.018	-2.538
us_week_rcvd.l9	0.199	3.495
us_week_rcvd.l10	0.158	2.722
us_cum_proc.l14	-0.033	-4.51
us_cum_proc.l16	0.046	6.233
us_week_rcvd.l26	0.121	2.008
us_week_rcvd.l42	0.112	1.751
us_week_rcvd.l52	0.119	2.068
Year trend	**-74.323**	**-0.14**
R-squared	**0.943**	
Adjusted R-squared	**0.926**	
F-statistic	**57.75**	**DF(105, 363)**
Dependent variable weekly range	**Min = 37,760**	**Max = 21,285,980**
Years of data used for estimation	2011 through 2019	

VAR Estimation Weekly Returns Processed, CY 2011 - 2019

Table 8. VAR of cumulative weekly processed in calendar year The us_cum_proc average = 120,191,204.

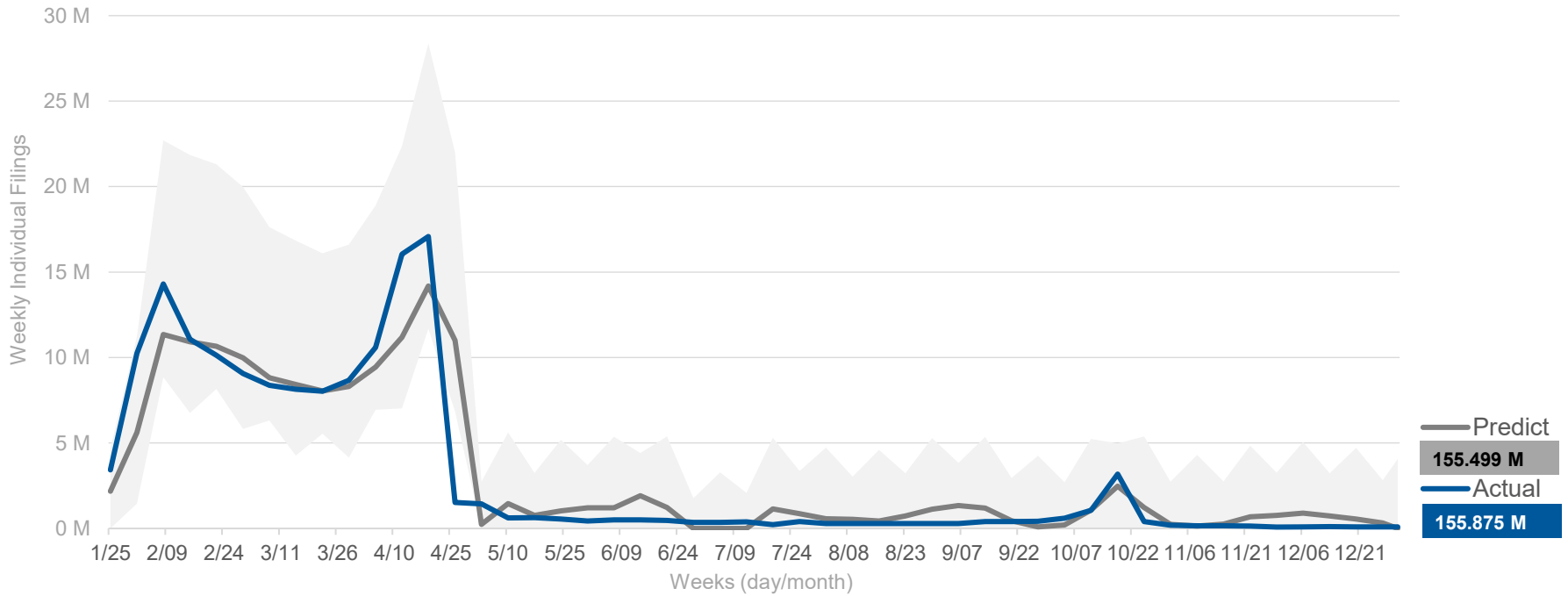
l1 means "lagged one week"	Estimate	t-value
us_week_rcvd.l1	0.088	7.976
us_cum_proc.l1	0.023	1.939
us_week_rcvd.l2	0.543	6.125
us_week_rcvd.l3	0.582	6.385
us_week_rcvd.l4	0.556	6.024
us_week_rcvd.l5	0.504	5.410
us_week_rcvd.l6	0.491	5.231
us_week_rcvd.l7	0.452	4.794
us_week_rcvd.l8	0.473	4.997
us_week_rcvd.l9	0.577	6.086
us_week_rcvd.l10	0.534	5.534
us_week_rcvd.l11	0.449	4.596
us_week_rcvd.l12	0.310	3.158
us_week_rcvd.l13	0.347	3.530
us_week_rcvd.l14	0.447	4.549
us_cum_proc.l14	-0.041	-3.387
us_week_rcvd.l15	0.468	4.759
us_week_rcvd.l16	0.426	4.330
us_cum_proc.l16	0.033	2.684
us_week_rcvd.l17	0.404	4.104
us_cum_rcvd.l17	-0.019	-1.779
R-squared	**0.999**	
Adjusted R-squared	**0.999**	
F-statistic	**1,231**	**DF(105,363)**
Dependent variable weekly range	**Min = 280,424**	**Max = 155,874,901**

l1 means "lagged one week"	Estimate	t-value
us_week_rcvd.l18	0.362	3.678
us_week_rcvd.l19	0.350	3.538
us_week_rcvd.l20	0.358	3.616
us_week_rcvd.l21	0.406	4.102
us_week_rcvd.l22	0.423	4.270
us_week_rcvd.l23	0.379	3.817
us_week_rcvd.l24	0.345	3.462
us_week_rcvd.l25	0.265	2.649
us_cum_proc.l25	-0.024	-2.293
us_week_rcvd.l26	0.431	4.313
us_cum_proc.l26	-0.027	-2.515
us_week_rcvd.l27	0.390	3.884
us_cum_proc.l27	-0.019	-1.731
us_week_rcvd.l28	0.454	4.538
us_week_rcvd.l29	0.456	4.556
us_week_rcvd.l30	0.429	4.270
us_week_rcvd.l31	0.411	4.078
us_week_rcvd.l32	0.385	3.812
us_week_rcvd.l33	0.388	3.853
us_week_rcvd.l34	0.408	4.063

l1 means "lagged one week"	Estimate	t-value
us_week_rcvd.l35	0.371	3.697
us_week_rcvd.l36	0.382	3.821
us_week_rcvd.l37	0.195	1.810
us_week_rcvd.l38	0.208	1.964
us_week_rcvd.l39	0.258	2.411
us_cum_proc.l39	-0.020	-1.887
us_week_rcvd.l40	0.289	2.718
us_cum_proc.l40	-0.020	-1.909
us_week_rcvd.l41	0.379	3.567
us_cum_proc.l41	-0.022	-2.098
us_week_rcvd.l42	0.440	4.142
us_week_rcvd.l43	0.394	3.698
us_cum_proc.l43	-0.020	-1.847
us_week_rcvd.l44	0.426	4.012
us_cum_proc.l44	-0.019	-1.815
us_week_rcvd.l45	0.400	3.758
us_week_rcvd.l46	0.454	4.300
us_week_rcvd.l47	0.511	4.866
us_week_rcvd.l48	0.536	5.145
us_week_rcvd.l49	0.627	6.128
us_week_rcvd.l50	0.720	7.182
us_week_rcvd.l51	0.768	7.890
us_cum_proc.l52	0.993	92.523
Year trend	**3492.557**	**3.948**

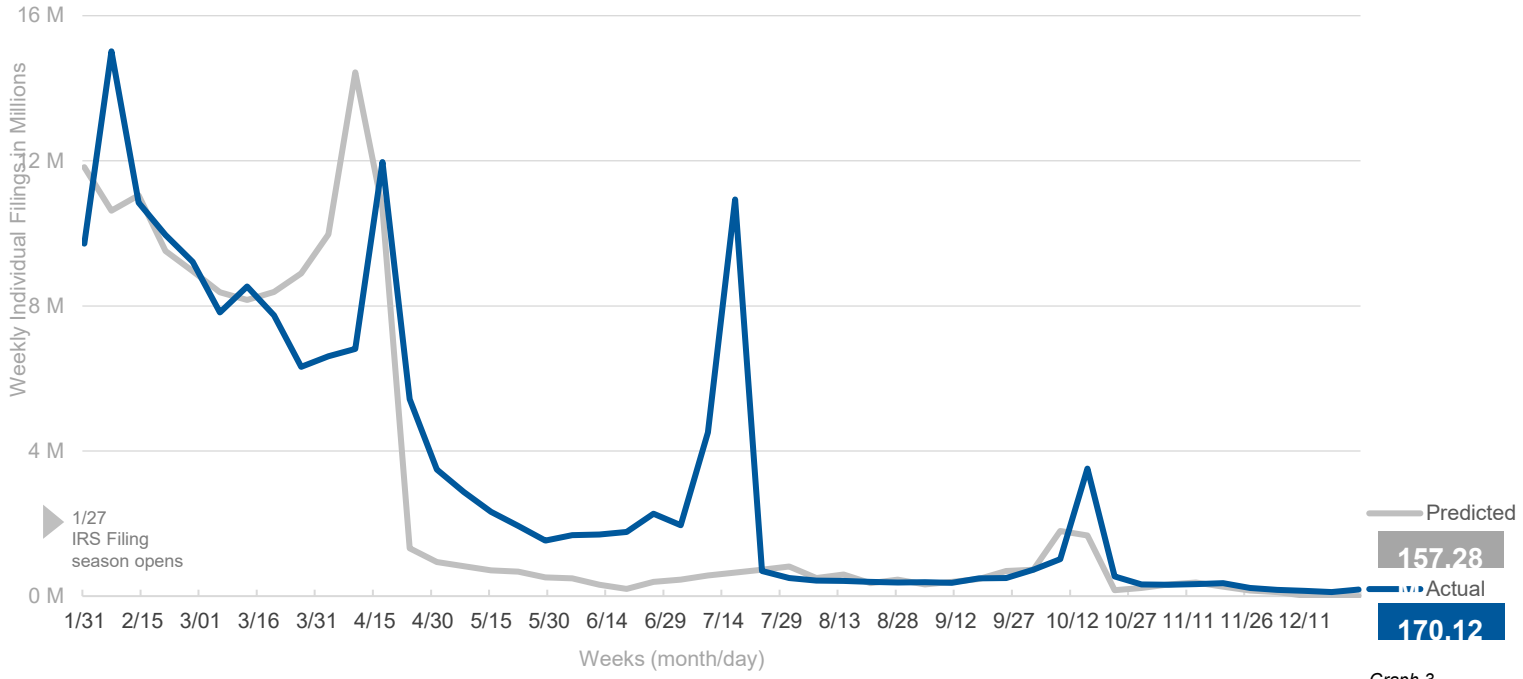
VAR Model Weekly Received, CY 2019 Actual vs Predicted

GRAPH 5 2019 Weekly Individual Filings Received .



VAR Model Weekly Received, CY 2020 Actual vs Predicted – COVID-19 begins

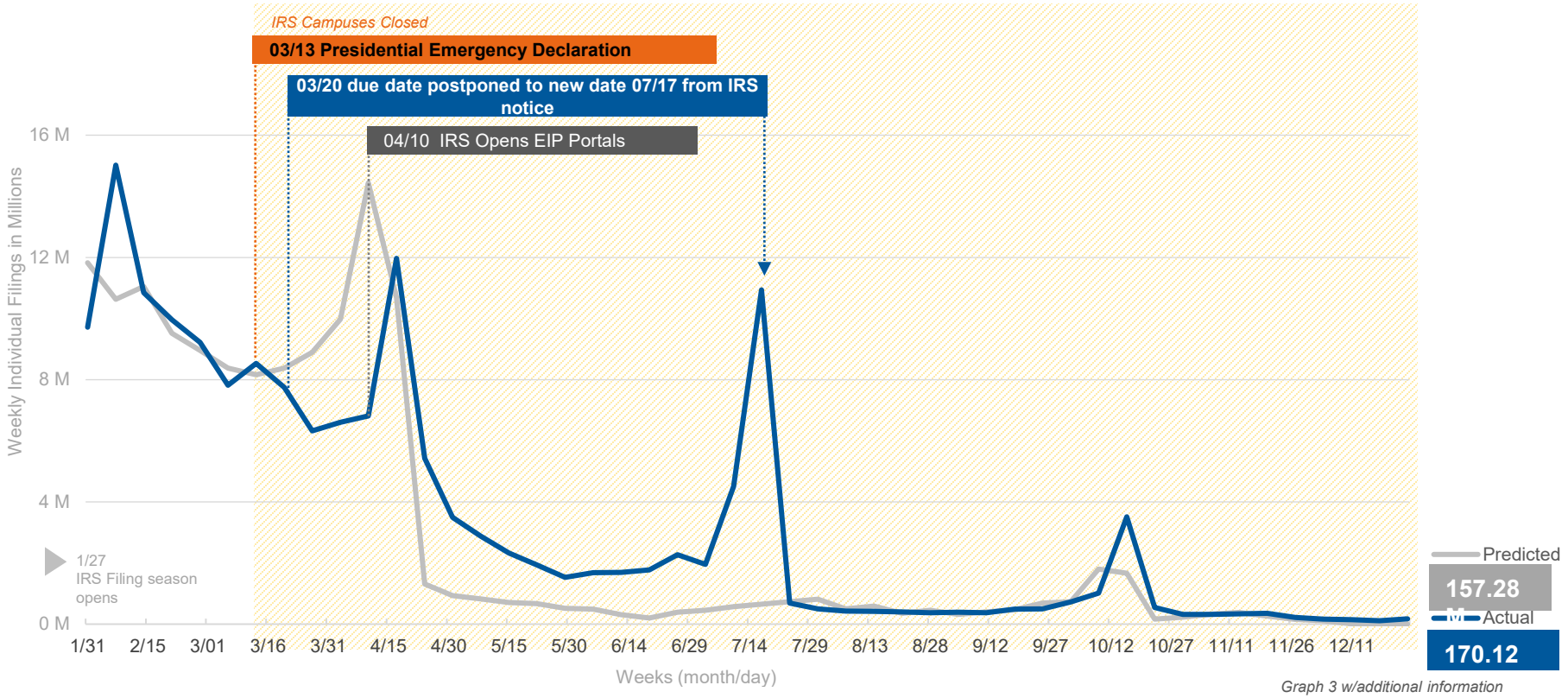
GRAPH 6 2020 Individual Filings Received by Week



Graph 3

CY 2020 Filings with Event Studies Using IRS Notices

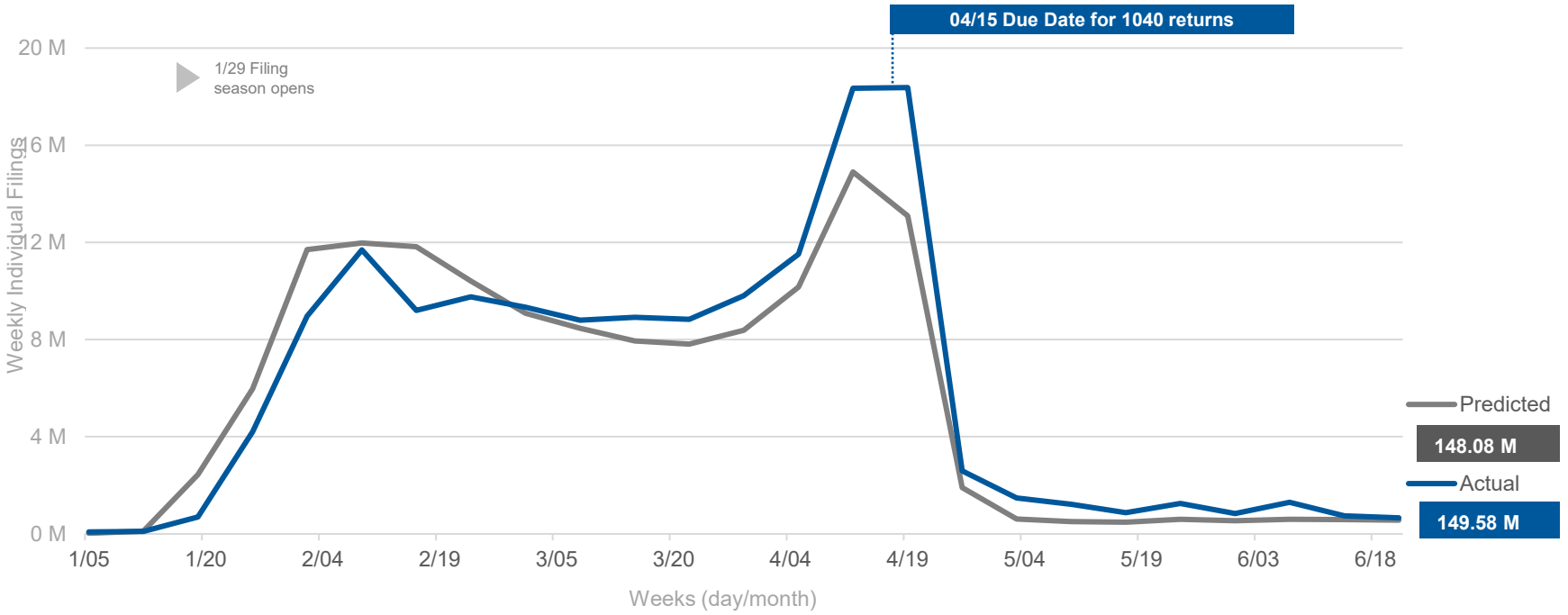
GRAPH 7 2020 Weekly Individual Filings Received and Event Notices



Graph 3 w/additional information

Back to Pre-Pandemic “Normal”, CY 2024 Filings

GRAPH 8 2024 Weekly Individual Filings Received



Research, Applied Analytics & Statistics

TAX POLICY CENTER
URBAN INSTITUTE & BROOKINGS INSTITUTION

15th Annual IRS/TPC Joint Research Conference on Tax Administration

Developing a New Method for Estimating the Underreporting Tax Gap for the Individual Income Tax and Self-Employment Tax

May 2025

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MITRE: India Lindsay, Chelyn Lee, Max McGill, Justin Nave, Miguel Sarzosa

** Corresponding Author: dan.t.rosenbaum2@irs.gov. Please do not share without contacting Dan Rosenbaum. We thank Ted Black, Ethan Krohn, members of the Compliance Modeling Lab, and members of the Tax Gap Estimation Technical Expert Panel for comments during various stages of development. The views expressed in the paper are those of the authors and do not necessarily reflect the views of the Internal Revenue Service or the Department of Treasury. Any remaining errors are our own.

Outline

Agenda

- Why do we estimate the tax gap?
- Background on tax gap and National Research Program (NRP).
- Motivation of new tax gap estimation methodology.
- Description of binning/reweighting approach.
- The distribution of NRP audits.
- Incorporation of prior year NRP audits and non-NRP audits.
- Final thoughts.

Why Do We Estimate the Tax Gap?

Why do we estimate the tax gap?

- Tax gap publications provide meaningful, high-profile statistics on tax noncompliance that are regularly referenced in IRS and Treasury leadership communications, Congressional inquiries, GAO/TIGTA reports, CBO/JCT analyses, and much more.
- Tax gap estimates are responsive to directives of the Evidence-Based Policy Act PL 115-435.
- Tax gap estimates are an input to the National Income Accounts.
- The method to estimate undetected income provides insight into opportunities for business unit processes to reduce variance in case outcomes.
- Tax gap estimates help put improper payment estimates in proper context.
- Tax gap estimates are not useful as performance metrics, but the information they provide inform IRS and Treasury goals and help guide decisions related to workload selection (and related AI modeling) and resource allocation for enforcement and taxpayer outreach.

Tax Gap Estimation and Projection

- The **tax gap** is an estimate of the level of overall noncompliance, i.e., the **difference in true tax liability and what taxpayers pay on time**, in the context of Internal Revenue Code (IRC) provisions in effect at the time.
- The tax gap includes estimates of both detected and (in some cases) undetected noncompliance.
- **Most of our noncompliance estimates rely on information from completed audits, which take several years to complete.**
- Tax gap estimates/projections include most types of tax (individual, corporate, employment, excise, and estate tax) by type of noncompliance (underreporting, nonfiling, and underpayment).
- Additional detail at the line-item level typically published for individual income tax underreporting tax gap estimates.
- **Tax gap projections are typically based upon compliance behavior several years ago but return characteristics from a more recent tax year.**

Tax Gap Reports

Most Recent Tax Gap Estimates/Projections

- The most recent tax gap estimates are from Tax Years (TY) 2014-2016, and the most recent tax gap projections are from TY 2022.
  - Those TY 2022 tax gap projections are based upon compliance behavior in TY 2014-2016 but return characteristics in TY 2022.

November 2025 Tax Gap Estimates/Projections

- We are committed to providing TY 2018-2020 tax gap estimates and TY 2023 tax gap projections in Fall 2025.
  - Development of new methodologies are underway.

New Tax Gap Estimation Methodologies

New NRP-Based Individual Income Tax Underreporting Tax Gap Estimation

- Partnering with MITRE to develop a new binning methodology for new tax gap estimates and projections.

