Business Income Underreporting and Public Finance

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The Macroeconomics of US Public Finance

- Net government saving ≈ -1 \$Trillion (in 2018)
  - Current receipts: 5.6T
  - Current expenditures: 6.7T

The Macroeconomics of US Public Finance

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  - Current receipts: 5.6T
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- Untaxed business income ≈ 1 \$Trillion
  - Income reported to IRS: 3.2T
  - Estimate of true: 4.2T

The Macroeconomics of US Public Finance

- Net government saving ≈ -1 \$Trillion
  - Current receipts: 5.6T
  - Current expenditures: 6.7T
- Untaxed pass-through income $\approx$ 700 \$Billion
  - Income reported to IRS: 1.3T
  - Estimate of true: 2T

The Macroeconomics of US Public Finance

- Net government saving $\approx -5.4\%$ GDP
  - Current receipts: 27%
  - Current expenditures: 33%
- Untaxed pass-through income $\approx 3.4\%$ GDP
  - Income reported to IRS: 6.4%
  - Estimate of true: 9.8%

The Macroeconomics of US Public Finance

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  - Estimate of true: 9.8%

$\Rightarrow$ Prompting more funding for IRS enforcement

Greater IRS Enforcement

- Inflation Reduction Act:
  - 80 billion over 10 years
  - Enforcement budget roughly doubled
- Predicted returns on investment (ROI):
  - CBO/JCT (2021): 5–9$
  - Boning et al (2023): 5–12$

This Paper

- First step before using IRS micro data
  - Use public IRS compliance data (TCMP/NRP)
  - Develop dynamic GE model of tax evasion
  - Compare higher tax vs enforcement counterfactuals
- Useful for next steps
  - Data: expand collection to business filings
  - Theory: add transition dynamics and welfare analysis

What's New?

- Factors relevant for *dynamics of tax evasion*
  - Loss of *sweat capital* (eg, reputation, brands, etc)
  - Recovery of *back taxes*
- Why relevant?
  - Impacts business dynamics and productivity
  - Amplifies precautionary motives

$\Rightarrow$ Economies with higher tax vs enforcement different

IRS Compliance Data

IRS Compliance Data

- Tax gap = random audits + DCE adjustments
- Random audits:
  - Taxpayer compliance measurement program, 1962–88
  - National research program, 2000–present
- *Detection controlled estimation* (DCE) adjustments:
  - Scale up recommendations of all examiners
  - Use data from examiners with largest adjustments

How Big is the Tax Gap?

Gross tax gap	2001	2011	2021
Amount:			
billions of 2023$	567	575	763
% of GDP	3.3	2.7	2.9

What is the Main Source of the Gap?

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Source share:			
Underreporting	83	80	80
Underpayment	10	12	10
Nonfiling	7	8	11

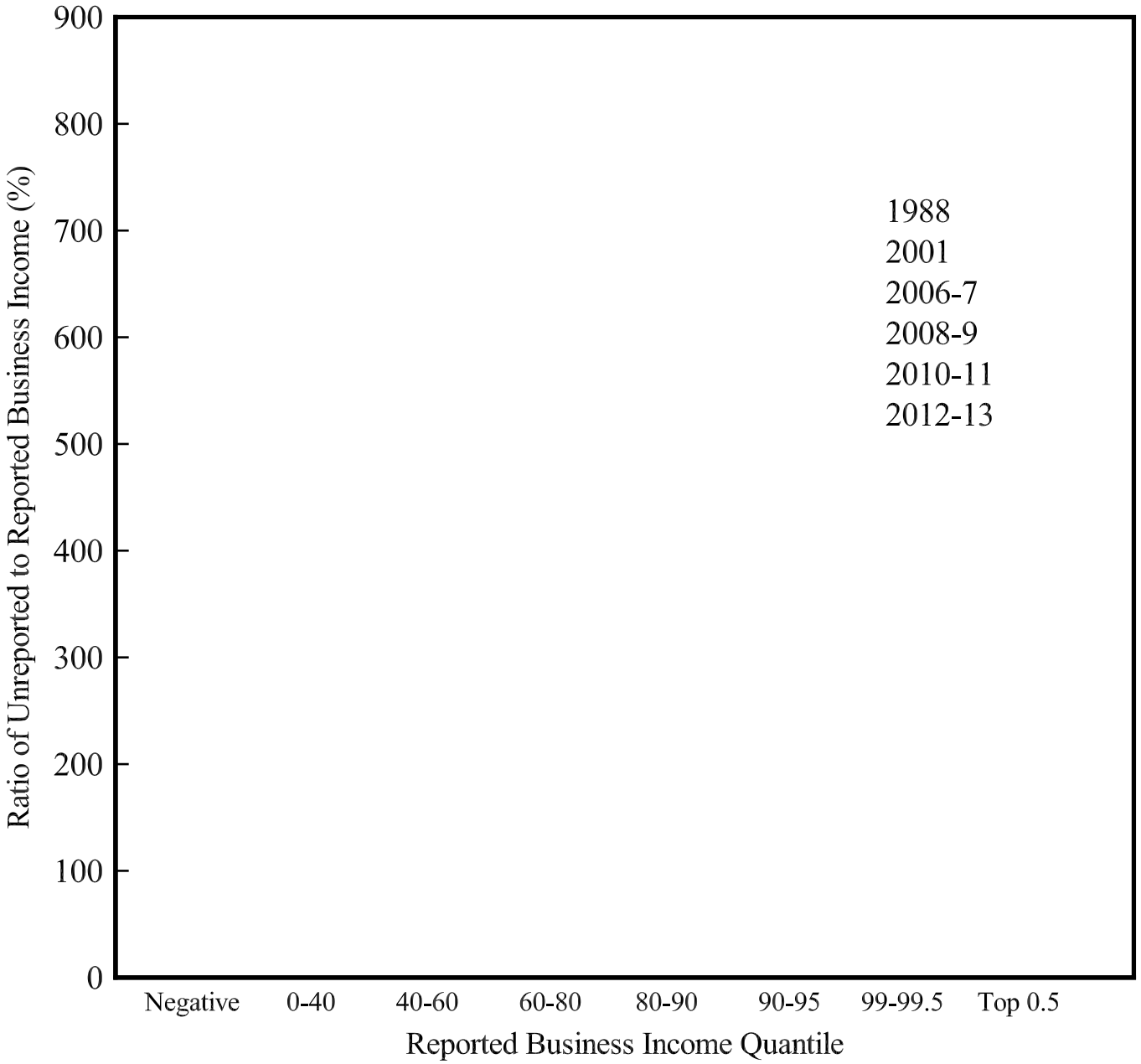
What is the Main Source of Underreporting?