New Undetected Tax Gap Estimates

- Partnering with Stanford RegLab to develop a Bayesian shrinkage model for undetected income (and tax gap) estimation.

New Corporate Income/Estate Tax Gap Estimates

- Developing clustering methods to update our tax gap estimates for corporate income tax and estate tax.

National Research Program (NRP)

- Comprehensive, stratified random, 1040-based research audits.
- About 14,000 audits per year from TY 2006-2015.
- About 4,000 audits per year since TY 2016.

NRP Redesign

- Stratified random sample (1,500 audits per year) designed to target high-information returns, i.e., those where compliance behavior is changing.
- High-risk sample (2,500 audits per year) designed to randomly sample high-risk returns, especially high-income/high-wealth returns.
- ICM model – random forest model of tax adjustment levels.

Effects of Cuts of Examiner Resources

- Large losses of examiners – likely to result in significantly reduced NRP samples in TY 2022, TY 2023, and likely beyond.
- Developing strategies for optimally reducing NRP samples, given tax gap estimation, improper payment estimation, and workload selection needs.

Need for New Tax Gap Estimation Methodology

Changes in NRP Necessitate New NRP-Based Tax Gap Estimation Methodology

- Current tax gap estimation extrapolates from NRP results.
- Smaller NRP requires more flexible estimation method that can incorporate additional information in areas where information is limited.
  - Method needs to incorporate dependencies across line items and reproduce the distributional characteristics from NRP audits.
  - Ability to selectively incorporate prior year NRP audits, non-NRP operational audits, and (eventually) results from partially completed audits.
  - Plan to incorporate standard errors (for the first time).

Binning Approach

- Use a binning approach to essentially reweight NRP audits and simultaneously allow for incorporation of prior year and non-NRP audits.

Binning Approach: Macro Bins

Macro-Bins

- **EITC** (10 bins) – returns with EITC claims.
- **Wage and Salary** (7 bins) – returns with wage and salary income but no EITC claims and no Schedules C, E, or F.
- **Schedule E** (6 bins) – returns including Schedule E (investment income) but without EITC claims and with no Schedules C or F.
- **Schedule C** (11 bins) – returns including Schedule C (self-employment income) but without EITC claims and without Schedule F.
- **Schedule F** (3 bins) – returns including Schedule F (farm income) but without EITC claims.

Binning Approach: Bin Characteristics

Bin Characteristics – The five macro-bins are further subdivided into 37 bins using return characteristics related to the following:

- Whether or not the EITC was claimed.
- Schedules included in the return, including in the case of Schedule E whether to front or back or both were included.
- Whether or not wage and salary income is present.
- The number of qualified dependents or exemptions.
- Filing status, married filing jointly or not married filing jointly.
- Whether or not a tax preparer was used.
- Whether or not non-EITC credits were claimed.

Binning Approach: Micro-Binning

Micro-Binning – We are in the process of further subdividing the 37 bins into 700 to 900 micro-bins with 15 to 20 TY 2018-2020 NRP audits in them using splits by income and risk.

- **Income Splits** – using Total Positive Income (TPI) with a small number of splits (6 or less) per bin.
- **Risk Splits** – further splits by risk (using some combination of predicted adjustments from ICM/AI Select and DIF models) in micro-bins of 15-20 TY 2018-2020 NRP audits.
- Micro-bins have audits with similar return characteristics, similar income, and very similar risk profiles.
- Need to assess whether these NRP micro-bins and their population counterparts (from the IRTF) have similar income and risk profiles.
    - Lots of work went into creating risk measures that could be compared across different types of returns and different tax years.

Binning Approach: Reweighting

Reweighting – Reweighting becomes a simple matter of counting the number of population returns and dividing that by number of NRP audits in each micro-bin.

- **Population Returns** – total number of returns in micro-bin in the population (using the TY 2018-2020 IRTF).
- **NRP Audits** – total number of NRP audits in micro-bin in TY 2018-2020.
- **Weight** = **Population Returns** divided by **NRP Audits**.
- Incorporating prior year NRP audits or non-NRP audits would change the denominator of this reweighting equation.
    - In the case of non-NRP returns, it may change the reweighting differentially for different parts of the return.
- Projections to a future tax year would change the numerator of this reweighting equation.

NRP Distribution by Tax Year and Risk

NRP Distribution by Tax Year and Predicted Adjustment Percentile

(with TY 2018-2020 IRTF%)

Macro Bin	Low/Medium Risk 0 to 80th Percentile			High Risk 80th to 100th Percentile		
	14-16	18-20	IRTF%	14-16	18-20	IRTF%
EITC	3,338	368	6.2%	3,425	1,563	10.5%
Wage & Salary	5,405	1,642	60.7%	536	100	0.2%
Schedule E	2,300	1.027	6.5%	2,416	1,236	2.3%
Schedule C	1,666	576	6.2%	8,339	5,350	6.4%
Schedule F	758	151	0.4%	1,683	1,007	0.6%
Total	**13,447**	**3,764**	**80.0%**	**16,399**	**9,256**	**20.0%**

- Note that almost three quarters of the tax gap is in those high-risk returns (80th to 100th percentile).

Incorporating Additional Information

Incorporating Prior Year NRP Audits:

- For some types of returns, sample sizes may be insufficient. Precision may be improved by incorporating prior year NRP audits.
- Incorporating prior year NRP audits may require (a) consideration of tax law changes, (b) decisions about down-weighting prior year NRP audits, and (c) incorporating adjustments to prior year NRP audits.

Incorporating Non-NRP Audits:

- Incorporating non-NRP audits are another potential method of improving precision when sample sizes may be insufficient.
- Non-NRP audits are varied and tend to be less comprehensive and limited to high-risk returns. Accounting for both the lack of comprehensiveness and risk profile is challenging.
- One promising future application of matching non-NRP returns is for some complex returns that are being audited with a focus on the non-1040-based issues that are the focus on NRP audits.

Other Steps in the Tax Gap Estimation Process

Other Steps in the Tax Gap Estimation Process:

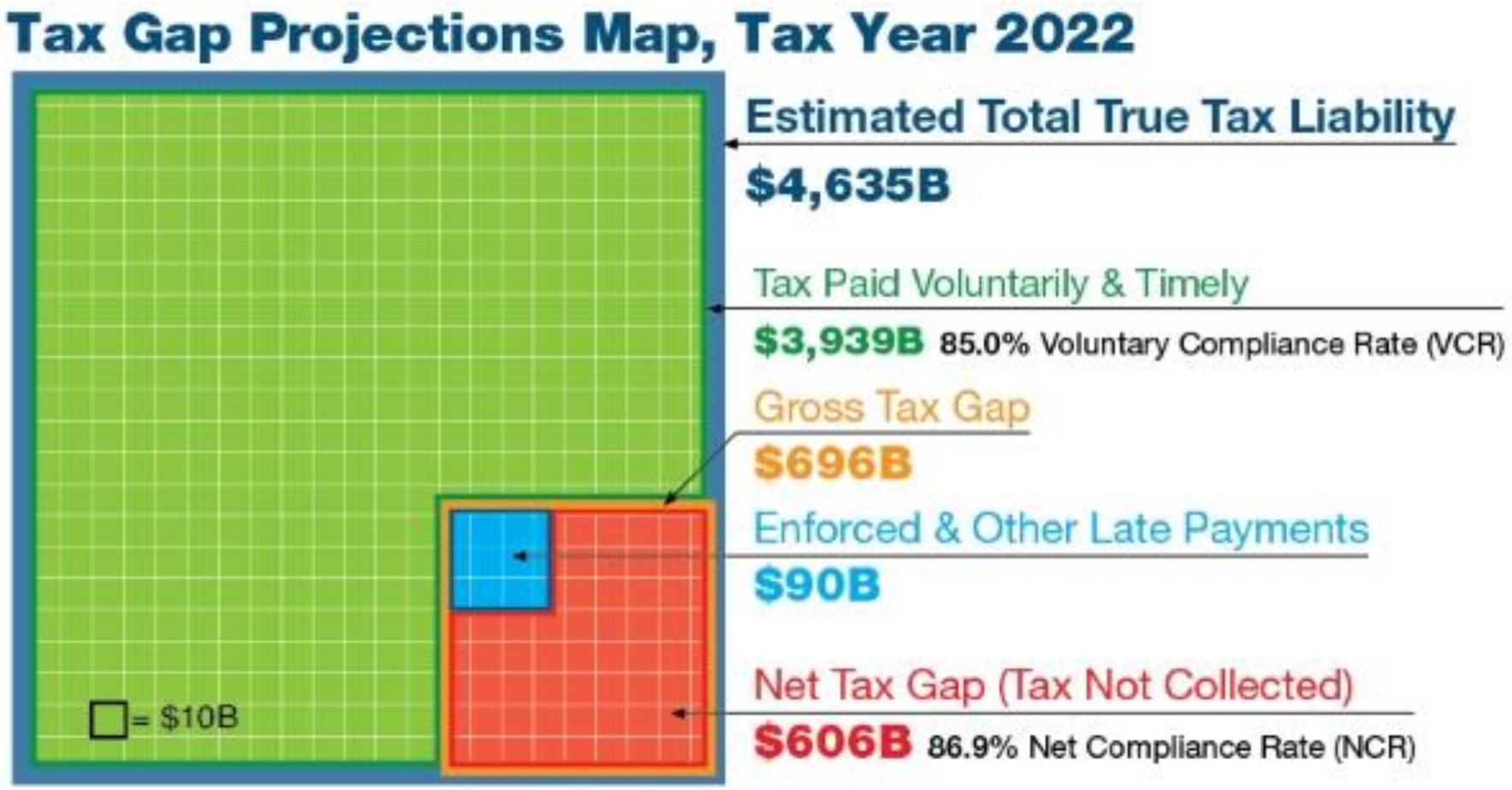
- Incorporating new method of estimating undetected income.
- Updating tax calculator.
- Applying binning algorithm to projections – should improve projection methodology.
- Estimating standard errors.

Final Thoughts

- **Challenges** – Developing new tax gap estimation methodologies for both the individual tax/self-employment tax and the corporate income tax, along with a new methodology for undetected income all in the same year presents implementation and communication challenges.
- **Collaboration** – In addition to working with MITRE and Stanford RegLab, we have a Tax Gap Expert Panel that is helping us vet these new methodologies.
- **Stakeholder Engagement** – We are presenting three papers related to this work here at the IRS-TPC Research Conference, are heavily engaging Treasury's Office of Tax Analysis in this work, and have started briefings of GAO, RAAS leadership, IRS leadership, and other business units.
- **Documentation** – We are anticipating that our tax gap publications this year will need to be supplemented with additional technical analysis of the new methodologies, along with extensive time series comparisons of the legacy and new methodologies.
- **Open Door Policy** – We very much encourage feedback on any of this work. We do not have all of the answers.

Appendix

TY 2022 Tax Gap Projections Map



TY 2022 Tax Gap Statistics

TY 2022 Projected Gross Tax Gap by Component:

- $539 billion – underreporting tax gap (tax understated on timely filed returns).
- $94 billion – underpayment tax gap (tax that was reported on time but not paid on time).
- $63 billion – nonfiling tax gap (tax not paid by those who did not file on time)

TY 2022 Projected Gross Tax Gap by Type of Tax

- $514 billion – individual income tax.
- $127 billion – employment tax.
- $63 billion – corporate income tax.
- $5 billion – estate tax.

Tax Gap by Information Reporting and Withholding

Income Type	Tax Gap	Net Income Misreporting Percentage
Substantial information reporting and withholding (includes wage and salary income, majority of taxpayers)	$9 billion	1%
Substantial information reporting but no withholding (includes pensions & annuities, unemployment compensation, dividend income, interest income, taxable Social Security benefits)	$22 billion	6%
Some information reporting but no withholding (Includes partnership/S corp. income, capital gains, alimony income)	$71 billion	15%
Little or no information reporting and no withholding (Includes nonfarm proprietor income, other income, rents and royalties, farm income, Form 4797 income)	$179 billion	55%

- Almost all of the tax associated with wage and salary income is paid.
- Noncompliance for other income sources varies a great deal; it hurts the economy by distorting economic decisions.

Tax Gap Components

- The tax gap is separated by type of tax
  - Individual Income Tax
  - Corporation Income Tax
  - Employment Taxes (social security and federal unemployment insurance)
  - Estate Tax
  - Excise Tax

- The tax gap is also separated into three primary components: Nonfiling, underreporting, and underpayment
  - Facilitates estimation
  - Components provide different insights into noncompliance
  - Estimation methods based on data availability

- Definitions
  - **Nonfiling tax gap**: The tax not paid on time by those who do not file required returns on time
  - **Underreporting tax gap**: The net understatement of tax on timely filed returns
  - **Underpayment tax gap:** The amount of tax reported on timely filed returns that is not paid on time

Tax Gap Projections

Background

- This overview presents projections of the tax gap for tax years (TY) 2022 and revised projections for TY 2021.
- The tax gap is an estimate of the level of overall noncompliance, in the context of Internal Revenue Code (IRC) provisions in effect at the time.
- Noncompliance estimates rely on information from completed audits, which take several years to complete.
- These projections apply noncompliance rates from TY 2014-2016 to return characteristics from TY 2021 and TY 2022.
- The projections provide the Internal Revenue Service (IRS) with more current information on the expected nature and extent of noncompliance for use in formulating tax administration strategies.
- These projections will be revised annually as more audit and administrative data come available.

Data Methodology and Limitations

Methodology

- The projection methodologies generally follow the methods used for the TY 2020-2021 projections.
  - The **underreporting** tax gap projections assume compliance rates have not changed since the TY 2014–2016 timeframe. For individual underreporting, this assumption applies to the line-item level. Updated administrative tax return data *increased* the TY 2021 total underreporting tax gap projection by $11 billion, of which the corporation income tax accounts for $9 billion of the increase.
  - The **underpayment** projections are calculated from administrative tax return and payment data. Updated administrative data *increased* the TY 2021 projection by $29 billion.
  - The individual income tax **nonfiling** tax gap projections use the "administrative data" method. The methodology was improved to better account for the share of taxpayers who will eventually file a late tax return as opposed to never filing a return. This methodological change *reduced* the TY 2021 projection by $20 billion.
  - **Enforced and other late payments** are projected from historical administrative payment data. The methodology was updated to account for the relationship between late payments and underpayments on timely filed returns. This change *increased* projected TY 2021 enforced and other late payments by $28 billion.

Limitations

- The projections reflect the same underlying data limitations as the tax gap estimates on which they are based. Each approach is subject to measurement error and other non-sampling error. The projections from estimates that are based on samples are also subject to sampling error.
- The estimates on which the projections are based cannot fully represent noncompliance in some components (e.g., digital assets and complex partnerships) because data are lacking.
- The IRS is pursuing new methods for estimating and projecting the tax gap to better reflect changes in taxpayer behavior as they emerge.

Comparison of TY 2014-2016 Tax Gap Estimates and TY 2022 Projections

Tax Gap Component	2014-2016	2022 [1]	Difference	Share of Gross Tax Gap Difference
Estimated Total True Tax	**$3,307**	**$4,635**	**$1,327**	**NA**
Gross Tax Gap	**$496**	**$696**	**$200**	**100%**
Voluntary Compliance Rate	85.0%	85.0%	0.0%	NA
Enforced and Other Late Payments	**$68**	**$90**	**$22**	**NA**
Net Tax Gap	**$428**	**$606**	**$177**	**NA**
Net Compliance Rate	87.0%	86.9%	-0.1%	NA
Nonfiling Tax Gap	**$39**	**$63**	**$24**	**12%**
Individual Income Tax	$32	$53	$20	10%
Self-Employment Tax	$7	$9	$3	1%
Estate Tax	[2]	$1	$1	[2]
Underreporting Tax Gap	$398	$539	$141	71%
Individual Income Tax	$278	$381	$104	52%
Corporation Income Tax	$37	$44	$7	4%
Small Corporations (assets under $10M)	$14	$19	$5	3%
Large Corporations (assets of $10M or more)	$23	$25	$2	1%
Employment Tax	$82	$111	$29	15%
Self-Employment Tax	$53	$71	$18	9%
Uncollected Social Security and Medicare Tax	[2]	$1	[2]	[2]
FICA and FUTA Tax	$29	$40	$11	6%
Estate Tax	$1	$2	$1	[2]
Underpayment Tax Gap	$59	$94	$35	18%
Individual Income Tax	$47	$80	$33	17%
Corporation Income Tax	$4	$6	$1	1%
Employment Tax	$5	$6	$2	1%
Estate Tax	$3	$1	-$2	[2]
Excise Tax	[2]	[2]	[2]	[2]

[1] These figures will be updated as more complete compliance data become available.

[2] Less than 0.5 percent or $0.5 billion.

Detail may not add to total due to rounding.

Money amounts are in billions of dollars.

TY 2022 Projections Highlights

The projected gross tax gap is $**696 billion**, an increase of 40 percent versus TY 2014-2016.

The increase in the projected gross tax gap is driven by growth in projected individual income tax liability.

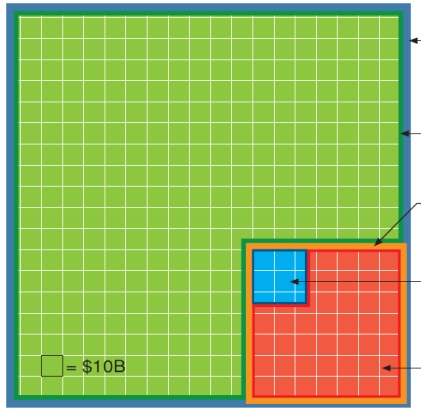
The increase is similar to the 41 percent increase in GDP from TY 2014-2016 to TY 2022

The underreporting projections assume compliance rates have not changed since TY 2014-2016.

Tax Gap Projections for Tax Year 2022

(Money amounts are in billions of dollars. These figures will be updated as more complete compliance data become available.)

IRS Research, Applied Analytics & Statistics



Estimated Total True Tax Liability*
$4,635B

Tax Paid Voluntarily & Timely
$3,939B **85.0%** Voluntary Compliance Rate (VCR)

Gross Tax Gap
$696B

Enforced & Other Late Payments
$90B

Net Tax Gap (Tax Not Collected)
$606B 86.9% Net Compliance Rate (NCR)

Calculating the Net Tax Gap

Nonfiling
Underreporting
+ Underpayment
Gross Tax Gap
– **Enforced & Other Late Payments**
Net Tax Gap

Total True Tax Liability	Tax Paid Voluntarily & Timely	Gross Tax Gap: Nonfiling	Gross Tax Gap: Underreporting	Gross Tax Gap: Underpayment	Gross Tax Gap	Enforced & Other Late Payments	Net Tax Gap (Tax Not Collected)
$4,635	$3,939	$63	+ $539	+ $94	= $696	– $90	= $606
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
$2,557	$2,042	$53	+ $381	+ $80	= $514	– $68	= $447
			Business Income $194; Non-Business Income 87; Credits $48; Income Offsets [1] $27; Filing Status $7; Other Taxes [2] $4; Unallocated Marginal Effects [3] $15				
Corporation Income Tax	Corporation Income Tax	Corporation Income Tax	Corporation Income Tax	Corporation Income Tax	Corporation Income Tax	Corporation Income Tax	Corporation Income Tax
$392	$342	#	+ $44	+ $6	= $50	– $10	= $40
			Large Corporations $25; Small Corporations $19				
Employment Tax	Employment Tax	Employment Tax [4]	Employment Tax	Employment Tax	Employment Tax	Employment Tax	Employment Tax
$1,585	$1,459	$9	+ $111	+ $6	= $127	– $8	= $119
			Self-Employment Tax $71; FICA & Uncollected FICA TAX $39; FUTA $1				
Estate Tax	Estate Tax	Estate Tax	Estate Tax	Estate Tax	Estate Tax	Estate Tax	Estate Tax
$35	$30	$1	+ $2	+ $1	= $5	– $4	= $0.4

NOTES:

* Totals include Excise Tax.

#—No estimate.

Detail may not add to totals due to rounding.

[1] Includes adjustments, deductions, and exemptions.

[2] Includes the Alternative Minimum Tax and taxes reported in the "Other Taxes" section of the Form 1040 except for self-employment tax and unreported social security and Medicare tax (which are included in the employment tax gap estimates).

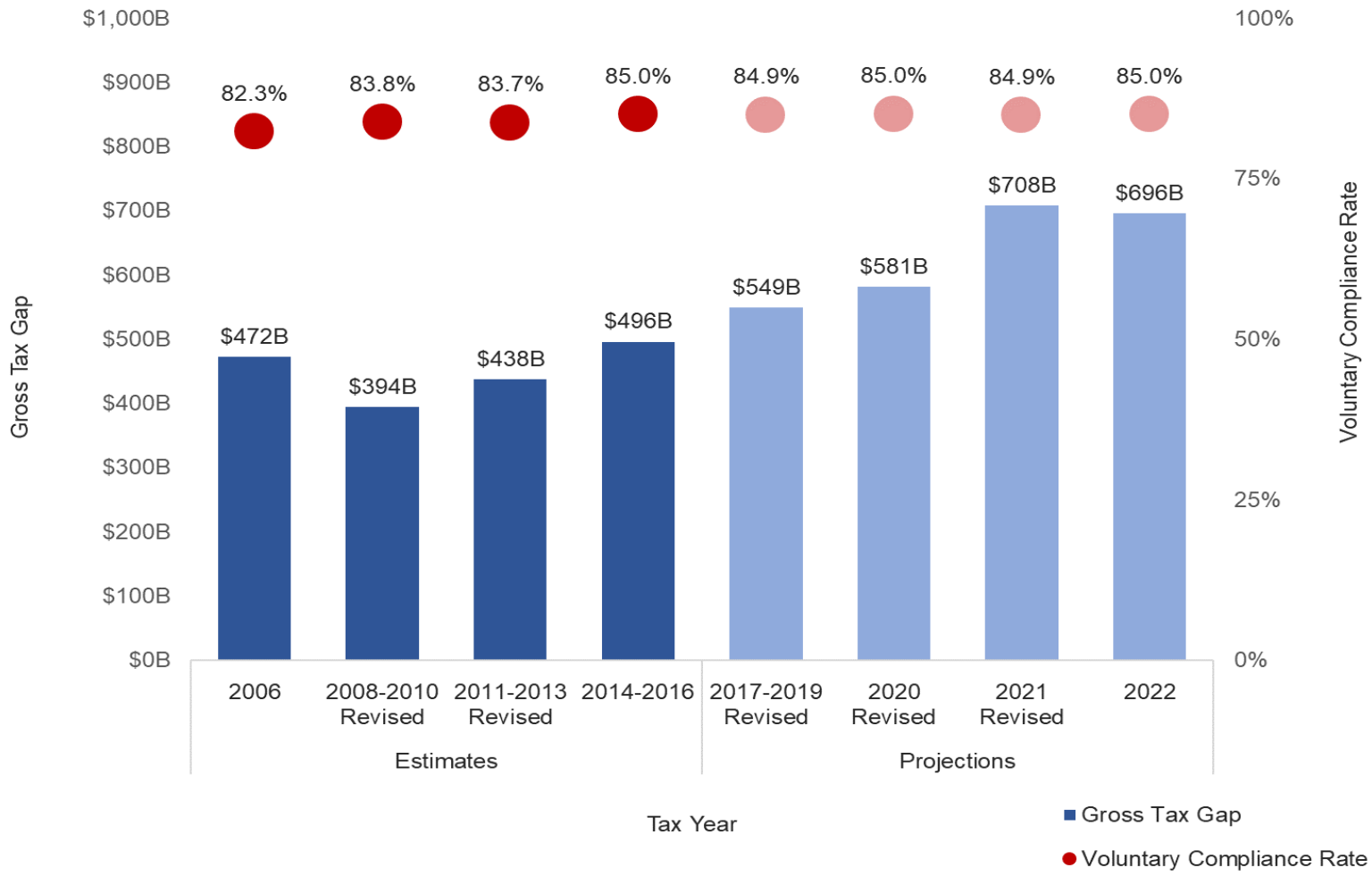
[3] Is the difference between (1) the estimate of the individual income tax underreporting tax gap where underreported tax is calculated based on all misreporting combined and (2) the estimate of the individual income tax underreporting tax gap based on the sum of the tax gaps associated with each line item where the line item tax gap is calculated based on the misreporting of that item only. There may be differences if the marginal tax rates are different in these two situations.

[4] Self-employment tax only.

Revised 07/2024

Comparison with Prior Estimates

Tax Gap and Voluntary Compliance Rate: Estimates and Projections



Gross Tax Gap Estimates: TY 2021 and 2022, Additional Details

Tax Gap Component	TY 2021 Revised	Share of Gross Tax Gap	TY 2022	Share of Gross Tax Gap
Estimated Total True Tax	**$4,673**		**$4,635**	
Gross Tax Gap	**$708**	**100%**	**$696**	**100%**
Voluntary Compliance Rate	*84.9%*		*85.0%*	
Enforced and Other Late Payments	**$90**		**$90**	
Net Tax Gap	**$617**		**$606**	
Net Compliance Rate	*86.8%*		*86.9%*	
Nonfiling Tax Gap	**$57**	**8%**	**$63**	**9%**
Individual Income Tax	$47	7%	$53	8%
Self-Employment Tax	$8	1%	$9	1%
Estate Tax	$2	[2]	$1	[2]
Underreporting Tax Gap	**$554**	**78%**	**$539**	**77%**
Individual Income Tax	**$398**	**56%**	**$381**	**55%**
Non-Business Income	$110	16%	$87	13%
Business Income	$183	26%	$194	28%
Adjustments, Deductions, Exemptions	$26	4%	$27	4%
Filing Status	$8	1%	$7	1%
Other Taxes [4]	$5	1%	$4	1%
Unallocated Marginal Effects [5]	$16	2%	$15	2%
Credits	$51	7%	$48	7%
Corporation Income Tax	**$49**	**7%**	**$44**	**6%**
Small Corporations (assets under $10M)	$23	3%	$19	3%
Large Corporations (assets of $10M or more)	$26	4%	$25	4%
Employment Tax	**$105**	**15%**	**$111**	**16%**
Self-Employment Tax	$68	10%	$71	10%
Uncollected Social Security and Medicare Tax	[2]	[2]	$1	[2]
FICA and FUTA Tax	$37	5%	$40	6%
Estate Tax	**$2**	**[2]**	**$2**	**[2]**
Underpayment Tax Gap	**$97**	**14%**	**$94**	**14%**
Individual Income Tax	$84	12%	$80	12%
Corporation Income Tax	$6	1%	$6	1%
Employment Tax	$5	1%	$6	1%
Estate Tax	$1	[2]	$1	[2]
Excise Tax	[2]	[2]	[2]	[2]

Tax Gap Component	Voluntary Compliance Rate		Distribution of Liability	
	TY 2021 Revised	TY 2022	TY 2021 Revised	TY 2022
Overall (all taxes combined)	85%	85%	100%	100%
Individual Income Tax	80%	80%	58%	55%
Corporation Income Tax	87%	87%	9%	8%
Employment Tax	92%	92%	31%	34%
Estate Tax	85%	87%	1%	1%
Excise Tax	N/A	N/A	1%	1%

[1] These figures will be updated as more complete compliance data become available.

[2] Less than 0.5 percent or $0.5 billion.

[3] The *Other taxes* component includes the Alternative Minimum Tax, Excess APTC Repayment, and taxes reported in the "Other Taxes" section of the Form 1040 except for self-employment tax and unreported social security and Medicare tax (which are included in the employment tax gap estimates).

[4] The *Unallocated marginal effects* component reflects the difference between (1) the estimate of the individual income tax underreporting tax gap where underreported tax is calculated based on all misreporting combined and (2) the estimate of the individual income tax underreporting tax gap based on the sum of the tax gaps associated with each line item where the line item tax gap is calculated based on the misreporting of that item only. There may be a difference whenever more than one line item has been misreported on the same return and the combined misreporting results in a higher marginal tax rate than when the tax on the misreported amounts is calculated separately.

N/A-Not applicable.

Detail may not add to total due to rounding.

Money amounts are in billions of dollars.

Tax Gap Background: The Tax Gap Objective

- The objective of tax gap estimation is to measure taxpayer compliance behavior as it manifests as tax not paid voluntarily and timely.
- The focus and challenge is to measure actual behavior.
- Because the goal is to measure actual behavior, the tax gap concept is inherently retrospective.
- Our tax gap estimates reflect tax noncompliance.
  - Tax noncompliance and tax gap estimates reflect both intentional and unintentional errors.
  - The tax gap estimates do not include tax “avoidance.”
  - We do not use the term “evasion.” “Tax evasion” has specific meanings within tax administration reflecting, in general, intentional noncompliance rising to the level of criminality. Some intentional errors might rise to the level of tax evasion, but tax noncompliance/tax gap and tax evasion are not interchangeable terminology.

Tax Gap Background: Key Points

The tax gap synthesizes compliance behavior into measures of tax not paid voluntarily and timely. Estimates have been developed and released on a recurring, irregular schedule.

The Tax Gap is:

- A tax year (TY) concept, as opposed to a fiscal year concept;
- A dollar concept;
- Broadly defined to encompass both tax and refundable and nonrefundable tax credits;
- Based on all the relevant events that occurred during a tax year and the Internal Revenue Code (IRC) provisions in effect at the time;
- Most informative if grounded in data that reflect observed compliance behavior;
- A measure of the extent of overall voluntary compliance and tax noncompliance;
- A compliance indicator — not an IRS performance measure, and
- Often used as a synonym for “noncompliance” and mistakenly thought to be the same thing as the National Research Program.

Tax Gap Background: Tax Gap Concepts

Tax Gap Concepts: Dollar Measures

- Gross tax gap:
  The amount of true tax liability after refundable credits that is not paid voluntarily and timely for a given tax year
- Enforced and other late payments:
  The dollar amount of the gross tax gap for a given tax year that will eventually be paid
- Net tax gap:
  The gross tax gap less enforced and other late payments
- Net misreported amount (NMA):
  The net dollar amount misreported on a return or schedule line item in the favor of taxpayers

Tax Gap Concepts: Ratio Measures

- Voluntary compliance rate (VCR):
  The amount of tax paid voluntarily and timely for a given tax year divided by total true tax, expressed as a percentage
- Net compliance rate (NCR):
  The sum of all timely and late tax payments divided by total true tax liability, expressed as a percentage
- Net misreporting percentage (NMP):
  The NMA divided by the sum of the absolute values of the amounts that should have been reported
- Voluntary reporting rate (VRR):
  The amount of reported tax divided by the amount of tax that should have been reported (only for underreporting tax gap)

TY 2021 and 2022 Tax Gap Projections Methodology

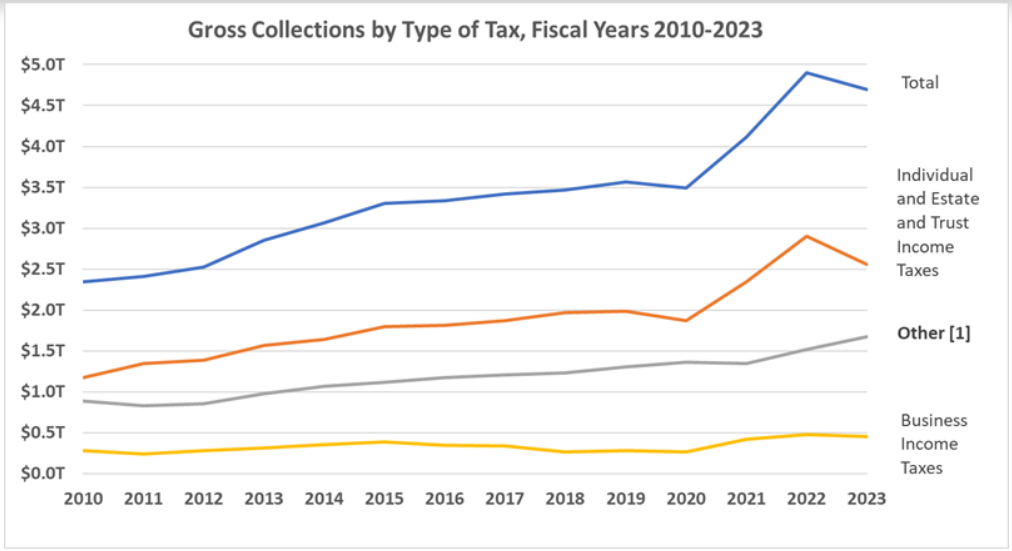
Tax Gap Component			TY 2020, TY 2021 and TY 2022 Tax Gap Projection Approach
Nonfiling Tax Gap	Individual Income Tax & Self-employment Tax	Data	IRS administrative data for TY 2020, 2021 and 2022
		Method	Administrative Data Method: Use IRS administrative data (information documents) for income and impute demographics (based on aggregate Census data) for those who did not file on time Subtract tax that was timely paid when calculating the tax gap
	Estate Tax	Data	IRS administrative data for TY 2020, 2021 and 2022
		Method	Late Filers Reported tax liability on late filed returns minus tax that was timely paid
Underreporting Tax Gap	Individual Income Tax & Self-employment Tax	Data	TY 2020, 2021 and 2022 IRTF data
		Method	Assumes line-item compliance rates and average marginal tax rates are constant Assumes that the TY 2014-2016 tax gap for a line item grew at the rate of growth in the absolute value of the reported amount for the line item.
	Corporation Income Tax	Data	BRTF data for TY 2020, 2021 and 2022
		Method	Small (assets < $10 million): Assumes VRR from small corporation TY 2014–2016 estimate, which is an estimate from 2009-2016 compliance data, applies to TY 2020, 2021 and 2022. This is equivalent to assuming the TY 2014-2016 tax gap grew at the rate as the growth in the rate of reported tax. Large (assets ≥: $10 million): Assumes VRR from large corporation TY 2014–2016 estimate, which is an estimate from 2005-2011 compliance data, applies to TY 2020, 2021 and 2022. This is equivalent to assuming the TY 2014-2016 tax gap grew at the rate of growth in reported tax.
	FICA & FUTA Tax	Data	TY 2020, 2021 and 2022 BRTF data
		Method	VRR estimated from NRP data for TY 2008–2010 applied to TY 2020, 2021 and 2022 reported tax liability. This is equivalent to assuming the tax gap grew at the rate of growth in reported tax.
	Estate Tax	Data	TY 2020, 2021 and 2022 BRTF data
		Method	Assumes VRR from estate tax TY 2014–2016 estimate applies to TY 2020, 2021 and 2022.This is equivalent to assuming the TY 2014-2016 tax gap grew at the rate of growth in reported tax.
Underpayment Tax Gap	All	Data	TY 2020–2022 IRS administrative data
		Method	Actual amounts calculated from IRS tax modules
Enforced & Other Late Payments	All	Data	FY 1995–2020 IRS administrative data: IRS Master File tabulations including all late payments by type of tax, tax year of liability, and fiscal year of payment
		Method	Projection of future payments for a given TY was based on the average historical flow of TY payments across successive FYs.

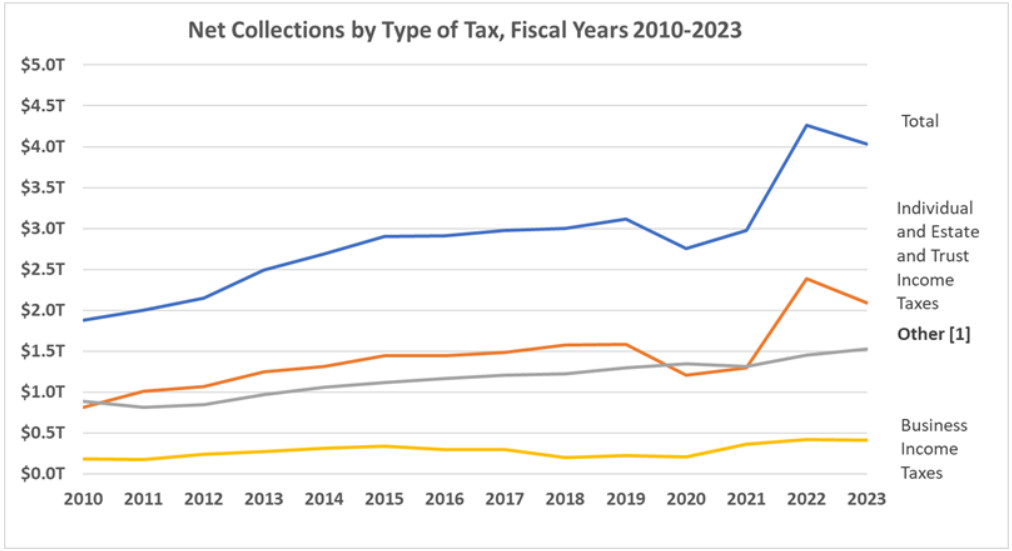
BRTF–Business Returns Transaction File: IRS administrative data containing return information for originally filed business returns
NRP–National Research Program
IRTF–Individual Returns Transaction File: IRS administrative data containing return information for originally filed individual income tax returns
VRR–Voluntary Reporting Rate

TY 2014–2016 Tax Gap Estimates Methodology

Tax Gap Component			TY 2014–2016 Tax Gap Estimation Approach
Nonfiling Tax Gap	Individual Income Tax & Self-employment Tax	Data	Census survey data linked to expanded IRS data for TY 2014–2016
		Method	Improved Census Method: Use IRS administrative data (information documents) for income and Census data for demographics for those who did not file on time Subtract tax that was timely paid when calculating the tax gap
	Estate Tax	Data	IRS administrative data for TY 2014–2016 National Center for Health Statistics (NCHS) and University of Michigan Health and Retirement Survey (HRS) data from 2014–2016.
		Method	Late Filers Reported tax liability on late filed returns minus tax that was timely paid Nonfilers Wealth adjusted mortality curves; NCHS and HRS data did not support an estimate due to the increased estate tax filing thresholds
Underreporting Tax Gap	Individual Income Tax & Self-employment Tax	Data	TY 2014–2016 NRP data with pooled TY 2011–2015 NRP data used to estimate DCE (Detection Controlled Estimation) TY 2016 NRP study was limited to returns that claimed certain tax credits
		Method	NRP individual income tax reporting compliance sample data weighted to population estimates and adjusted for non-detection measurement error through DCE Line-item DCE estimates Tax calculator (recomputes tax with DCE adjustment and determines underreporting tax gap for total and by line item)
	Corporation Income Tax	Data	AIMS closed case audit data & tax return data for TYs 2005–2016
		Method	Small (assets < $10 million) Econometric model using audit & tax return data from TY 2009–2016 to calculate a VRR which is applied to TY 2014–2016 BRTF reported tax Large (assets ≥: $10 million) Extreme value VRR from Large Corps; uses audit data from TY 2005–2011 to estimate a VRR which is applied to TY 2014–2016 BRTF reported tax
	FICA & FUTA Tax	Data	NRP Employment Tax Study for TY 2008–2010 and TY 2014–2016 BRTF data
		Method	VRR estimated from NRP for TY 2008-2010 and applied to TY 2014–2016 BRTF reported tax liability
	Estate Tax	Data	Operational audit data for TY 2014–2016.
		Method	Econometric model used to calculate voluntary reporting rate which is applied to TY 2014–2016 BRTF reported tax
Underpayment Tax Gap	All	Data	TY 2014–2016 IRS administrative data
		Method	Actual amounts calculated from IRS tax modules
Enforced & Other Late Payments	All	Data	IRS administrative data--IRS Master File tabulations including all late payments by type of tax, tax year of liability, and fiscal year of payment
		Method	Estimate for a given type of tax & tax year is the sum of late payments to date plus a projection of future late payments based on payment patterns observed for earlier tax years

IRS Gross and Net Collections, FY 2010–2023





[1] Includes employment, estate and gift, and excise tax forms.