Source share	2001	2011	2021
Business	62	55	55
Wages & salaries	4	3	2
Other	34	42	43

How Widespread is Cheating?

- Evidence from NRP random-audit studies (no DCE)
  - All owners—ranked by reported incomes
  - Sole proprietors—ranked by understated tax
- Reveal same patterns
  - Cheating is widespread
  - Few owners account for most cheating

Owners Ranked by Reported Incomes



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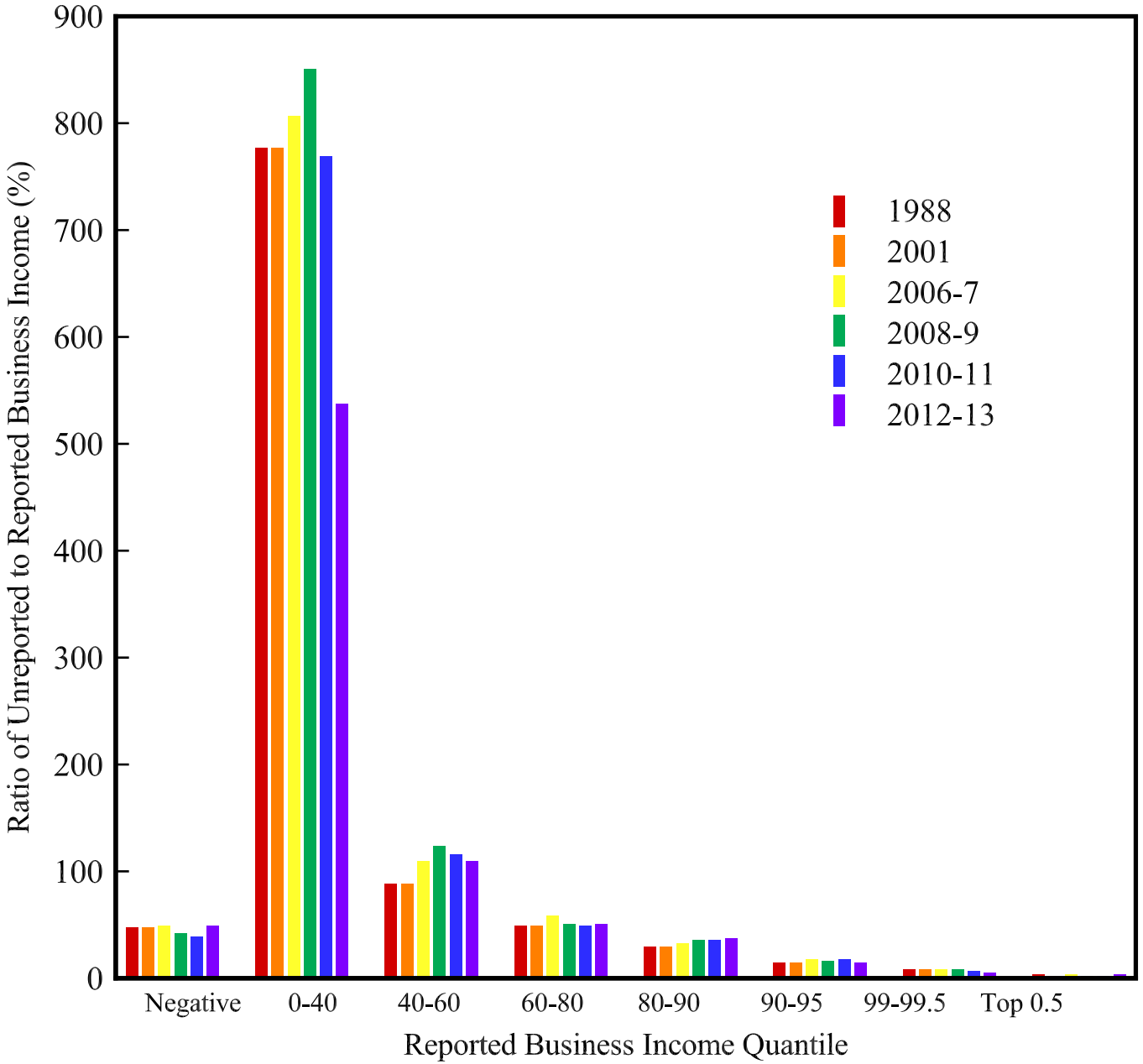