SOURCE: *IRS Data Book* Table 1

Research, Applied Analytics & Statistics

TAX POLICY CENTER
URBAN INSTITUTE & BROOKINGS INSTITUTION

15th Annual IRS/TPC Joint Research Conference on Tax Administration

Undetected Income:
Identification, Estimation, and Uncertainty

Stanford RegLab: Patrick Vossler, Aviv Caspi, Jonathan Hennessy, Zaynah Javed
IRS: John Guyton, Andrew Johns, Dan Rosenbaum
Co-PIs: Jacob Goldin (University of Chicago), Daniel E. Ho (Stanford)

IRS – TPC Conference

June 12, 2025

Using (Imperfect) Investigations to Estimate Overall Prevalence

- Common across regulatory domains (e.g. food safety, patents, *tax compliance*)
- In our context: estimate Tax Gap = Taxes Owed – Taxes Paid, using random audits

Using (Imperfect) Investigations to Estimate Overall Prevalence

- Common across regulatory domains (e.g. food safety, patents, *tax compliance*)
- In our context: estimate Tax Gap = Taxes Owed – Taxes Paid, using random audits
- Core challenge and opportunity: not all investigators detect equally

Goal: identify best examiner despite noise and correct for imperfect detection *(i.e. what would the best examiner have found?)*

Tax Gap Background

- A large tax gap is a major challenge for tax administration and fiscal policy
- Underreported income accounts for 80% of tax gap
- Currently, IRS uses Detection Controlled Estimation (DCE) Details
- DCE relies on embedded structure (e.g., to separate evasion from detection) DCE

Four Key Contributions

1. **Identification:** tax gap is under-identified using only examiner variation
   - Variation in examiners identifies Detection – Under-reporting Frontier
   - Clarifies assumptions needed to pin down a single tax gap estimate

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4. **Uncertainty:** Bayesian approach naturally produces uncertainty estimates

Presentation Outline

1. **Identification Framework:** notation and Detection – Under-reporting Frontier
2. **Relative Rate Estimation:** Bayesian approach to model examiner performance
3. **Simulation Results:** test performance across scenarios, benchmark to DCE
4. **Application to IRS Data:** implementation with NRP data
5. **Extensions and Implications:** audit design considerations, model extensions

Identification Framework

Two-Examiner Intuition

- Consider two examiners (1 and 2) auditing tax returns:
  - $\overline{A}_j$: average adjustment found by examiner j
  - Assume $\overline{A}_1 \geq \overline{A}_2$ (examiner 1 finds more)
- Let $\overline{A}_0$ be the true average adjustment (our estimand, $\theta = \overline{A}_0$)
- Define detection rate: $D_j = \overline{A}_j / \overline{A}_0$

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- Define detection rate: $D_j = \bar{A}_j / \bar{A}_0$

Key equation: true underreporting $\hat{\theta} = \frac{\bar{A}_1}{D_1}$

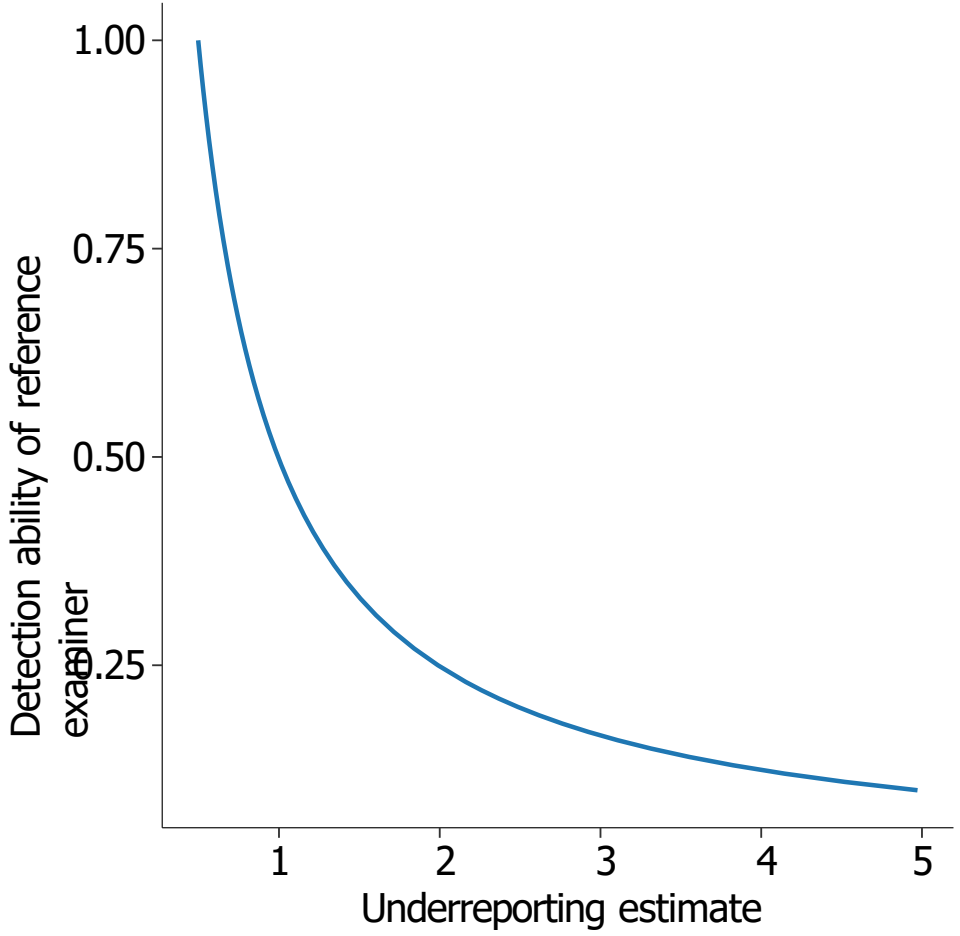
If D_1 is...	Then $\hat{\theta}$ equals...
100%	$\bar{A}_1$
50%	$2 \cdot \bar{A}_1$
25%	$4 \cdot \bar{A}_1$

The Fundamental Identification Challenge

- If examiner *1* finds twice as much as examiner *2*:
  - *1*: 100%, *2*: 50%? or
  - *1*: 50%, *2*: 25%?
  - or countless other combinations
- Additional information or assumptions needed to pin down true tax gap

Detection – Underreporting Frontier

- Visualizes all possible combinations of detection rates and tax gap estimates
- Any point on the curve is consistent with observed data
- Shows inverse relationship: as detection rate ↓, tax gap ↑
- Makes transparent how identification assumptions drive final estimates



Approaches to Anchoring

- External knowledge about specific examiner:
  - $D_{j^*} = D^*$ for some examiner j^*
  - Estimate: $\hat{\theta} = \frac{\bar{A}_{j^*}}{D^*}$
- Maximum detection assumption:
  - Best examiner achieves perfect detection: $\theta = \max_j \bar{A}_j$
- Percentile assumption:
  - Examiners at certain percentile p achieve known detection rate
- Partial identification:
  - Examiner at percentile p has detection rate within bounds
  - Yields interval estimate rather than point estimate

Relative Rate Estimation

From Identification to Estimation

We've established a framework that identifies *relative* rates but requires anchoring.

Now, we need an estimation procedure that:

- Efficiently extracts signal from noisy exams of very different returns
- Regularizes estimates for examiners with few exams
- Provides uncertainty quantification

From Identification to Estimation

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Now, we need an estimation procedure that:

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Our approach: model relative to predictions, not raw adjustments

- Model captures the variety in return complexity and potential noncompliance
- New framing: how do examiners perform *relative to expectations*?
- In IRS context: leverage AI Select's risk predictions as a baseline

Relative Detection Rate: Intuition

- For each return i audited by examiner j:
  - A_i^{obs}: Actual adjustment found
  - $f(x_i)$: Predicted adjustment from AI Select (x_i are return features)

- Relative detection rate: $r_i^{obs} = \frac{A_i^{obs} - f(x_i)}{f(x_i)}$

Relative Detection Rate: Intuition

- For each return i audited by examiner j:
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  - $f(x_i)$: Predicted adjustment from AI Select (x_i are return features)
- Relative detection rate: $r_i^{obs} = \frac{A_i^{obs} - f(x_i)}{f(x_i)}$
- Interpretation:
  - $r_i^{obs} = 0$: Examiner found exactly what was predicted
  - $r_i^{obs} = 0.5$: Examiner found 50% more than predicted
  - $r_i^{obs} = -0.25$: Examiner found 25% less than predicted
- Normalizes for return complexity and expected underreporting

Hierarchical Model for Examiner Skill

- Each examiner has an underlying skill level γ_j
- Observed relative rates vary around skill level:

$$r_i^{obs} | \boldsymbol{\gamma}, \boldsymbol{\sigma}^2 \sim N(\gamma_j, \sigma_j^2)$$

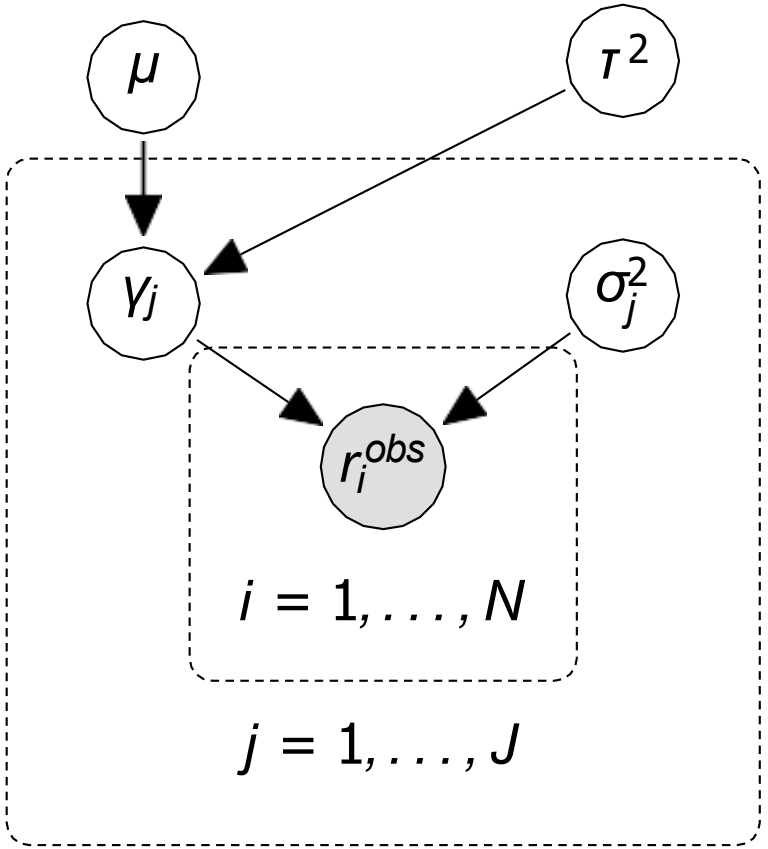
- Prior distribution on examiner skills:

$$\gamma_j | \mu, \tau^2 \sim N(\mu, \tau^2)$$
$$\sigma_j^2 \sim \text{Inv-}\chi^2(1, 1)$$

- Hyperparameters have diffuse priors:

$$p(\mu) \propto 1 \quad \text{and} \quad p(\tau^2) \propto 1/\tau^2$$

$p(\mu) \propto 1$ $\qquad$ $p(\tau^2) \propto 1/\tau^2$



How Shrinkage Works in Our Model

- Posterior mean of examiner skill:

$$E(\gamma_j | r^{obs}, W) \approx \kappa_j \cdot \mu + (1 - \kappa_j) \cdot r_j^{obs}$$

where $\kappa_j = \frac{\sigma_j^2 / N_j}{\sigma_j^2 / N_j + \tau^2}$ is the shrinkage factor

- More shrinkage ($\kappa_j \to 1$) when:
  - Examiner has few exams (small N_j)
  - Examiner's results are highly variable (large σ_j^2)
  - Little variation in examiner skill overall (small τ^2)

Estimating the True Average Adjustment

- After estimating examiner skills γ_j, we identify "best" examiner
- For each posterior draw s, find $\gamma_{max}^{(s)} = \max(\gamma_1^{(s)}, \ldots, \gamma_J^{(s)})$
- Estimate the tax gap as $\theta^{(s)} = (1 + \gamma_{max}^{(s)})\bar{f}$
- Alternative options:
  - Use a specific percentile (e.g., 95th) rather than maximum
  - Scale up by an additional factor to account for undetected issues
  - Allow for partial identification through bounds
- Report posterior mean and credible intervals using posterior draws $\{\theta^{(s)}\}$

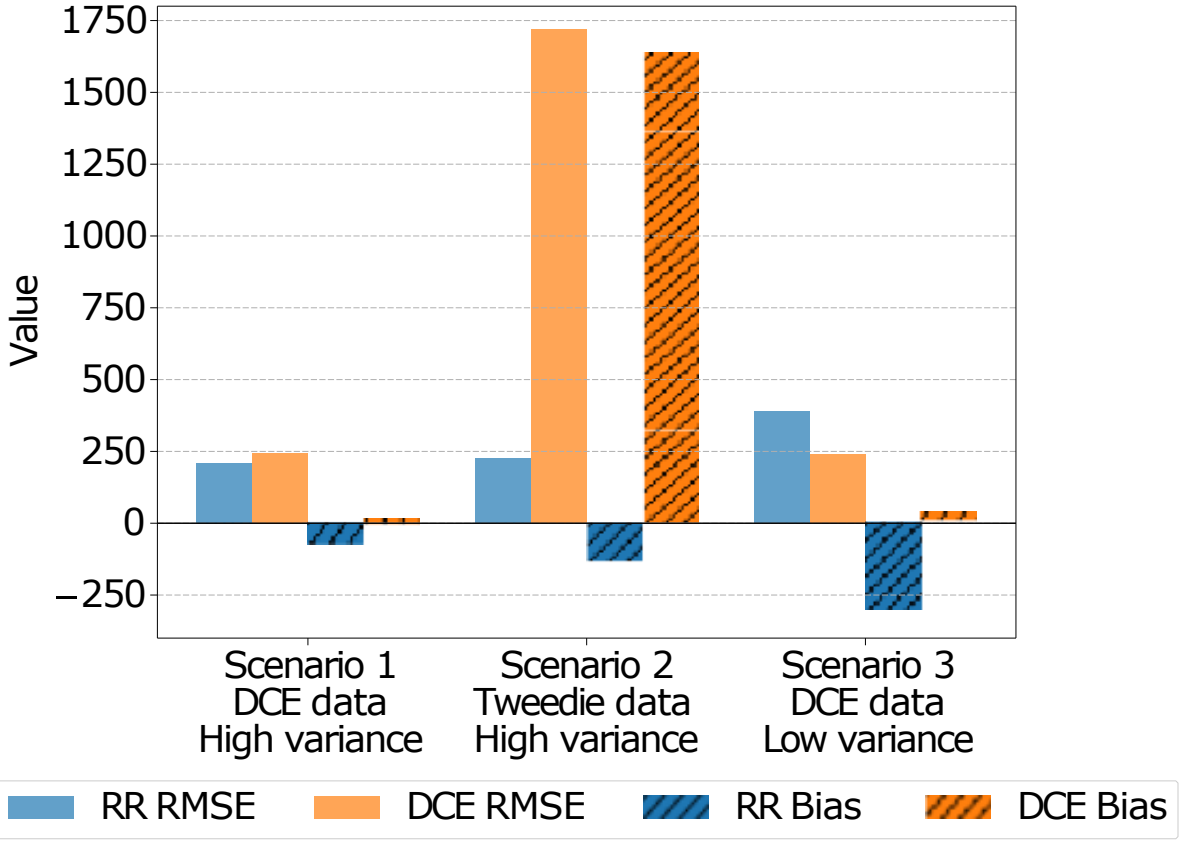
Simulation Results

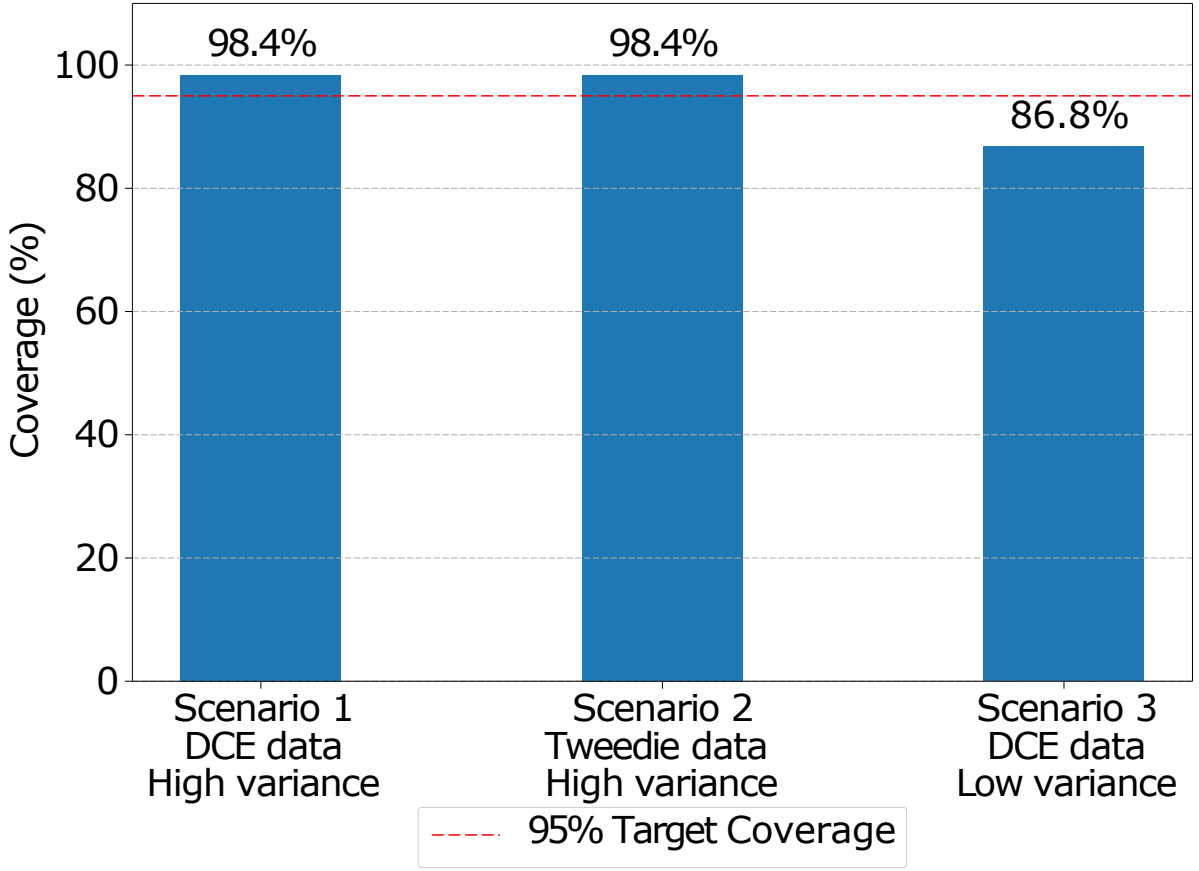
Simulation Design and Key Scenarios

- 100 examiners with varying exam counts, 500 simulation runs per scenario
- Key dimensions varied:
  - True adjustment distribution: DCE or Tweedie
  - Examiner skill heterogeneity: high, low, or none
- Scenario groups:
  - Scenarios 1-2: Substantial examiner heterogeneity (skill SD = 0.3)
  - Scenarios 3-6: Minimal examiner heterogeneity (skill SD = 0.1)
  - Scenarios 9-10: Edge cases with no true examiner variation

Setting Details | Scenario Details | Tweedie Details

Simulation Results





For context, average true adjustment ≈ $2,800

Full Sim Results

Application to IRS Data

Data and Implementation

- Data: 2006-2014 NRP examinations
- Final sample: 113,524 completed exams by 4,896 unique examiners
- Key variables:
  - Tax change determined by examiner (outcome variable)
  - Prediction from IRS AI Select model (baseline)
- Calibrated AI Select predictions using GAM

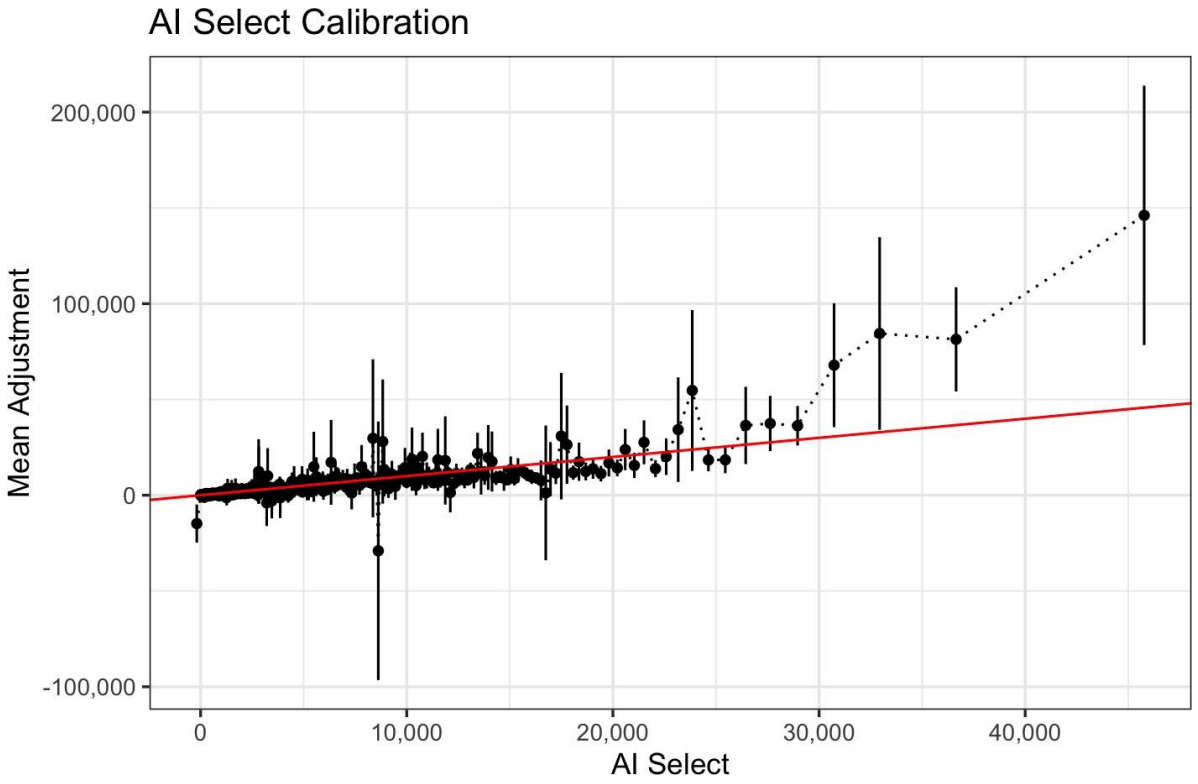
Implementation and Low-Prediction Returns

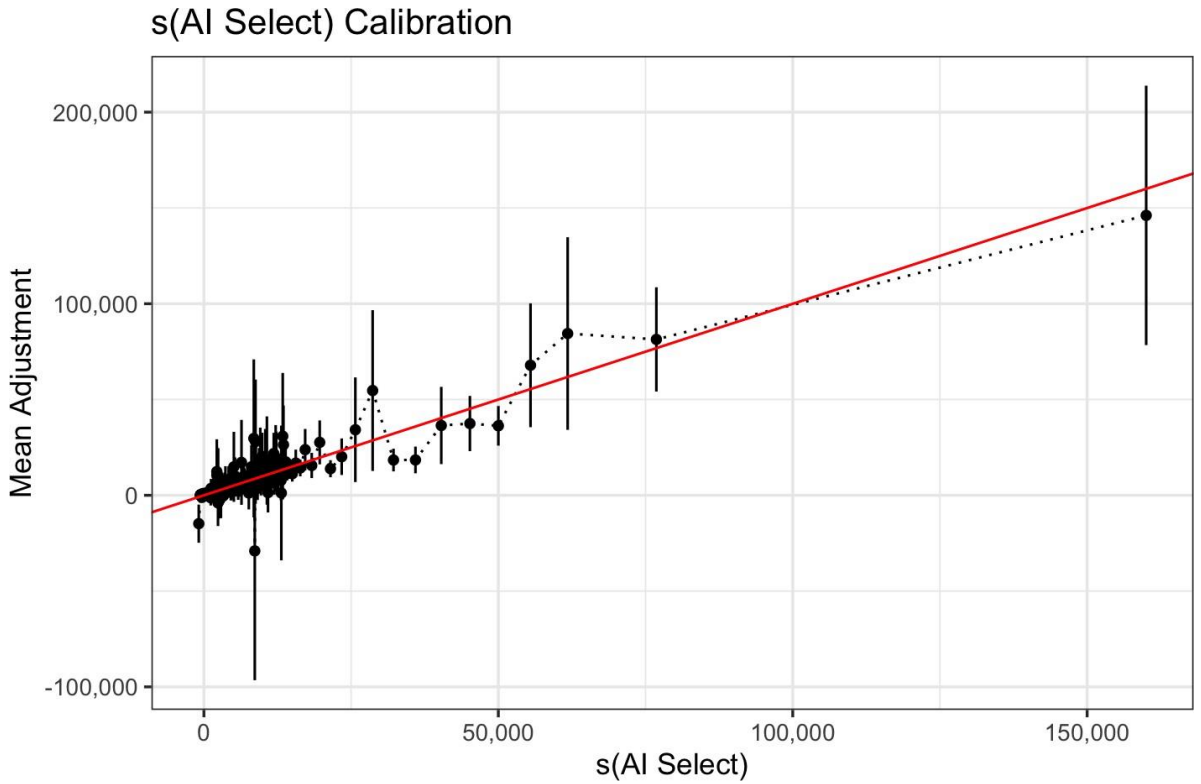
- Low returns could inflate relative rate through smaller denominator → set a floor F
- Effort on smaller returns may be unrepresentative → reweight by prediction
- Top examiner may be more sensitive to weighting decisions → use percentile

Today: preliminary results without floors, weights, or percentiles.

Soon: principled approach to jointly choose implementation parameters.

Calibrating AI Select Predictions





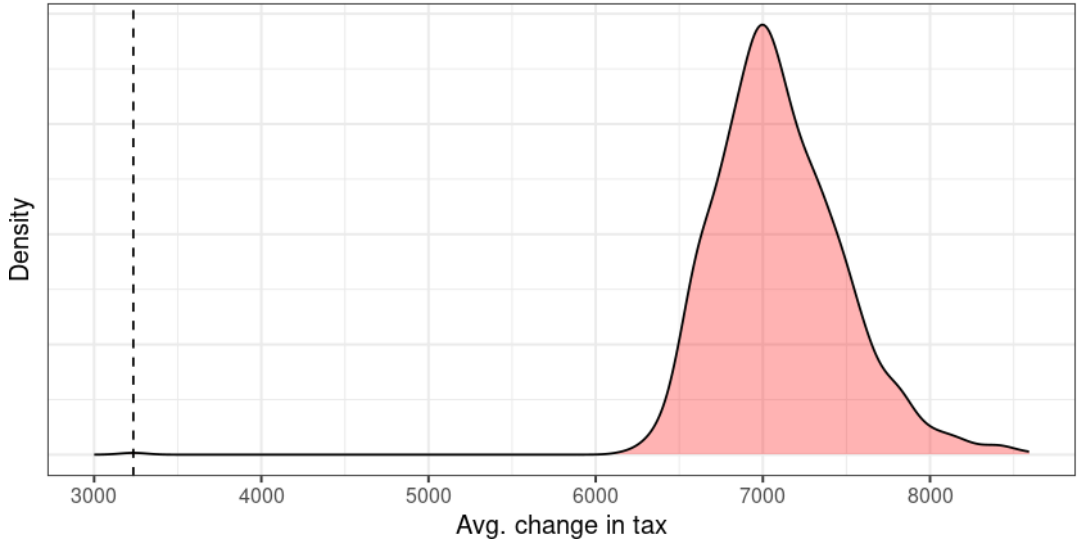
- Fit GAM: $A^{obs} \sim$ `s(AI Select)`
- Use calibrated predictions from GAM

Contributions

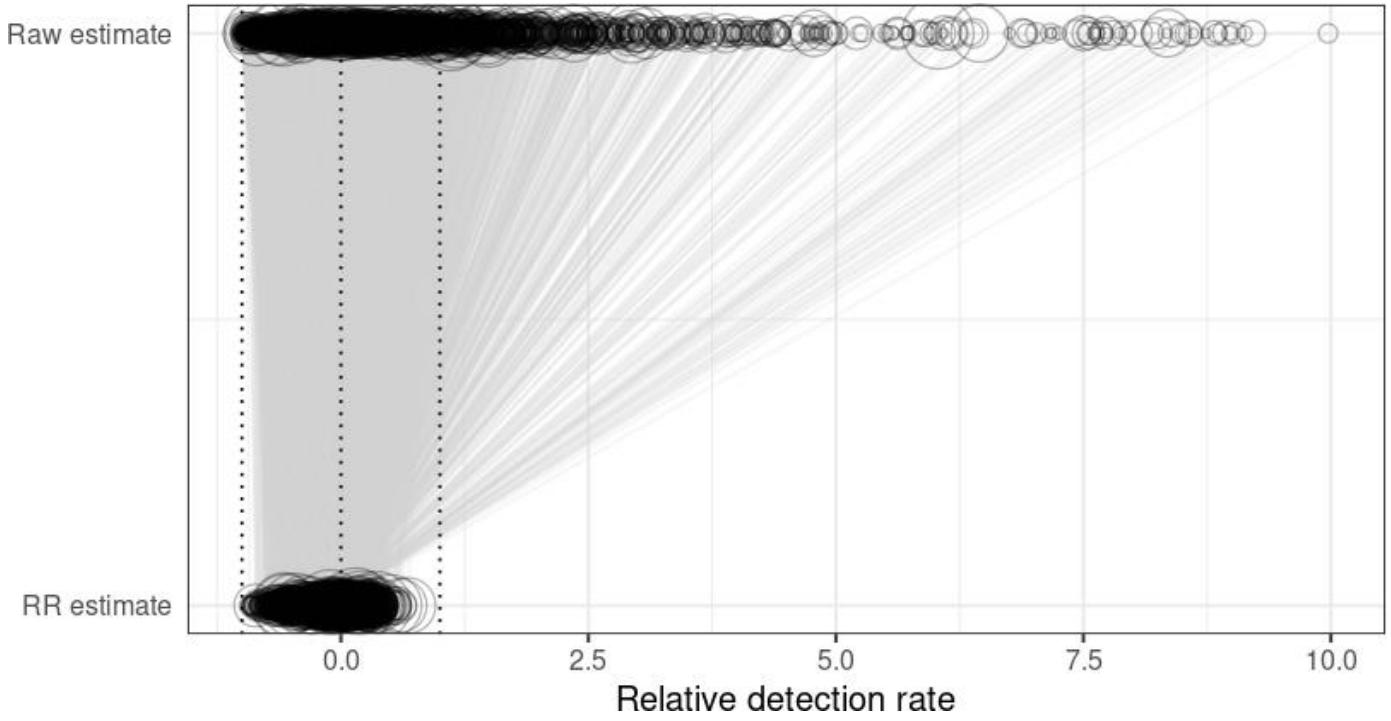
- Lowers examiner inclusion threshold:
  - From minimum 25 exams per examiner to 2
  - Triples number of individually identified examiners
- No truncation of outliers; uses model-based regularization instead
- Incorporates negative adjustments (11% of sample) – previously replaced with 0's
- Integration with existing infrastructure:
  - Uses AI Select prediction model
  - Calibrates predictions with GAM
  - Benefits from future prediction improvements

Results: Estimated Tax Gap

- Posterior mean: $E(\theta | r^{obs}, W^{obs}) = \$7,076$
- 95% credible interval: $(\$6,476, \$7,915)$
- Avg observed adjustment: $A^{obs} = \$3,234$
- Implied multiplier ~ 2.2 (95% CI: [2.0,2.4])



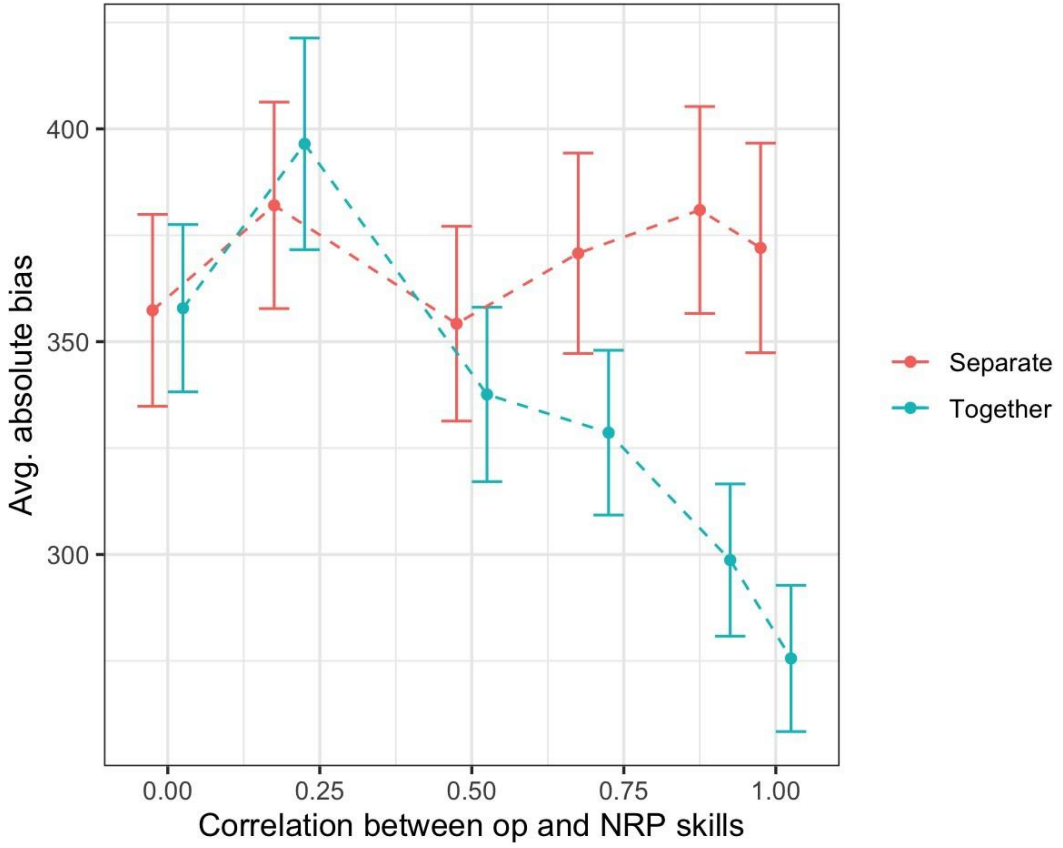
Examiner Effect Shrinkage



- Posterior mean $\mu = -0.146 \rightarrow$ avg examiner finds slightly less than predicted
- Posterior mean $\tau = 0.359 \rightarrow$ estimate meaningful skill differences across examiners

Extension: Pooling Information Across Return Types

- Examiners often audit multiple return types; skill likely correlates across tasks
- Natural extension:
  1. Model vector of skills per examiner
  2. Estimate correlation of skills
  3. "Borrow strength"
- Particularly valuable with decreasing NRP sample, issues with few exams



Discussion and Implications

We propose a method to use variation in examiner skills to:

- Identify a Detection – Under-reporting Frontier
- Estimate relative detection rates while regularizing noise
- Estimate a tax gap with uncertainty measures and more explicit assumptions
- Expand the opportunities to pool analysis across investigations
- Inform design of audit strategies Implications

Thank you – questions and feedback very welcome!

Appendix

Simulation Design

- 100 examiners, varying number of exams per examiner
- Key dimensions varied:
  - True adjustment distribution: DCE or Tweedie Tweedie Details
  - Examiner skill distribution: Normal, Uniform, or constant
  - Detection rate bounds: $[0, 1]$, $[0, \infty)$, or $(-\infty, \infty)$
  - Examiner skill heterogeneity: varying SD of detection skills
- 500 independent simulation runs for each scenario

Sim Design and Scenarios

Simulation Scenarios

Scenario	True Adjustment	Detection Skill	Detection Bounds
1-2	DCE, Tweedie	$N(0.7, 0.3^2)$	$[0, 1]$
3-6	DCE, Tweedie	$N(0.8, 0.1^2)$	$[0, 1]$, $[0, \infty)$
7-8	Tweedie $N(0.6, 0.2^2)$, Unif(0,1)		$(-\infty, \infty)$
9-10	Tweedie	$D_j = 1$	$(-\infty, \infty)$

- Scenarios 1-2: Test performance with substantial examiner heterogeneity
- Scenarios 3-6: Test with minimal examiner heterogeneity
- Scenarios 7-8: Evaluate with unbounded detection rates
- Scenarios 9-10: Edge cases with no true examiner variation

Sim Design and Scenarios

Simulation Results: Comparison with DCE

		Relative Rate			DCE	
Scenario	Description	Bias	RMSE	Coverage	Bias	RMSE
1	DCE, $N(0.7, 0.3^2)$, [0,1]	-72.8	209.6	98.4%	15.9	244.3
2	Tweedie, $N(0.7, 0.3^2)$, [0,1]	-137.6	226.1	98.4%	1,639.8	1,719.3
3	DCE, $N(0.8, 0.1^2)$, [0,1]	-299.1	389.5	86.8%	39.3	239.1
5	Tweedie, $N(0.8, 0.1^2)$, [0,1]	-340.7	424.1	83.2%	1,449.7	1,530.5
9	Tweedie, $D_j = 1$, $[-\infty, \infty]$	624.8	729.5	46.6%	N/A	N/A

DCE methodology

- Detection Controlled Estimation methodology developed by Jonathan Feinstein in the late 1980s and expanded by Brian Erard to adjust for imperfect detection
- Multi-equation model of observed adjustment (A) decomposed into latent variables W, N and D
  - Non-compliance (W, N)
    - Presence of non-compliance (W): $P(W = 1)$ modeled using probit regression
    - Magnitude of non-compliance ($N|W = 1$): $E(N|W = 1)$ log-Normal regression
  - Detection (D)
    - $D \in [0, 1]$ modeled as draw from Normal truncated between 0 and 1, where mean depends on examiner fixed effect
- Maximize likelihood for observed adjustment ($A = W \cdot N \cdot D$) to estimate model parameters

◂ Background

DCE pros/cons

Background

Pros

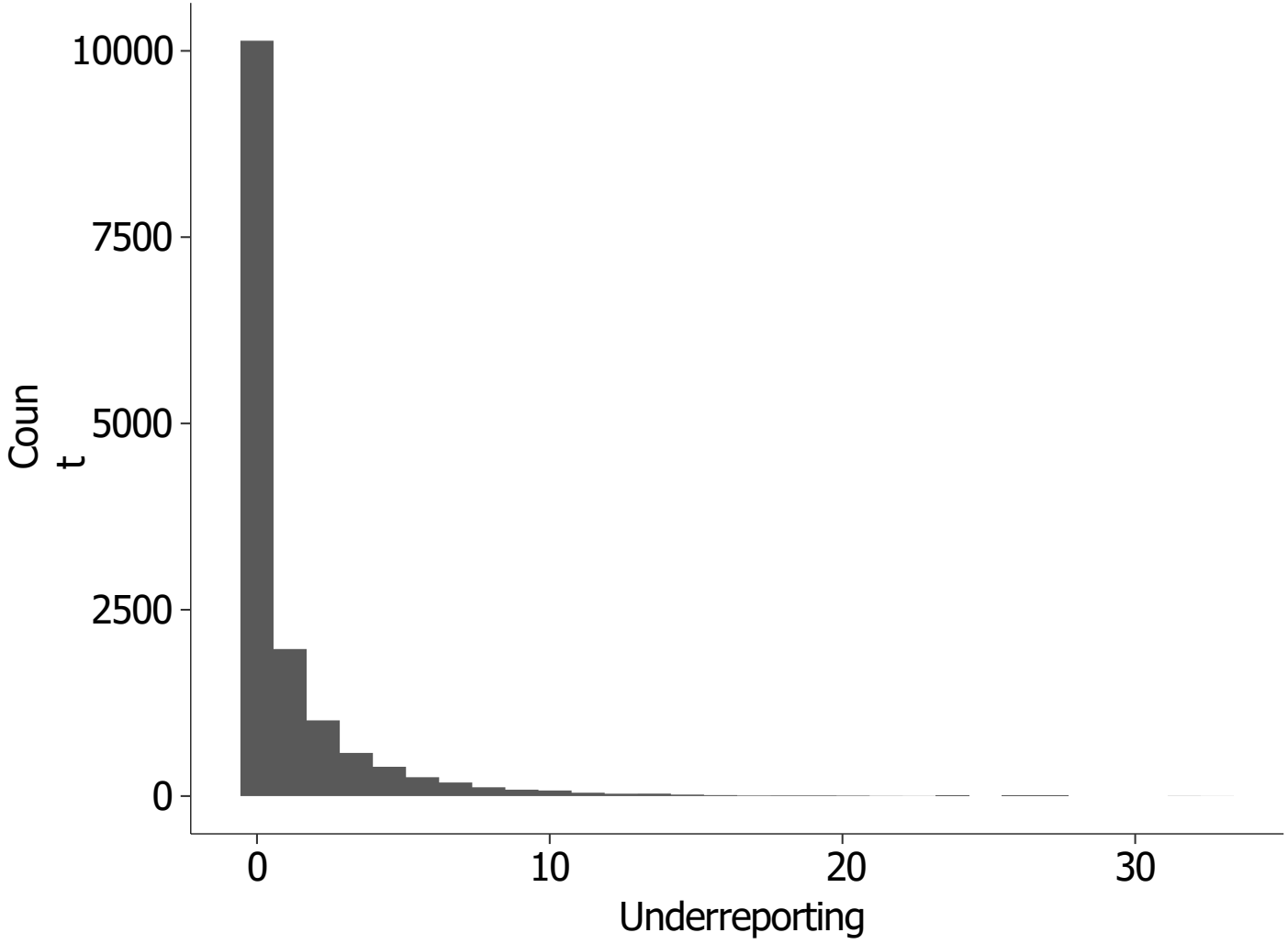
- Simultaneously accounts for both non-compliance and detection
- Parameters are statistically identified via detection model
- Predict evasion via conditional mean, $E(W \cdot N|A)$

Cons

- Computationally difficult to fit
- Complicated to reason about
- Difficult to extend

Modeling adjustments

Simulation Scenarios



- Could model 0 and continuous adjustments separately (2 part model)
- Tweedie distribution approximates adjustment distribution
- $A \sim \text{Tweedie}(\mu, \phi, \xi)$

Pooling Information Across Return Types

- Practical applications:
  - Leverage operational audits to improve NRP estimates
  - Pool information over time as NRP sample shrinks
  - Increase precision for examiners with few exams of certain types

- For each examiner j, model vector of skills for K return types:

$$\gamma_j = (\gamma_{j,1}, \gamma_{j,2}, \ldots, \gamma_{j,K})$$

- Model correlation structure between skills:

$$\gamma_j \sim N(\mu, \text{diag}(\tau)\Omega\text{diag}(\tau))$$

- Depending on simulation settings, see 7 - 40% decline in bias of tax gap

Discussion

Implications for Audit Program Design

- **Random Audit Program:**
  - Concentrate among fewer examiners with more exams each
  - Simulations show this improves precision, especially for identifying minimal examiner variation
- **Validation Strategy:**
  - Implement selective re-examination by senior examiners
  - Provides empirical grounding for referent examiner anchor points
- **Operational Integration:**
  - Leverage correlated skills across audit types
  - Maintain statistical power as NRP sample size decreases
- **Statistical Framework:**
  - Adopt transparent frontier approach
  - Communicate uncertainty in tax gap estimates

Discussion

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15th Annual IRS/TPC Joint Research Conference on Tax Administration