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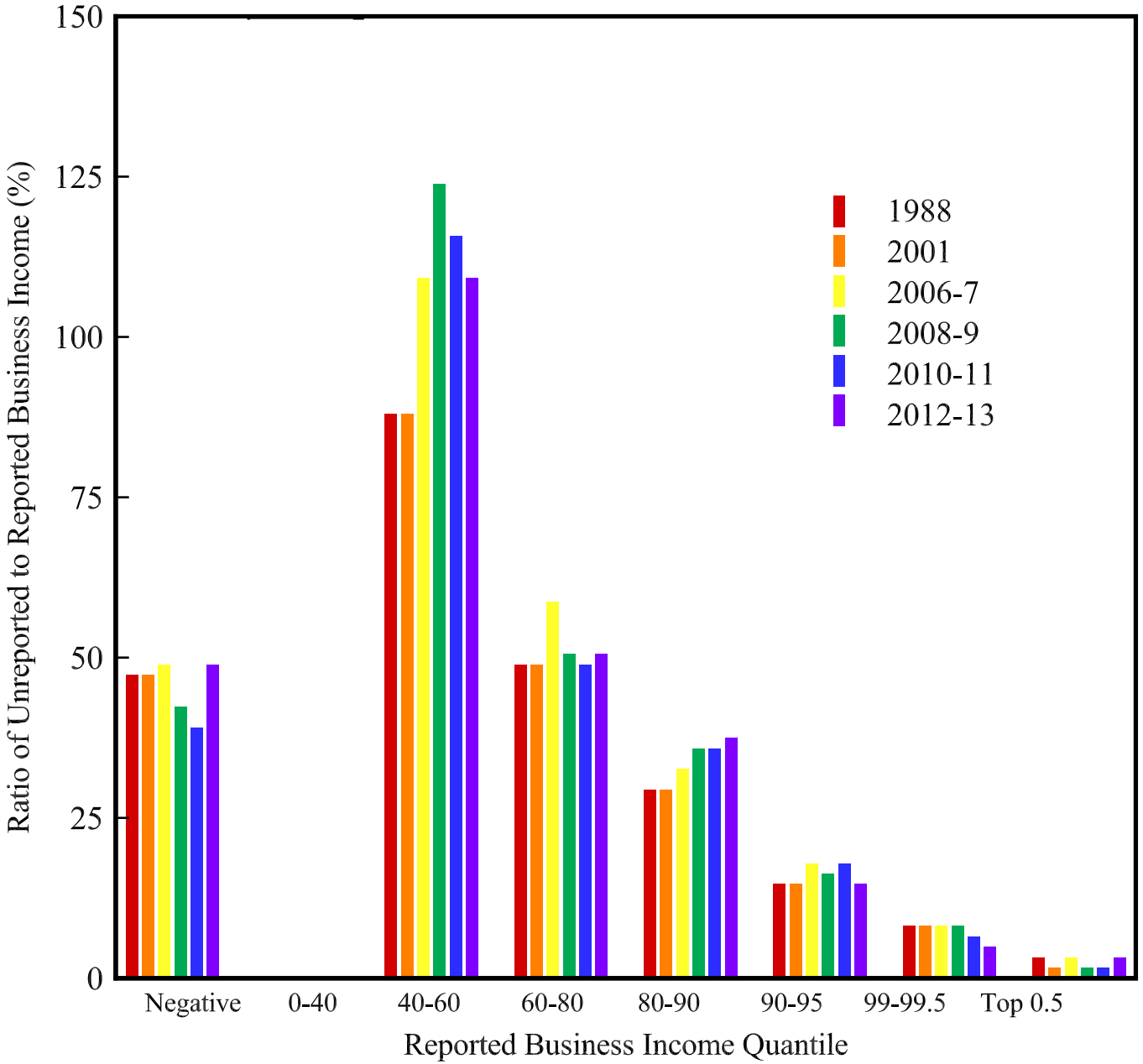