Who Evades Taxes?
The Distribution of the U.S. Tax Gap

William Gorman
Joint Committee on Taxation, U.S. Congress

Jamie McGuire
Joint Committee on Taxation, U.S. Congress

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Joint Committee on Taxation, U.S. Congress

June 12, 2025
IRS-TPC Conference

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

Overview

Outline

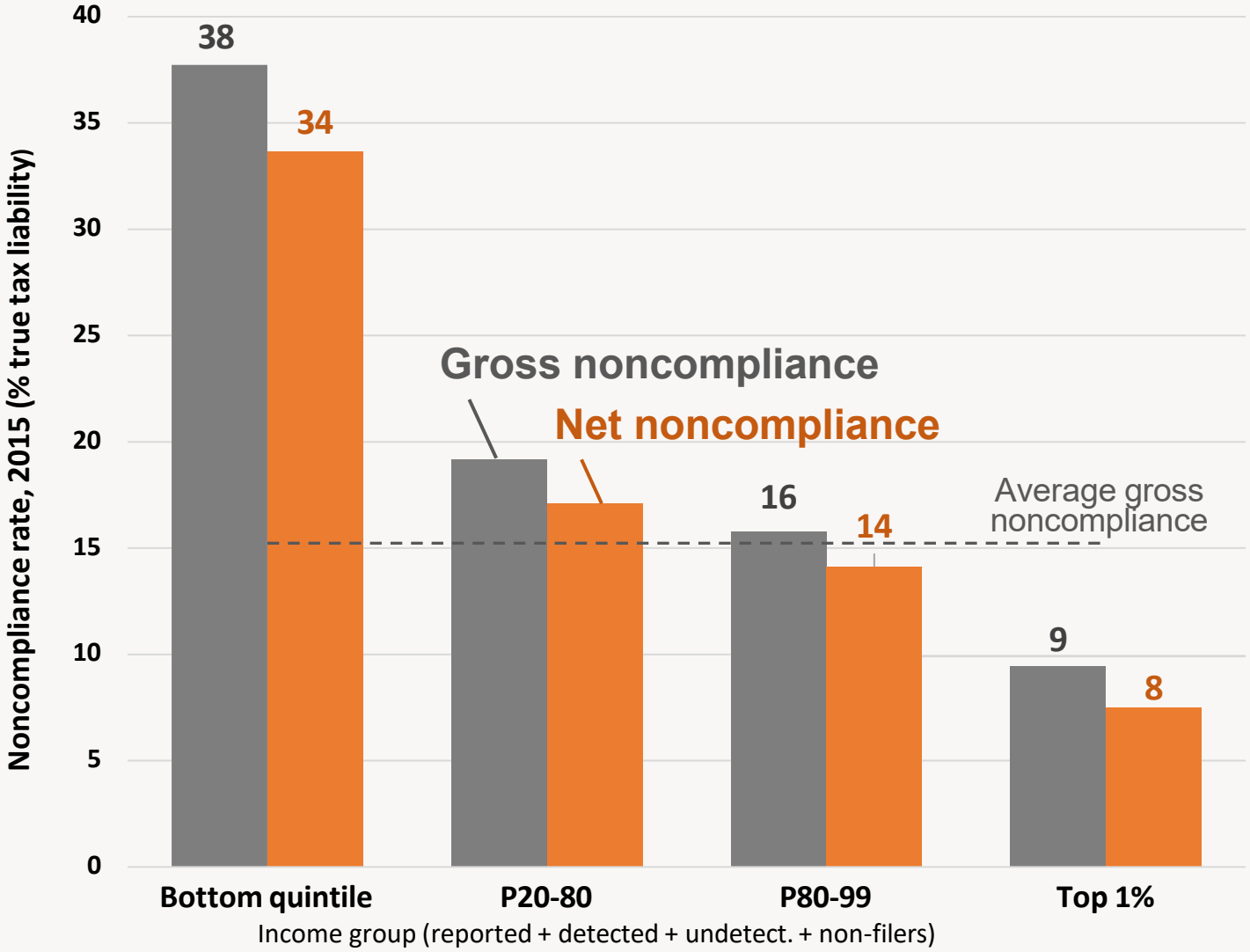
- **Main result: Noncompliance rates highest for low incomes**
  Similar finding in prior estimates, but not for full tax gap:
  Christian 1994, Cay Johnston 2008; Johns and Slemrod 2010;
  DeBacker et al. 2020; Auten & Langetieg 2023; Johns 2023; IRS 2024
- **Estimate the FULL tax gap for 2006-2015**
- **Robust to more high/low-income noncompliance**
  Guyton et al. 2021; Hemel, Holtzblatt, and Rosenthal 2022; GAO 2024
- **2006-15:** Lower incomes less compliant, top 1% more compliant
- **Inverse correlation of audit and compliance rates**
  Audit rates fell by half as tax compliance increased

Gross and Net Tax Gap

- **Gross tax gap:** filers, non-filers, corporate, estate, underpayments
- **Net tax gap:** deduct late payments, including from audits

Tax noncompliance rates (%true tax)

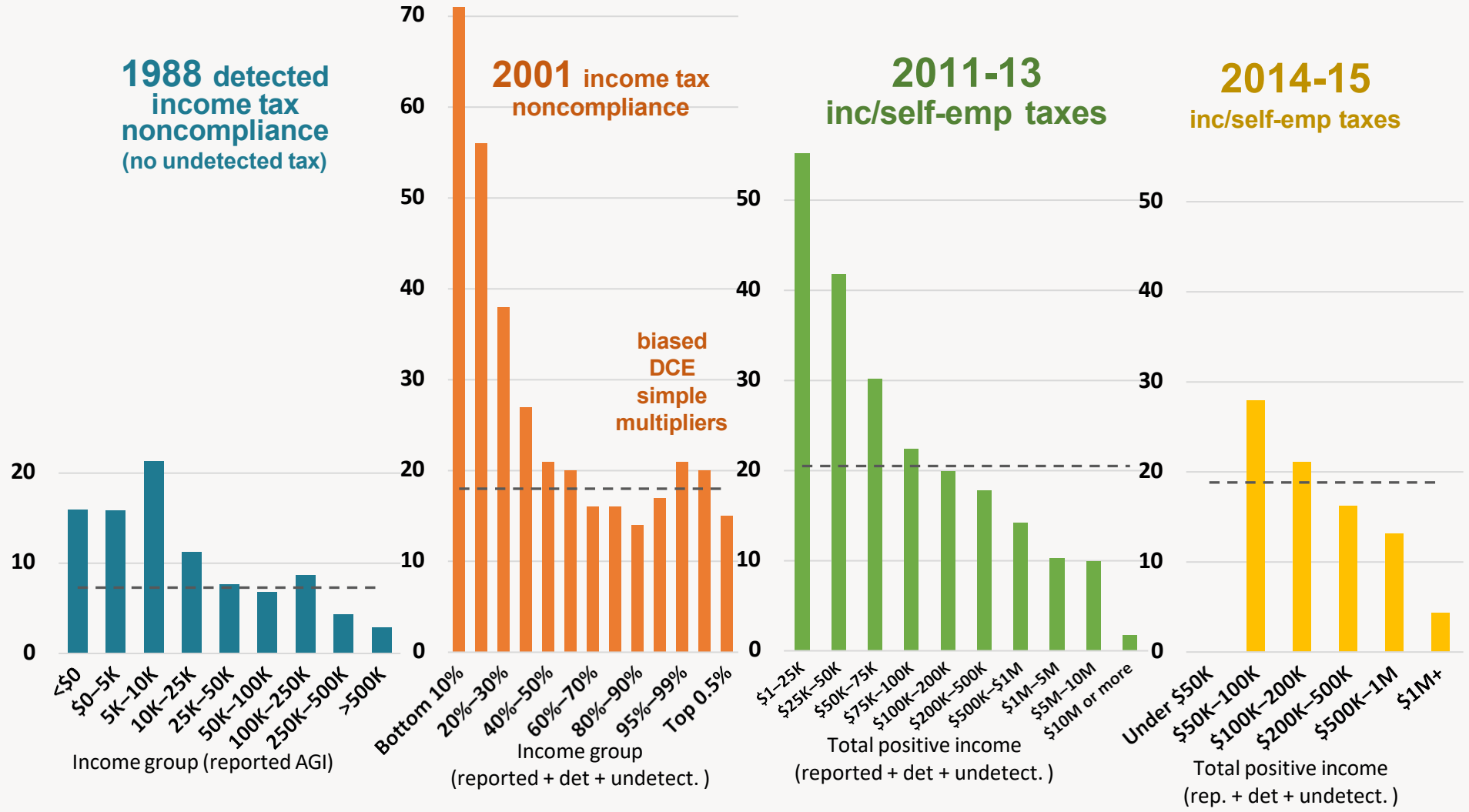
Noncompliance rates higher at lower incomes



Source: Authors' calculations with 2015 NRP.

Similar finding in prior studies (filers only)

Income tax noncompliance rates higher at lower incomes



Sources: Christian (1994), Johns and Slemrod (2010), Johns (2023), IRS (2024), for 2014-15 authors' calculations with NRP.

Operational vs. Random Audits

Operational audits

- **Returns selected based on likelihood of noncompliance**
- **Only select lines of return are audited**

Random audits: Special audit studies

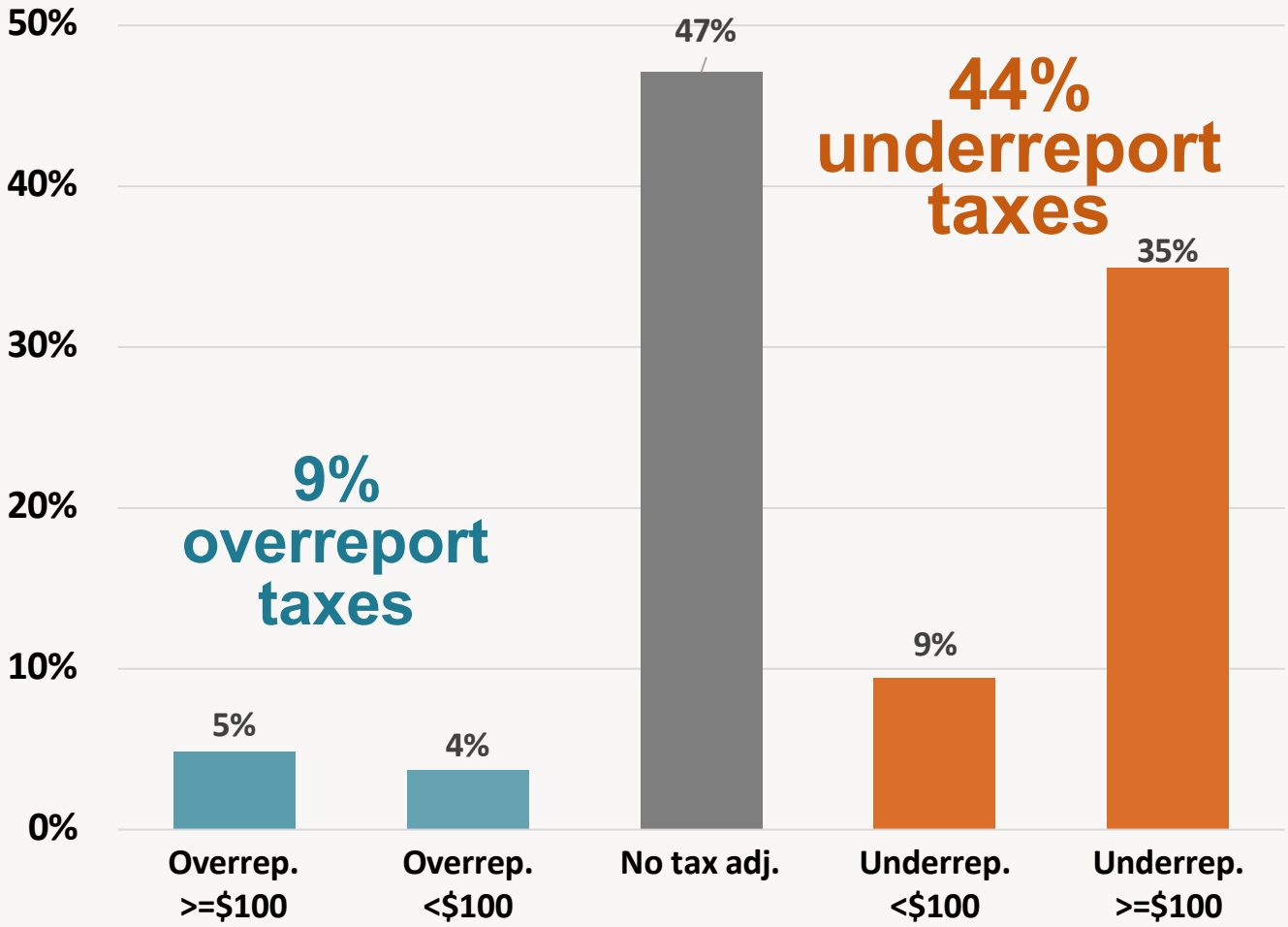
- **National Research Program (NRP):** 14K indiv. tax returns
- **Represents all returns:** oversamples high-income returns
- **More comprehensive audits**
- **Includes all changes by auditor**—from accidental errors, missing documents, and when rules uncertain

Tax Gap is much broader than just evasion

- Evasion is only from willful noncompliance

Detected Tax Adjustments, 2015

Nearly half of tax returns had tax positive adjustments



Source: Authors' calculations with 2015 NRP.

Add undetected underrep. income

Detection Controlled Estimation (DCE)

- Accounts for **undetected** underreported income
- Among similar returns, DCE brings smaller auditor income adjustments up to largest auditor adjustments

2014-15 NRP: Indiv. tax returns only ($billions, IRS 2024)

~$500 detected underrep. income

~$160 detected taxes

~$500 undetected income

~$160 undetected taxes

Undetected Income: DCE multipliers

Old method

Simple multipliers proportionally scaled up detected underreporting

Gave incorrect distributions (IRS has updated its DCE methods)

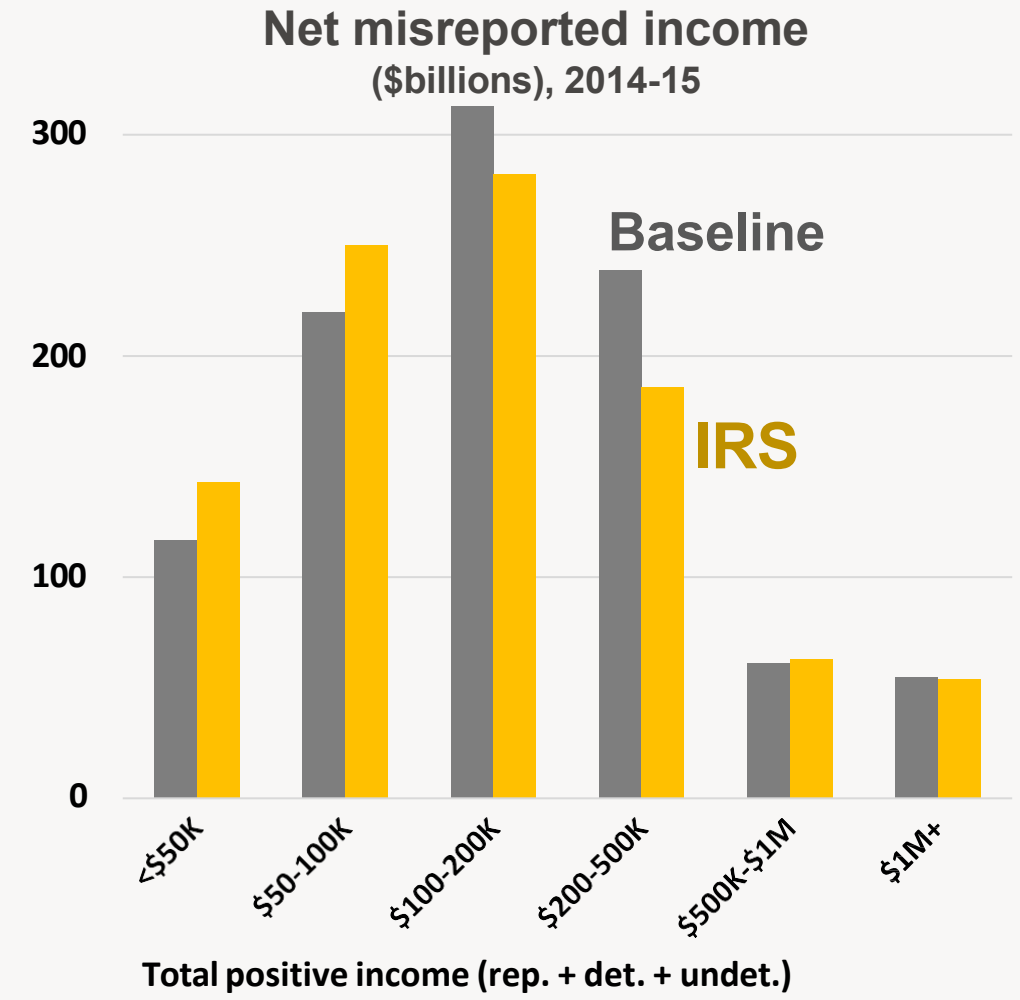
> **DeBacker et al. (2020, p. 1106)**
>
> "Published multipliers are applied to all auditors regardless of skill level….This runs counter to the intended application of the adjustments..."

Multipliers for our estimates

- **Undetected income should account for auditor effectiveness**
- **No access to auditor identities → Start with gradient multipliers**
  from Auten & Splinter (2021)
- **Gradient multipliers proxy auditor ability**
  if less detected underreporting as %reported income → larger multiplier
- **Rescale to target IRS implicit multipliers across ~20 sources** (IRS 2022)
- **This is not the IRS approach, but it approximates the IRS distribution**

Distributions similar to IRS

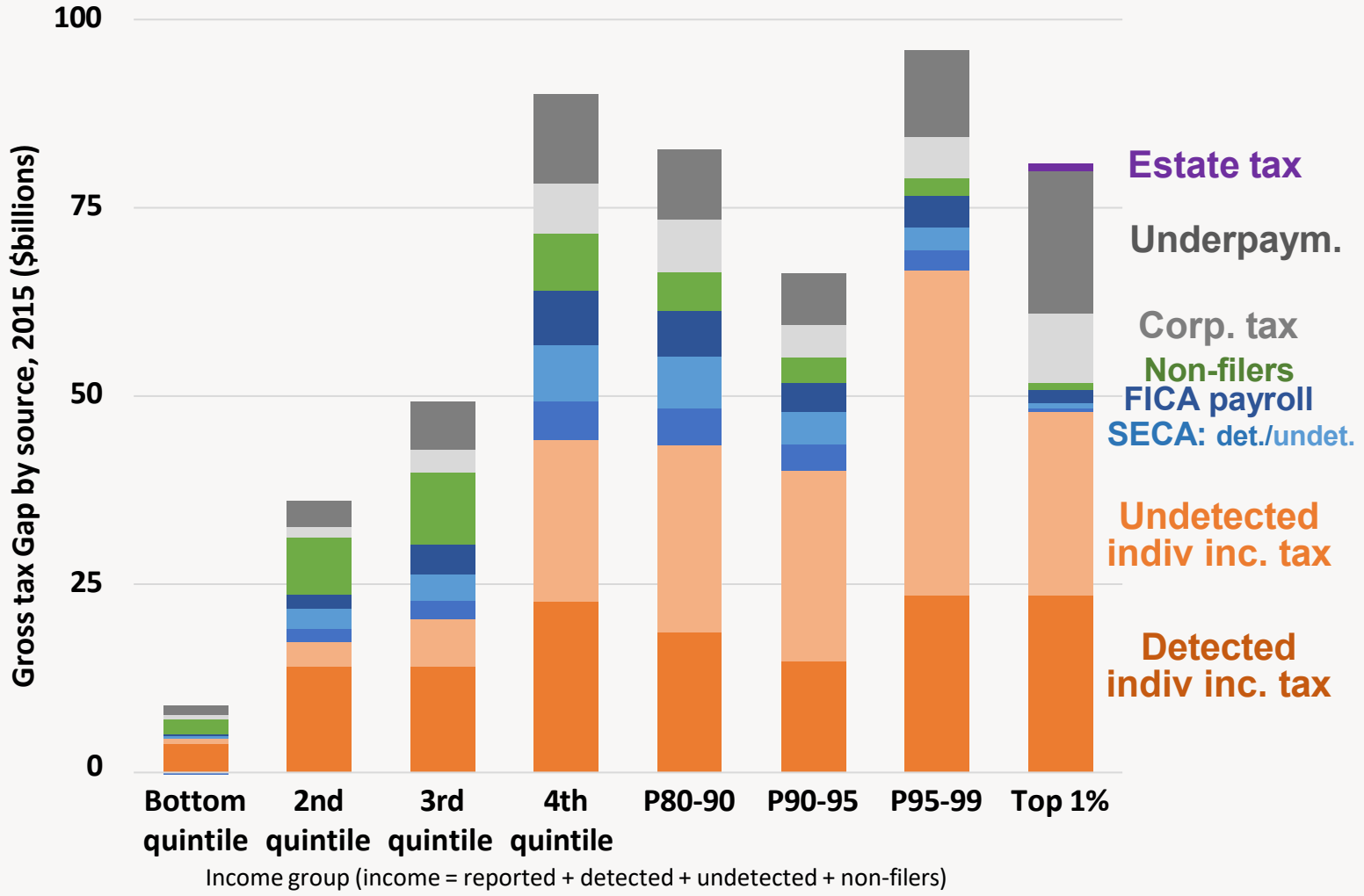
But we allocate less underreporting to lower incomes



Notes: Filers only. Includes detected and undetected amounts. *Source*: Authors' calculations using 2014-15 NRP data and IRS (2024).