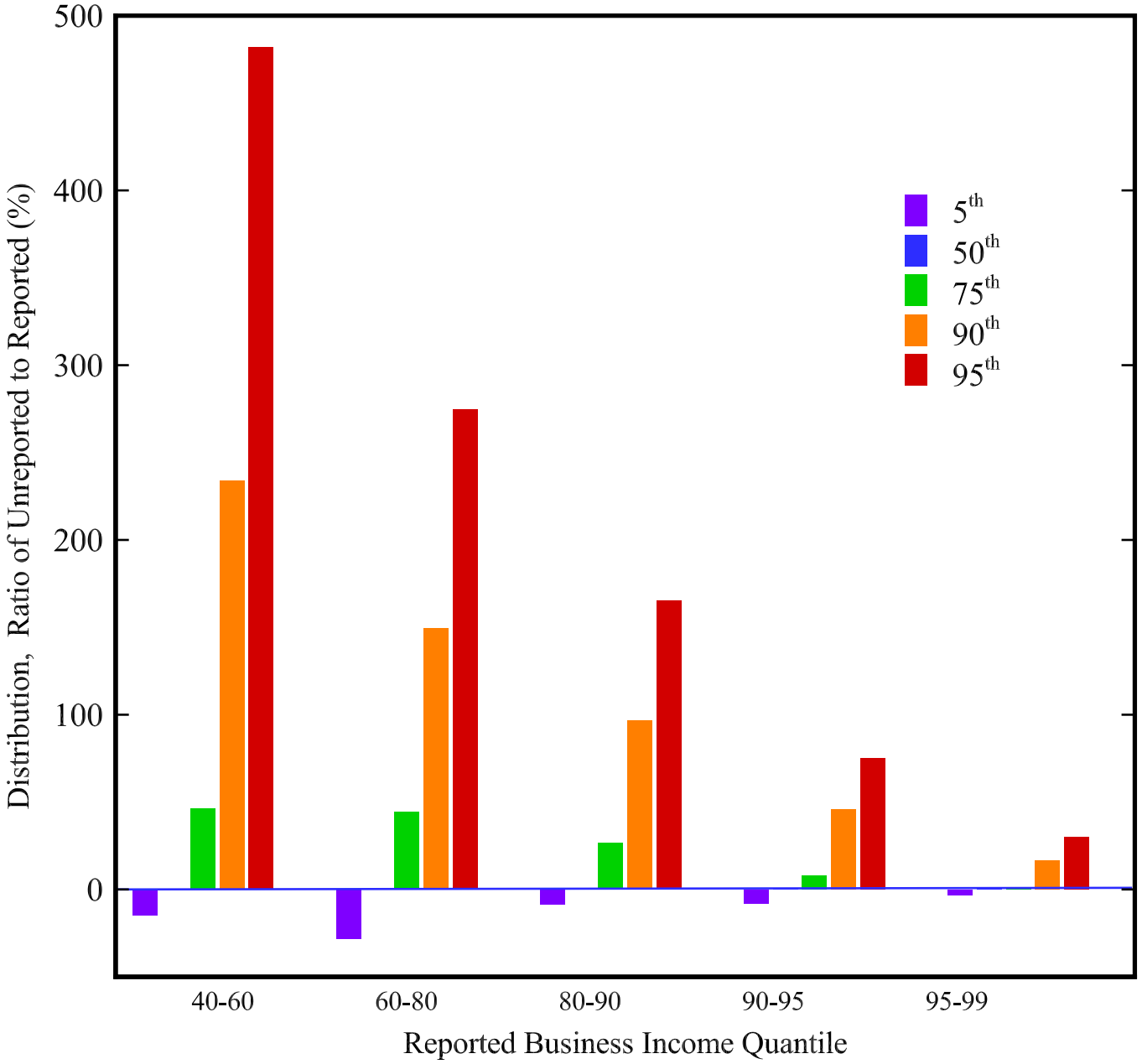
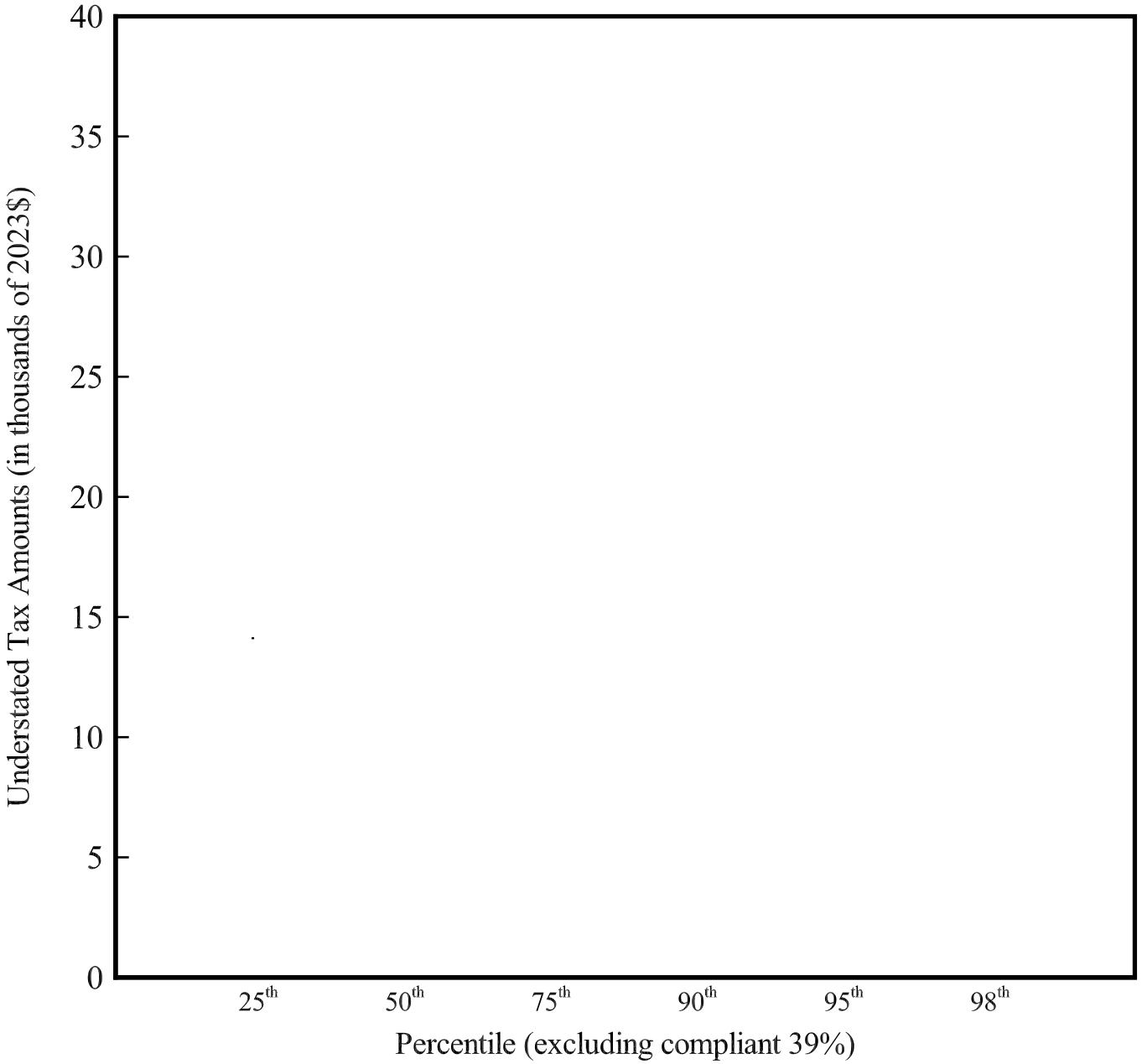


Distribution of U-to-R Ratios



Proprietors Ranked by Understated Taxes



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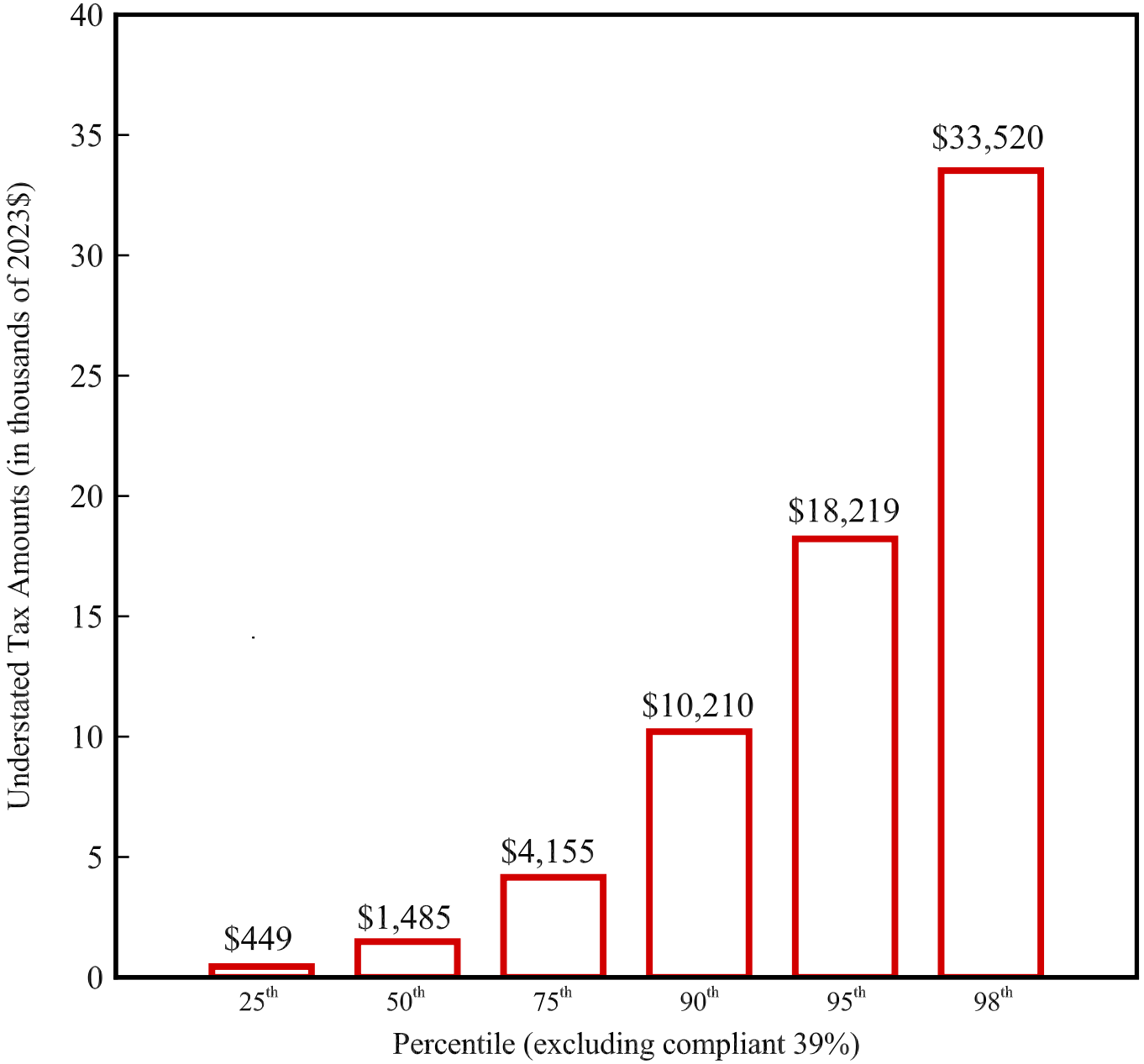
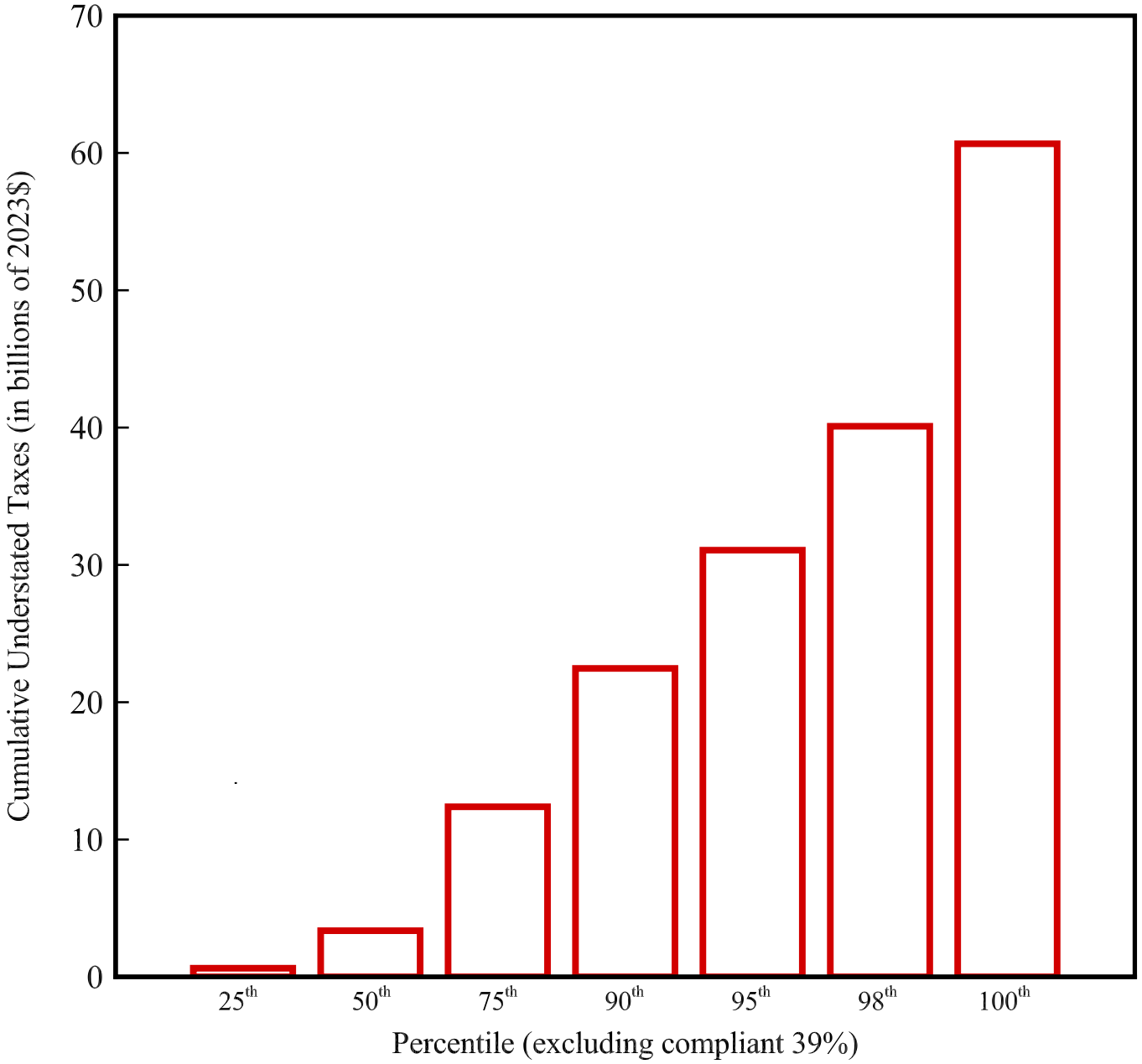


Cumulated Understated Taxes



Nonpecuniary Motives for Compliance

- TAS surveys intended to elicit nonpecuniary motives
- How?
  - Construct samples of sole proprietors
  - Use DIF scores indicating likelihood of audit
  - Group proprietors by DIF score
  - Compare responses of low-DIF and high-DIF groups