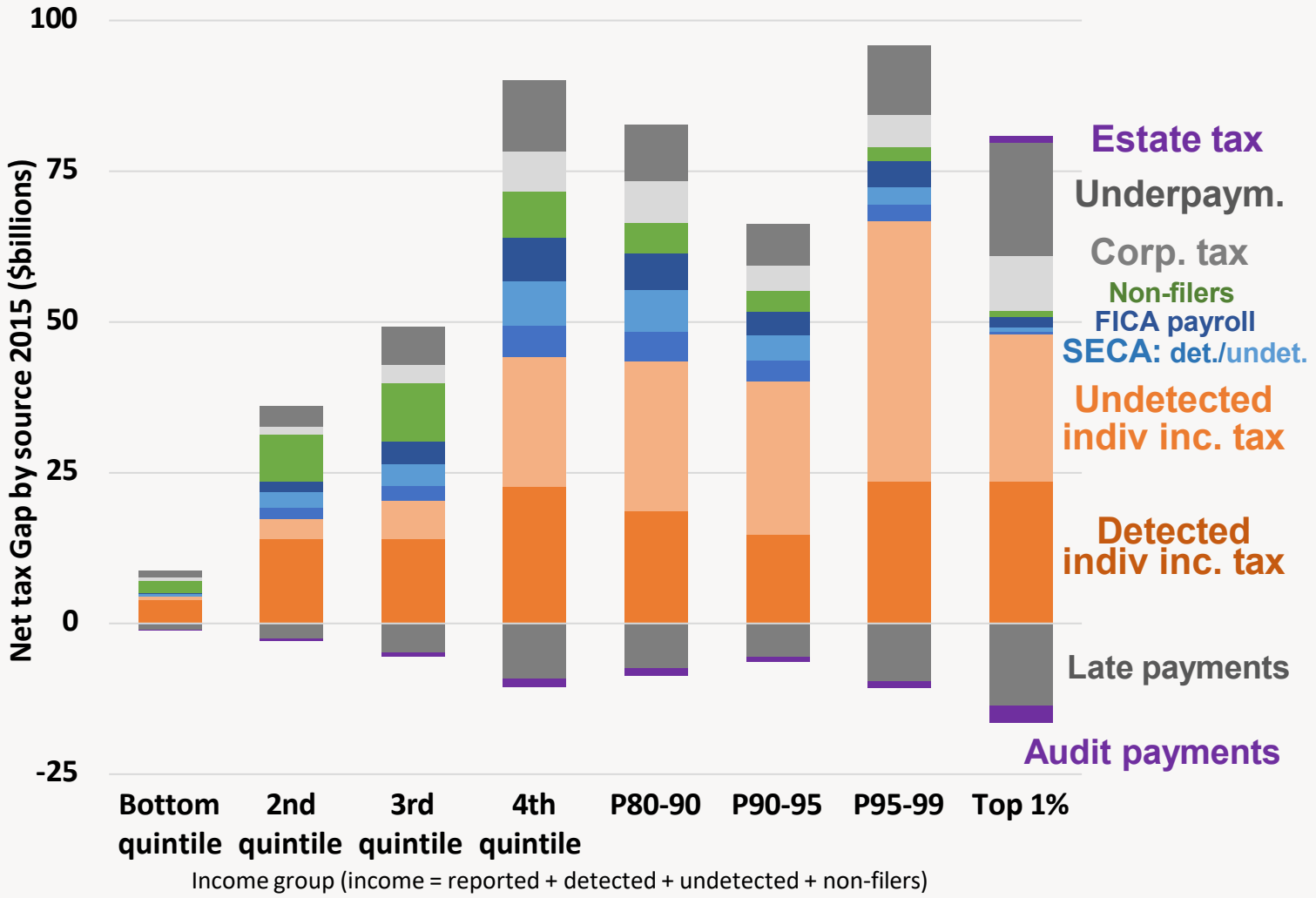
Gross tax gap: Distribution & Sources

Non-filers added using information returns
Target NRP 2014-16 totals for corporate, non-filer, & estate taxes



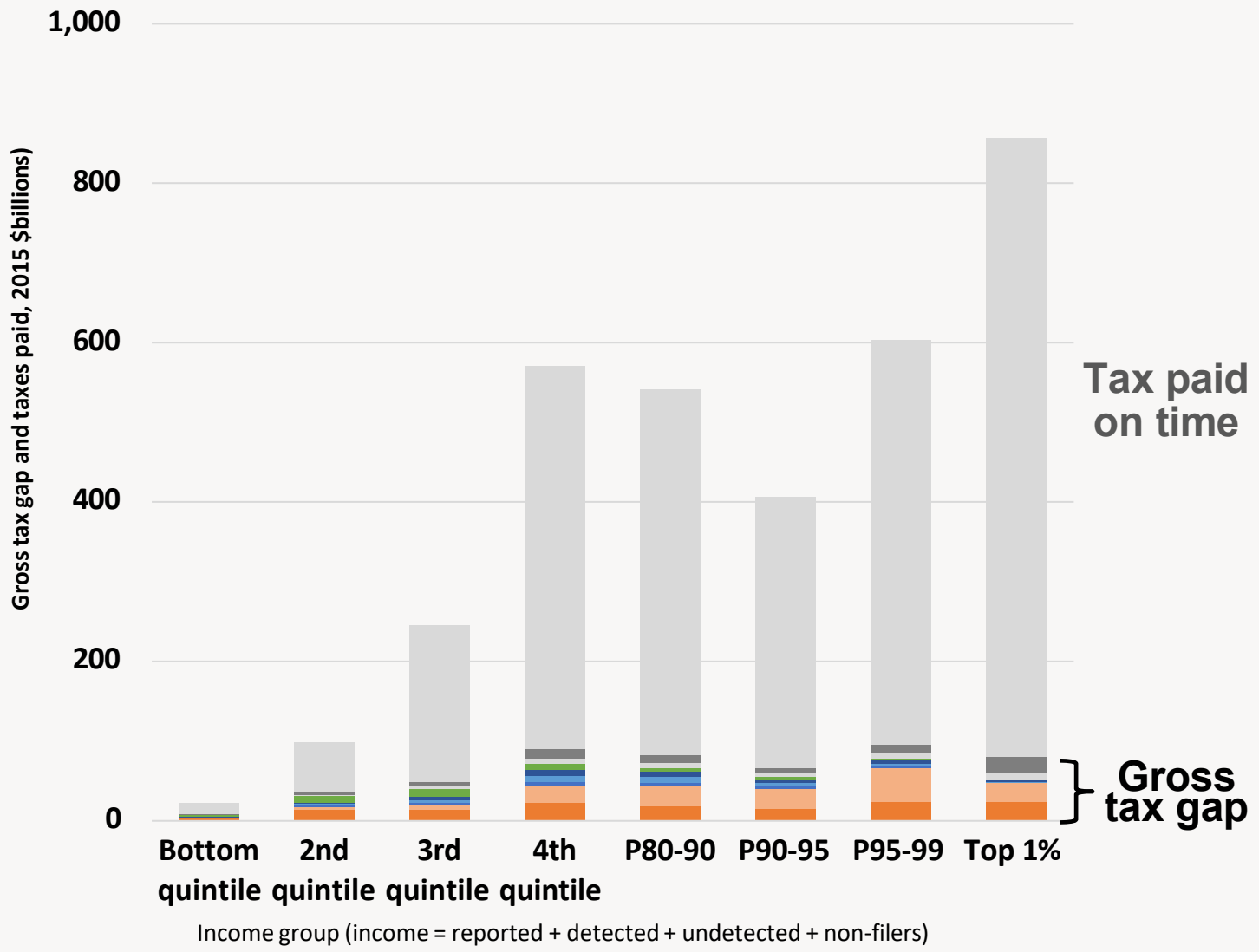
Source: Authors' calculations using 2015 NRP and non-filer data.

Net tax gap: Distribution & Sources



Source: Authors' calculations using 2015 NRP, GAO (2024), and non-filer data.

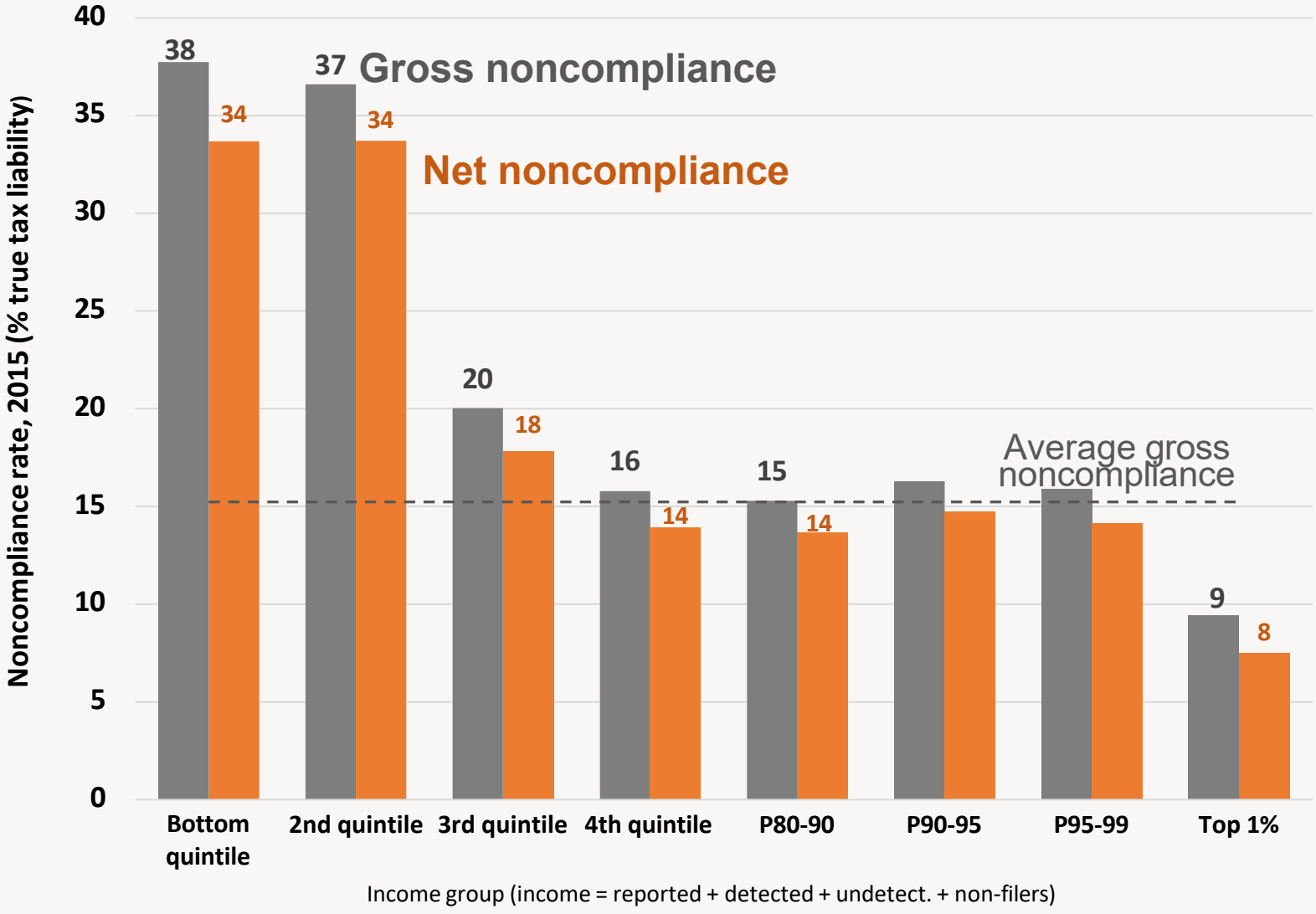
Gross tax gap & progressive taxes



Source: Authors' calculations using 2015 NRP, GAO (2024), and non-filer data.

Tax noncompliance rates in 2015 (%true tax)

Noncompliance rates higher at lower incomes

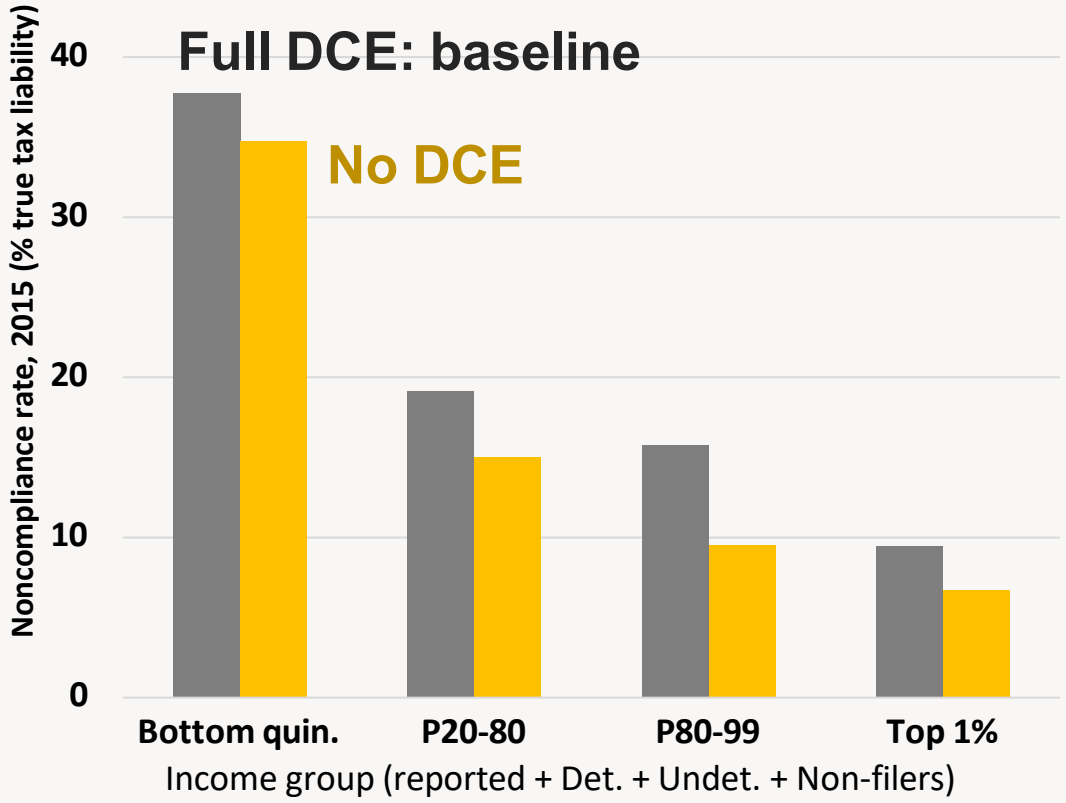


Source: Authors' calculations using 2015 NRP.

Sensitivity test: DCE too large?

DCE from auditor with largest adjustments, not most accurate
(Hemel, Holtzblatt, and Rosenthal 2022)

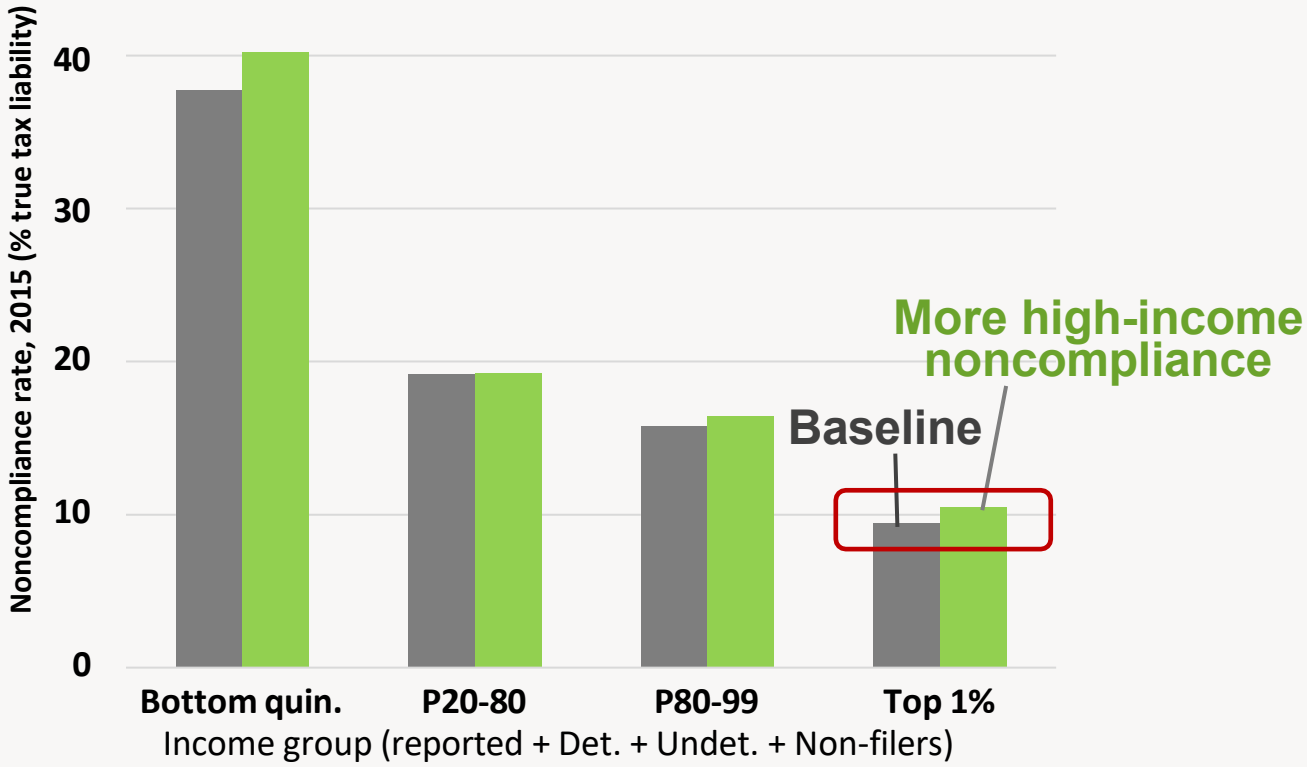
Tax Gaps: UK is 6%, Australia 7%, Canada 11%
US with DCE is 15%, without DCE it's 10%



Source: Authors' calculations using 2015 NRP.

Sensitivity test: More high-inc. noncompliance?

- Taxes from undetected offshore income (half pre-FATCA of Guyton et al.)
  top noncompliance rate up ~half a percentage point
- Taxes from more passthrough income (per Guyton et al. 2021)
  top noncompliance rate up ~half a percentage point



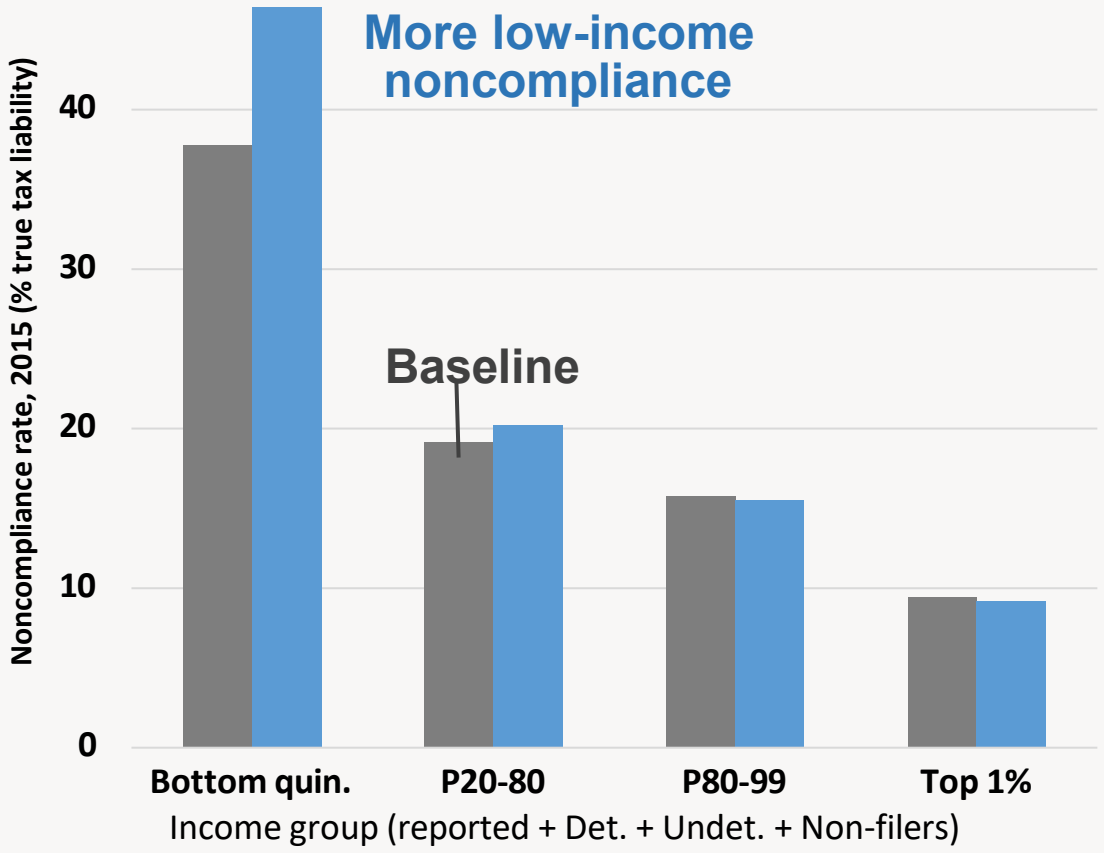
Source: Authors' calculations using 2015 NRP.