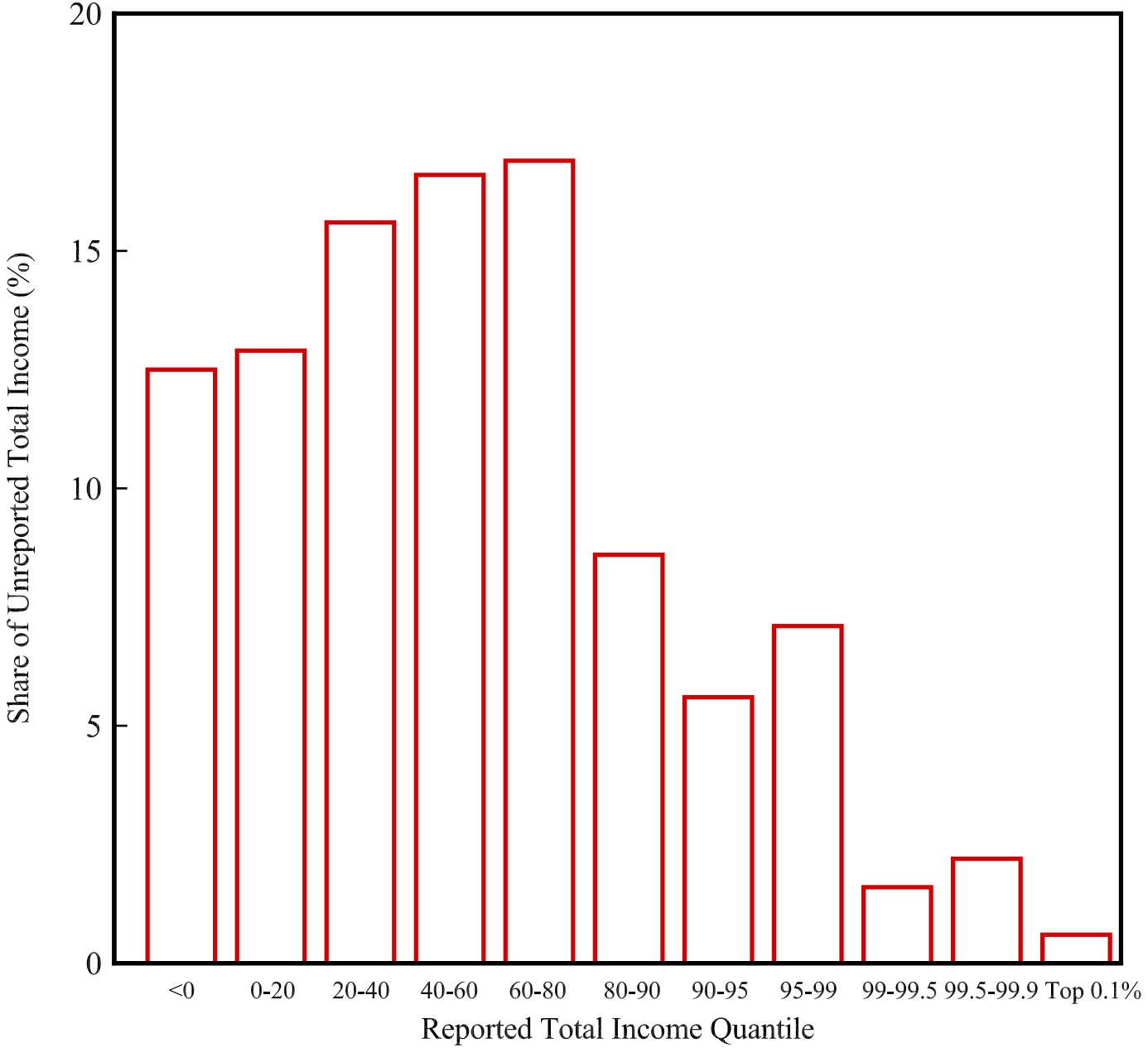
TAS Survey Main Results

- Compare lowest and highest compliance groups
- Where similar:
  - Agree tax rules complicated
  - Know consequences of underreporting
  - Profess moral obligation to pay taxes
- Where different:
  - High-compliance more trusting in IRS/govt
  - High-compliance rely more on preparers

Does Evasion Occur Across Income Distribution?

- Evidence from NRP random-audit studies (no DCE)
  - Available publicly only for total incomes
  - Shows underreporting across the distribution
- Estimates of very top depend on DCE adjustments

Shares of Unreported Total Incomes (no DCE)



Recap: Lessons from IRS Data

- Gross tax gap large and $\approx 3\%$ of GDP over time
- Underreporting is main source of tax gap
- Underreporting by business owners is most of that
- Underreporting is widespread but concentrated
- Underreporting occurs across the income distribution
- Economic deterrence is only one factor driving compliance

Theory

Key Factors

- Occupational choice: paid- or self-employment
- Taxpayer types: always compliant or not
- Noncompliance source: business income underreporting
- Dynamics of tax evasion:
  - Loss of reputation, business brands, customers
  - Recovery of back taxes

$\Rightarrow$ Extends standard model of economic deterrence

Occupational Choice

- Choose business b or work w

$$V(s) = \max \{V^b(s), V^w(s)\}$$

$$V^i(s) = \max_x \{U(c, \ell) + \beta \sum_{z', \epsilon'} \pi(z', \epsilon' | z, \epsilon) \mathcal{V}(s')\}$$

where $s = (a, \kappa, d, z, \epsilon)$ and

  - a: financial assets
  - κ: *sweat capital*, eg, reputation, brands, etc
  - d: *back taxes*, eg, accumulated unpaid taxes
  - z: productivity in self-employment
  - ϵ: productivity in paid-employment
  - $x = [a', \kappa', d', c_p, c_c, \ell, k_p, h_p, h_\kappa, e, c^r, y_b^r]$

Continuation Value

$$\mathcal{V}(a', \kappa', d', z', \epsilon')$$

$$= \underbrace{(1 - \Pi(d'))V(a', \kappa', d', z', \epsilon')}_{\text{no audit}}$$

$$+ \underbrace{\Pi(d')V(a' - f_a(d'), f_r(\kappa'), 0, z', \epsilon')}_{\text{audit}}$$

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$\uparrow$

Probability of audit

Continuation Value

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Probability of audit and fines depend on d'

Continuation Value

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$\uparrow$

Audit results in reputational losses

Business Owner's Technologies

- Goods and services: $y_p = z f_p(\kappa, k_p, h_p)$
  - z = productivity in self-employment
  - κ = sweat capital
  - k_p = rented physical capital
  - h_p = owner time in production
- Sweat investment: $x_\kappa = f_\kappa(h_\kappa, e)$
  - h_κ = owner time in brand building
  - e = owner expenses

Business Owner's Constraints

- Budget

$$a' = [(1+r)a + y_b - T^b(y_b^r) - (1+\tau_c)(c_c + pc_p) + \chi]/(1+\gamma)$$

- Sweat capital

$$\kappa' = [(1-\delta_\kappa)\kappa + f_\kappa(h_\kappa, e)]/(1+\gamma)$$

- Back taxes

$$d' = [(1-\delta_d)d + f_d(c^r)]/(1+\gamma)$$

- Borrowing

$$a' \geq f_a(d')$$

Business Owner's Constraints

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$\uparrow$ $\nearrow$

next period and current assets

Business Owner's Constraints

- Budget

$$a' = [(1+r)a + y_b - T^b(y_b^r) - (1+\tau_c)(c_c + pc_p) + \chi]/(1+\gamma)$$

true and reported income

$$y_b = py_p - (r+\delta)k_p - e,\ y_b^r = y_b - (1+\tau_c)c^r$$

Business Owner's Constraints

- Budget

$$a' = [(1+r)a + y_b - T^b(y_b^r) - (1+\tau_c)(c_c + pc_p) + \chi]/(1+\gamma)$$

$\uparrow$ $\nearrow$

taxes on business and consumption

Business Owner's Constraints

- Budget

$$a' = [(1+r)a + y_b - T^b(y_b^r) - (1+\tau_c)(c_c + pc_p) + \chi]/(1+\gamma)$$

$\uparrow \nearrow$

goods produced by C-corps

and pass-thrus, $c = \text{ces}(c_c, c_p)$

Business Owner's Constraints

- Budget

$$a' = [(1+r)a + y_b - T^b(y_b^r) - (1+\tau_c)(c_c + pc_p) + \chi]/(1+\gamma)$$

χ: transfers

Business Owner's Constraints

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$$\uparrow$$

sweat investment (shown earlier)

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$$\uparrow$$

current misreporting: $y_b - y_b^r = (1+\tau_c)c^r$

Business Owner's Constraints

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$$d' = [(1-\delta_d)d + f_d(c^r)]/(1+\gamma)$$

- Borrowing

$$a' \geq f_a(d')$$

Close the Model

- Standard dynamic program for workers, except
  - Sweat capital decays without use
  - Back taxes not forgiven
- Standard dynamic program for C corporations
- Public financing (G&S plus transfers) with
  - Taxes on consumption and all forms of income
  - Fines if caught evading taxes

(Details in slide deck appendix)

Qualitative Predictions

Predictions of Increased Enforcement

- Lower precautionary motives
  - Financial assets used to pay future fines
  - Borrowing constraints less binding
- Lower sweat capital stocks
  - Brand assets lost with exposed tax evasion
  - Business ages lower with more exit/entry
  - Business productivity higher due to selection

Quantitative Results

Key Compliance Parameters

- Audit probability, $\Pi(d') = \pi$, π varied
- Fines, $f_a(d) = \bar{p}d$, $\bar{p} = 4$
- Reputational cost, $f_r(\kappa) = 0$ if non-compliant
- Underreporting, $f_d(c^r) = \tau_b(1 + \tau_c)c^r$, $\tau_c = .065$, $\tau_b = .4$
- Back taxes depreciation, $\delta_d = 20\%$

Note: See paper for full calibration

Comparative Statics

- Vary audit probability π
- Record impacts for owners by type

Fraction of Population

	% Change from $\pi = 1\%$ to			
Owner type:	2%	3%	5%	7%
Non-compliant	−21	−35	−60	−70
Compliant	11	23	43	45
All owners	−6	−9	−12	−17

$\Rightarrow$ Large compositional shift

Financial Assets (a)

	% Change from $\pi = 1\%$ to			
Owner type:	2%	3%	5%	7%
Non-compliant	−4	−9	−29	−57
Compliant	5	12	28	39
All owners	−10	−18	−30	−36

$\Rightarrow$ Large drop in precautionary saving

Productivity (z)

	% Change from $\pi = 1\%$ to			
Owner type:	2%	3%	5%	7%
Non-compliant	9	16	25	27
Compliant	0	0	-1	-2
All owners	6	9	10	11

$\Rightarrow$ Large increase in productivity due to selection

Sweat Capital (κ)

	% Change from $\pi = 1\%$ to			
Owner type:	2%	3%	5%	7%
Non-compliant	−9	−14	−37	−31
Compliant	12	13	21	21
All owners	−4	−9	−15	−12

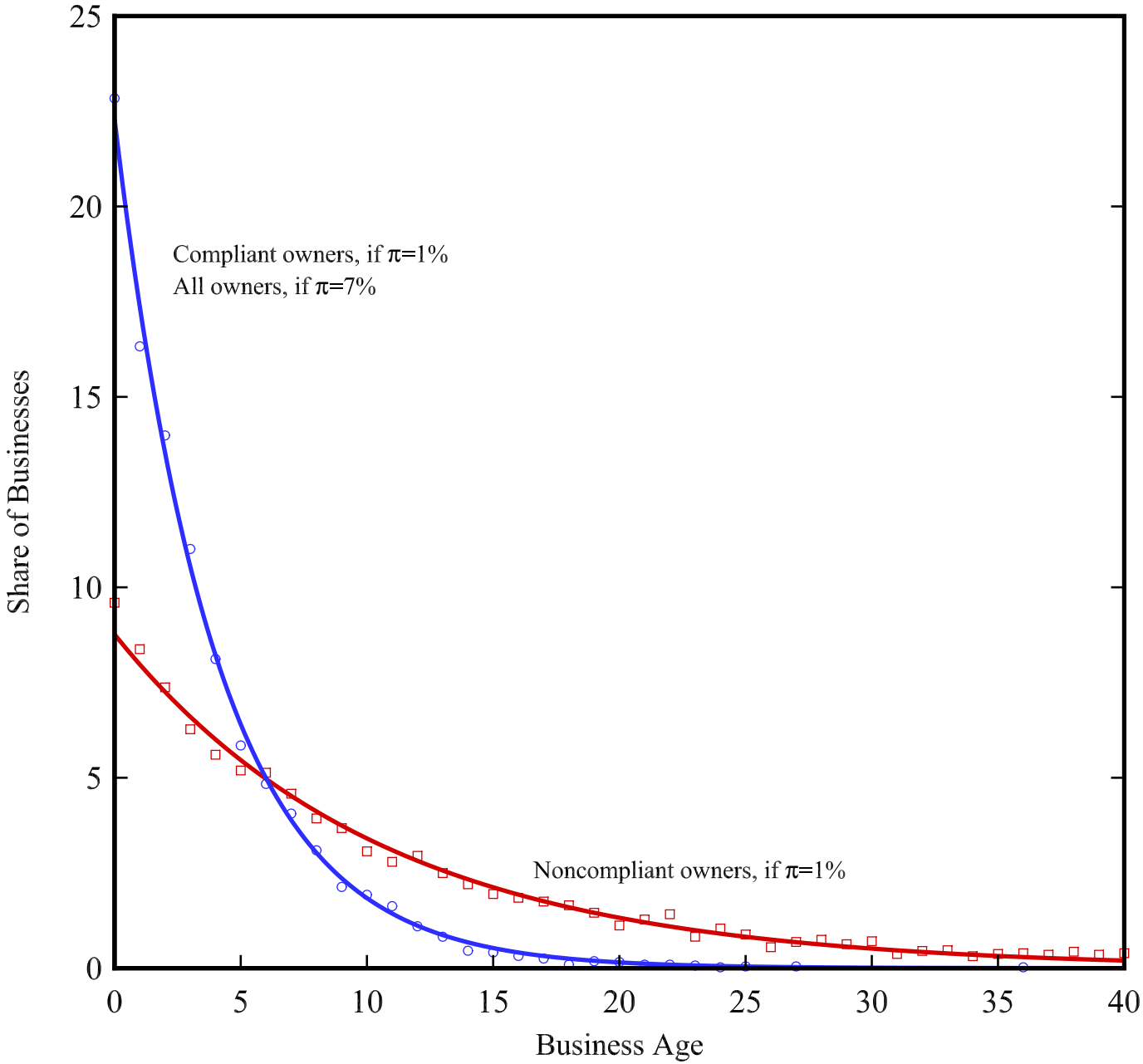
$\Rightarrow$ Large drop in business assets with more audits