Sensitivity tests: More low-inc. noncompliance?

Negligible: corp tax by more wages, FICA lower-incomes, estate tax

Large: add Nannies/Ag workers as not in tax gap (Erard 2018)

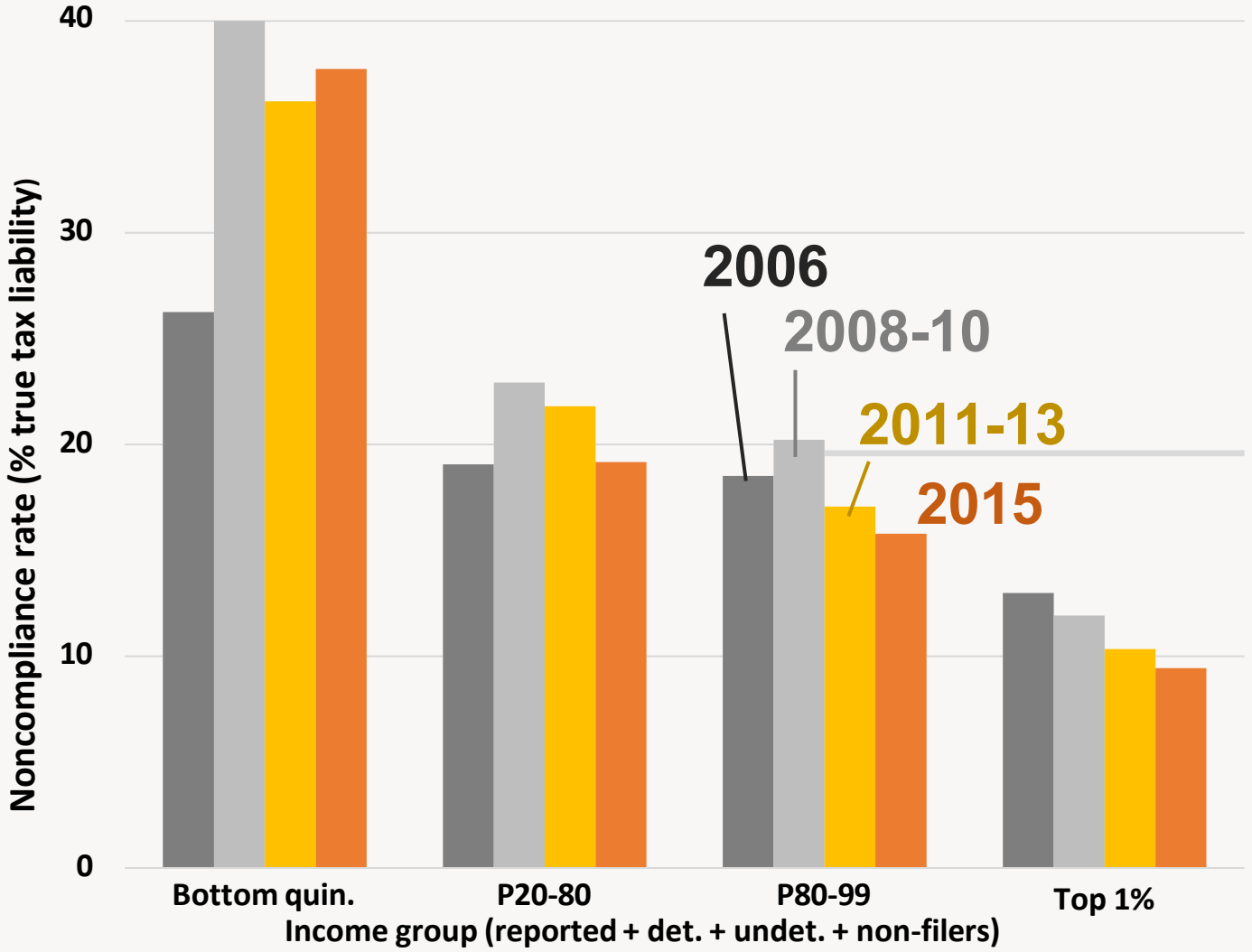
add credits to double-claimed kids (Gorman, McGuire, & Splinter 2025)



Source: Authors' calculations using 2015 NRP.

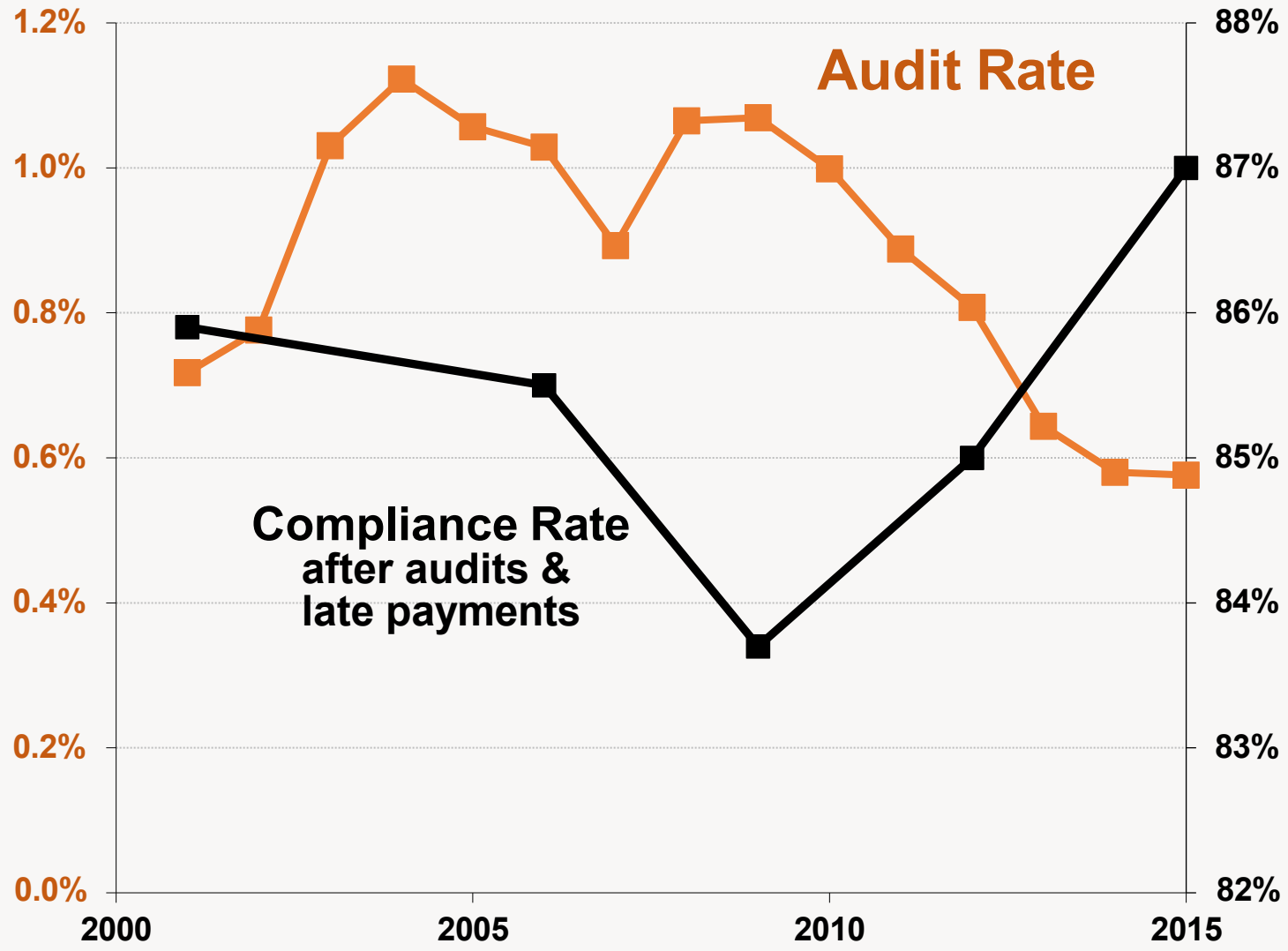
Tax noncompliance rates over time

Bottom-quintile noncompliance ↑ when ref. credits expanded in 2009
Top 1% noncompliance ↓ since 2006



Source: Authors' calculations using NRPs and IRS tax gap totals.

Compliance & audits: Inverse correlation



Source: IRS Data Books and authors' calculations using NRP data.

Why did compliance increase since 2009?

Increased third-party information reporting

- **Certain business receipts on 1099-Ks since 2011** (Slemrod et al. 2017)
- **Capital gains basis on 1099-Bs since 2011**
- **Offshore income: FATCA and FBARs since about 2014** (Johannesen et al. 2024)

Electronic filing rate doubled since 2003

- **E-filing rates from 44% to 94%** (Gorman, McGuire, & Splinter 2024)
- **Modernized e-File system for individual returns in 2010**

Conclusions

Using NRP data, gradient/IRS implicit multipliers, and tax gap totals, we estimate the full tax gap distribution for 2006-2015

Findings

- **Similar to IRS estimates, but less noncompliance for lower-incomes**
- **In 2015, bottom-quintile noncompl. rate four times that of the top 1%**
- **Robust to adding more offshore/passthrough effects**
- **Bottom/top ratio increased from 2.0 to 4.0 between 2006 and 2015**
  Low-income noncompliance increased High-income noncompliance decreased

Audits seem overrated

- **Audits closed only 0.3% of taxes paid for 2015 returns**
- **Audit rates and compliance rates had inverse correlation**
- **Information returns, e-filing, etc., seem underrated**

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15th Annual IRS/TPC Joint Research Conference on Tax Administration

Congressional Budget Office
Nonpartisan Analysis for the U.S. Congress

Session 4: Mind the Tax Gap Discussant Comments

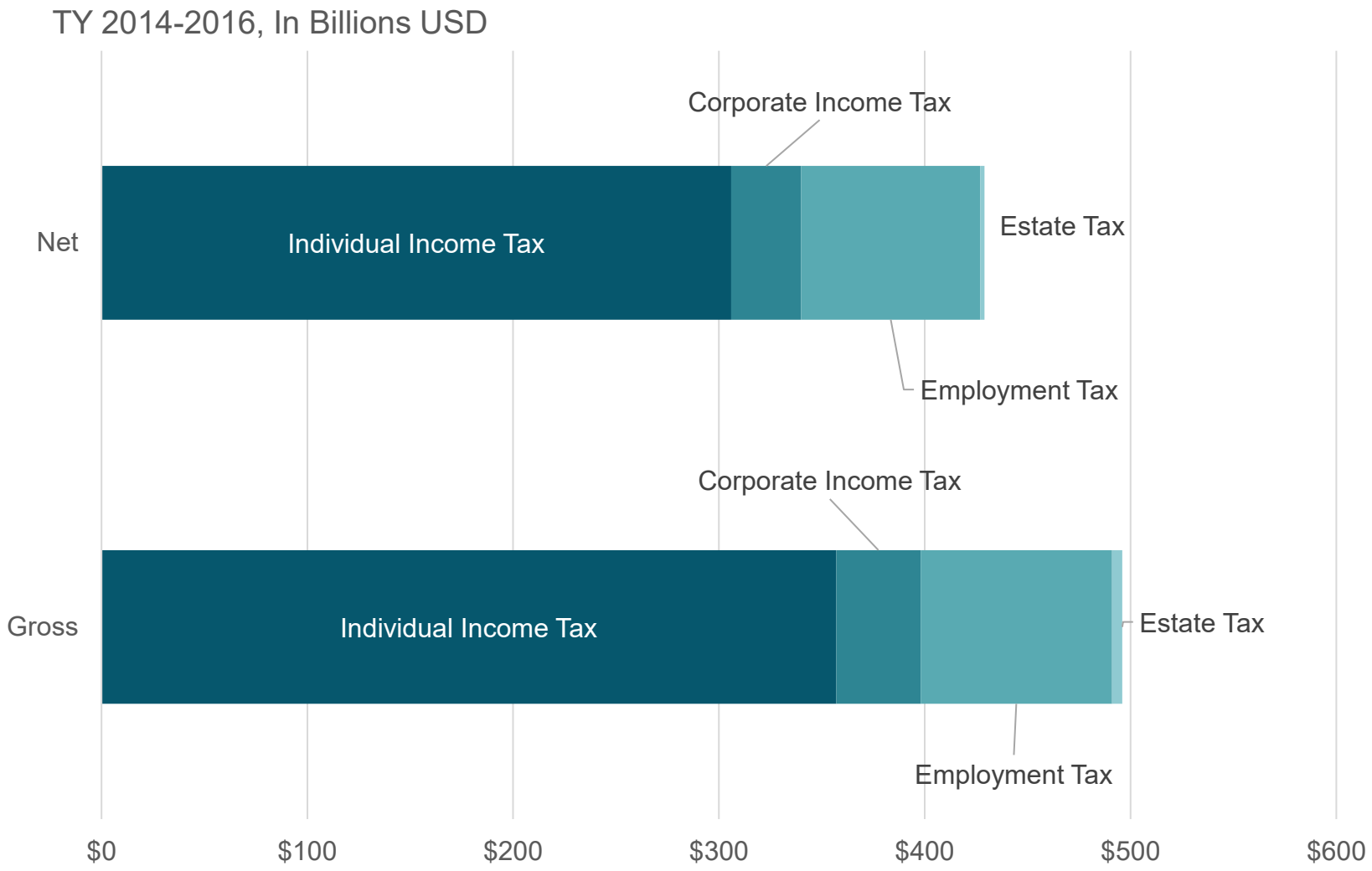
June 12th, 2025

Fifteenth annual IRS-TPC Joint Research Conference on Tax Administration

John Iselin

Tax Analysis Division

The Tax Gap



Basic Terms:

Gross Tax Gap: Taxes not paid voluntarily / on time.

Net Tax Gap: Taxes not paid after enforcement and late filing.

Why is it important?

Allows the IRS to evaluate compliance and determine appropriate policy responses.

This session:

1. Future of tax gap estimation.
2. New undetected estimation.
3. Distribution of tax gap.

This session: improving and expanding estimation of the Tax Gap

1. A New Methodology for Estimating the Underreporting Tax Gap for the Individual Income and Self-Employment Tax
   a. **Issue**: The National Research Program (NRP) sample is getting smaller, imperiling precision.
   b. **Proposed solution**: Incorporate other sources of information and new methods (binning).

2. Undetected Income: Identification, Estimation, and Uncertainty
   a. **Issue**: How best to account for differences in auditor skill in estimating undetected underreporting.
   b. **Proposed solution**: New Bayesian model with clear assumptions and uncertainty estimates.

3. Who Evades Taxes? The Distribution of the U.S. Tax Gap
   a. **Issue**: The tax gap methodology does not provide comprehensive distributional estimates.
   b. **Proposed solution**: Expand on NRP data to distribute the tax gap to individuals across the income distribution.
   c. BONUS: Considers aggregate effect of audits on tax compliance.

A New Methodology for Estimating the Underreporting Tax Gap for the Individual Income and Self-Employment Tax

Description and Contributions

Outline the development of a new methodology for estimating the tax gap in the context of a smaller NRP.

- Maintain dependencies and distributional characteristics.
- Maintain precision of older (larger) NRPs.
- Construct standard errors.

Tools: New information (prior-year audits, non-NRP audits, partially completed audits) combined with binning.

Contributions:

- Very useful to see evolution of thinking (what works and what doesn't and why).
- Even more important in the context of potential future changes to NRP audit processes.
- Valuable summary statistics on changes in the NRP audits between 2014-2020.

Comments

1. The project could benefit from a clear (mathematical?) statement of the problem posed by smaller / risk-weighted NRP audits.

   Smaller sample → Decrease in precision.

   NRP redesign → Decrease in precision for low-risk groups.

   Sets up the potential for a clear statement about how a given method (ex. Binning) would help.

2. Incorporating new information seems to reflect tradeoffs
   a. Ex. Incorporating PY audits might increase precision (larger N) but could add bias.
   b. Ex. Incorporating non-random audits might increase precision but could add complexity.
   c. You could create a process to systematically estimate these tradeoffs:
      a. Can you use prior-year NRP cycles?
         a. Randomly select sub-samples of NRP.
         b. Apply new information.
         c. Use left-out NRP audits to evaluate trade-off.
      b. This approach would likely work better for non-random audits than PY audits.

3. What about audits that capture things that the NRP misses? Ex. Entity-level audits?

4. Any effort here should consider impact on DCE (randomization assumption).

Undetected Income: Identification, Estimation, and Uncertainty

Description and Contributions

Develop a new methodology for estimating the average true adjustment when different auditors have different abilities.

Building on DCE by introducing a model that:

- Can calculate the average adjustment per examiner (assuming random assignment).
- Can summarize the set of potential tax gaps given different assumptions re. the reference examiner.
- Can calculate uncertainty estimates.

Tools: New framework, clear assumptions, Bayesian shrinkage model.

Contributions:

- Clear framework and assumptions.
- Incorporates many previously excluded auditors.
- Allows uncertainty estimates.
- Provides information that could influence how best to spend additional resources on audits.

Comments

1. How sensitive is this approach to the choice of ML model $f(x_i)$?
   What characteristics of a prediction model are advantageous in this setting?

2. What is the relationship between adjustment size and shrinkage (and number of audits per auditor)?

$$E\left(\gamma_j \middle| r^{obs}, W\right) \approx \kappa_j * \mu + \left(1 - \kappa_j\right) * \bar{r}_j^{obs}$$

   Fewer exams → larger κ_j → less information from examiner

   Are there reasons why returns with fewer exams might have larger or smaller adjustments ($\bar{r}_j^{obs}$ >> or << μ)?

      Ex. Audits of more complex returns take more time? Auditors with lower levels of skill take more time?

      Institutional question!

   Can you look across characteristics of returns (separate from adjustments) by number of audits per auditor?

3. Relatedly, how does the result vary with different cutoffs for minimum number of exams?
   Many exams that are included are excluded in DCE → isolate what is the method and what is the sample.

4. How sensitive is this approach to changes in the NRP sample? (re. paper 1)
   Can you estimate this by randomly sampling / weighting current (2006-2014 NRP) to resemble the redesigned NRP.
   Further conversation with this paper and the prior one.

Who Evades Taxes? The Distribution of the U.S. Tax Gap

Description and Contributions

Develop a structure for estimating the distribution of the *entire* tax gap over time.

Building on previous literature by:

- Estimating undetected underreported income via gradient multipliers + IRS multipliers.
- Adds in multiple other tax gap components (non-filers, corporate, etc…).

Tools: NPR + Gradient multipliers (Auten and Splinter 2021), IRS multipliers (IRS 2022) + other estimates

Contributions:

- Step-by-step guide for constructing distribution.
- Allows comparison of distribution over time.
- Allows estimation of drivers of both overall distribution and changes in the distribution.

Comments

1. What is the interaction between the gradient multipliers and the IRS multipliers?
   - Both operate based on different assumptions: Gradient via individual ability, IRS via aggregate return-type accuracy.
   - How do they interact? If auditor ability (as measured in DCE) is a function of return type, then is there a double-counting issue?
   - Could plot share of undetected evasion three ways (Gradient, IRS, and both) (extension of Figure 5).
   - Do these multipliers change over time? Might we expect them to?

2. What explains the increase in non-compliance rates for bottom quintile in between 2006 and 2008?
   - Were increases in EITC (3+ QC) and CTC (drop in refundability threshold) generosity large enough to explain this?
   - Could this be a denominator change (ex. impact of great recession on income?
     - **How sensitive is this measure to small changes in income, tax liability, and refundable credits?**
   - Could you examine the tax gap at the bottom by source over time? (Figure 7a) or compare returns with and without EITC / CTC?

3. The time-series pattern of compliance and audit rates (2000-2015) contains useful information. However, the claim that audits are overrated seems strong.
   - Recent academic work showed high rates of return (DeBacker et al. 2018a, 2018b; Boning et al. 2025)
   - Alternative explanations (mis-measurement, lag structures, confounding economic factors) complicate any causal claim.
   - My take: audits are low-probability events (0.8-1.2 percent), but can produce large returns, and macro-trends can be noisy.

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