Business Age

	% Change from $\pi = 1\%$ to			
Owner type:	2%	3%	5%	7%
Non-compliant	−33	−50	−64	−68
Compliant	5	8	15	18
All owners	−30	−42	−49	−49

$\Rightarrow$ Large drop in age with more audits, less capital

Business Age Distributions (π=1% and 7%)



Distributional Impacts

- Two rankings of interest:
  - By misreporting rates: $100(y_b - y_b^r)/y_b$
  - By business receipts: py_p
- Looking for patterns of underreporting
  - Few owners account for most cheating
  - Cheating occurs across the income distribution

Rank Owners by Underreporting ($\pi = 2\%$)

	% of Income Underreported				
% Deviations	None	<80	80-90	90-99	>99
Business age	−37	−18	19	4	67
Financial assets	−40	−63	−30	−4	79
Sweat capital	−21	63	59	51	23
Productivity	7	11	14	13	−16
True income	−10	111	107	93	−7
% Owners	59	2	2	4	33

$\Rightarrow$ Concentrated, but too many able to get income to 0

Rank Owners by Receipts ($\pi = 2\%$)

	Quintiles of Receipts				
% Deviations	(1)	(2)	(3)	(4)	(5)
Business age	−21	6	−21	14	21
Financial assets	19	12	−1	−6	−23
Sweat capital	−57	−13	−15	36	49
Productivity	−21	−17	10	14	14
True income	−113	−68	5	72	104
% Underreporting	32	47	26	36	57

$\Rightarrow$ Cheating occurs throughout the size distribution

Policy Counterfactuals

- Two ways to raise same revenues
  - Higher enforcement: $\pi = 2\% \rightarrow \pi = 5\%$
  - Higher tax rate on business: $\tau_b = 40\% \rightarrow \tau_b = 47\%$
- Raise revenues by 3% relative to $\pi = 2, \tau_b = 40$ baseline

Enforcement vs Taxation

% Change in:	More Audits π=5 vs 2%	Higher Tax τ_b=47 vs 40%
# of Owners	−7	−4
Non-compliant	−50	12
Compliant	29	−18
Business age	−28	16
Financial assets, a	−22	14
Sweat capital, κ	−11	6
Back taxes, d	−66	44
Productivity, z	6	−3
Business income, y_b	4	4

Bottom Line

- Higher enforcement vs taxation
  - Most evident in composition of businesses/owners
  - Not evident in aggregate business income
- Need transitional dynamics to do proper welfare analysis

Next Steps

- Data: gather relevant IRS micro data
  - Current NRP studies only work with 1040
  - Want to expand analysis to business filings
- Theory: add transitional dynamics
  - Current analysis is steady state
  - Want to analyze Inflation Reduction provisions
  - Want to do full welfare analysis with transition

Appendix

Dynamic Program for Workers

- Workers choose $x = [a', c_p, c_c, \ell]$ to solve

$$V^w(s) = \max_x \{U(c, \ell) + \beta \sum_{z',\epsilon'} \pi(z', \epsilon'|z, \epsilon)\mathcal{V}(s')\}$$

subject to

$$\begin{aligned} a' = [&(1+r)a + w\epsilon h_w - T^w(w\epsilon h_w) \\ &- (1+\tau_c)(c_c + pc_p) + \chi]/(1+\gamma) \end{aligned}$$

$$\kappa' = (1-\lambda_\kappa)\kappa/(1+\gamma)$$

$$d' = (1-\lambda_d)d/(1+\gamma)$$

$$1 = \ell + h_w$$

Dynamic Program for Corporations

- Corporations choose x_c, n_c to solve

$$V^c(k_c) = \max \left\{ (1-\tau_d)d_c + \frac{1+\gamma}{1+r} V^c(k_c') \right\}$$

subject to

$$d_c = AF(k_c, n_c) - wn_c - x_c - \tau_p(y_c - wn_c - \delta_k k_c)$$

$$x_c = (1+\gamma)k_c' - (1-\delta_k)k_c$$

Government Budget Constraint

$$
\begin{aligned}
g + \chi + (r - \gamma)b = \tau_c \int (c_{ci} + p c_{pi})\, di + \\
+ \tau_d (y_c - w n_c - (\gamma + \delta_k) k_c - \tau_p (y_c - w n_c - \delta_k k_c)) \\
+ \tau_p (y_c - w n_c - \delta_k k_c) + \int T^n (w \epsilon_i n_i)\, di \\
+ \int T^b (y^b_{ri})\, di + \int \mathbf{1}_i f_a (d_i)\, di
\end{aligned}
$$