Behavioral responses to taxation

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Optimal Income Tax and Elasticities

Recall the optimal income tax formula:

$$\frac{t}{1-t} = -\frac{\operatorname{cov}\left(\lambda, \frac{I}{I^M}\right)}{\frac{1}{N}\sum_{i=1}^{N} \varepsilon_i \cdot \frac{I_i}{I^M}}$$

Policy goals:

- Define (taxable) income appropriately to capture the ability to pay (accurate I/I^M)
- Make avoidance/evasion more or less accessible (lower ε_i)
- Most empirical estimates of the tax elasticity of labor supply ε_i are fairly small
- What does small ε_i imply for income tax rates?
- How can people reduce their taxable income?

Lecture Goals

- Identify the different margins of response to taxation
- Characterize the empirical methods used to estimate the behavioral responses to taxation
- Contrast and evaluate tax avoidance and tax evasion and their impact on the social cost of taxation

Limitations of the Theory on Labor Supply

Theory assumes free adjustment of hours worked.

- Ambiguous effect on labor supply (income vs. substitution)
- Firms may want all workers to work the same hours
- Overtime pay makes it harder to adjust at a constant wage

Intensive versus Extensive Margin Adjustments:

- Intensive margin = hours changes for those who work
- Extensive margin = labor force participation

Variation by group:

- Primary vs secondary earners
- Low vs high income individuals
- Cost of work variation (e.g., parenthood)

Other Behavioral Margins of Adjustment:

1. Intensity of work, occupational choice, retirement
2. Short- and long-run elasticities may differ

Summary of Evidence on Labor Supply Responses

- both margins small for men/primary earners
- large response for secondary earners ($\varepsilon \in [0.5, 1]$), mostly via participation
  $\Rightarrow$ Declined as gender gaps in employment rates closed
- large responses for low-income/welfare/EITC recipients, again mostly on the participation margin

Behavioral responses to taxation

- The cost and incidence of taxes depend on responses
- For income tax, labor supply responsiveness, ε_l matters, but need:
  - To account for income (positive) and substitution (negative) effects
  - "Exogenous" variation in tax rates
  - Assume wage elasticity of labor supply = tax elasticity of labor supply

Excess burden of income tax

- Labor supply responses suggest small overall cost of income taxation, but...
- **Types of responses to income tax**
  - real — labor supply, effort, occupational choice
  - shifting — salary vs. fringe benefits, organization of firm
  - re-timing — e.g., asset sales, timing of bonus payments
- Each behavior is a "costly" response to taxation
- Feldstein (1999) showed that cost of income tax depends on total taxable income, not just labor supply
- On the government side, revenue depends on taxable income only (it is $t \cdot I$ where I is taxable income)
- On the individual side, see next slide...

Taxable income summarizes effect on utility

- Utility: $u(C, L, E)$ with consumption C, leisure L, and effort $\mathcal{E}$
- Budget constraint:

$$C = w(E)(1 - L) - t \cdot \underbrace{[w(\mathcal{E})(1 - L) - A]}_{I=\text{taxable income}} - g(A)$$

  Wage rate $w(\mathcal{E})$ depends on effort; A is avoidance — it reduces taxable income but costs $g(A)$.
- Effect of $\Uparrow t$ on utility:
  - Taxes higher
  - By envelope theorem, $C'(t) = L'(t) = \mathcal{E}'(t) = A'(t) = 0$ at optimum

$$\frac{\partial}{\partial t}\Big\{u(C(t), L(t), \mathcal{E}(t))\Big\} = -u_C \cdot I$$

  (substitute out C with budget constraint)

Responsiveness of taxable income

- Empirical benefit: taxable income right in the tax data
- A lot of other problems though:
  - Measurement: Taxable income changes with policy
  - Variation rare: Tax structure somewhat stable
  - Reverse causality: Taxable income determines t
- Which side of the Laffer curve are we on?

$$\frac{\partial tI}{\partial t} = I + t\frac{\partial I}{\partial t} = I\left(1 - \frac{t}{1-t}\varepsilon\right) \overset{?}{>} 0 \text{ depends on } \leftrightarrow \varepsilon \overset{?}{>} \frac{1-t}{t}$$

- Initial work in the 1990s (Lindsay, Feldstein): high taxable income elasticity, so "wrong side of Laffer curve"
- Newer studies find high elasticities due to re-timing in short run; longer term effects much smaller, but larger than labor supply alone

Bunching at kink points

Assume that your marginal tax rates are 10% up to 50K, 20% up to 100K and 90% for every dollar over $100K.

Where would you expect there to be a lot of people earning their income?
$\Rightarrow$ Bunching at exactly $100,000

What are some reasons we might not see any bunching?

- Difficult to perfectly choose hours/earnings and earnings/hours
- Effective after-tax wage still high enough to work beyond kink point

Empirical Estimation: Bunching at Kinks & Notches

Kink estimation (discontinuities in marginal tax rate)

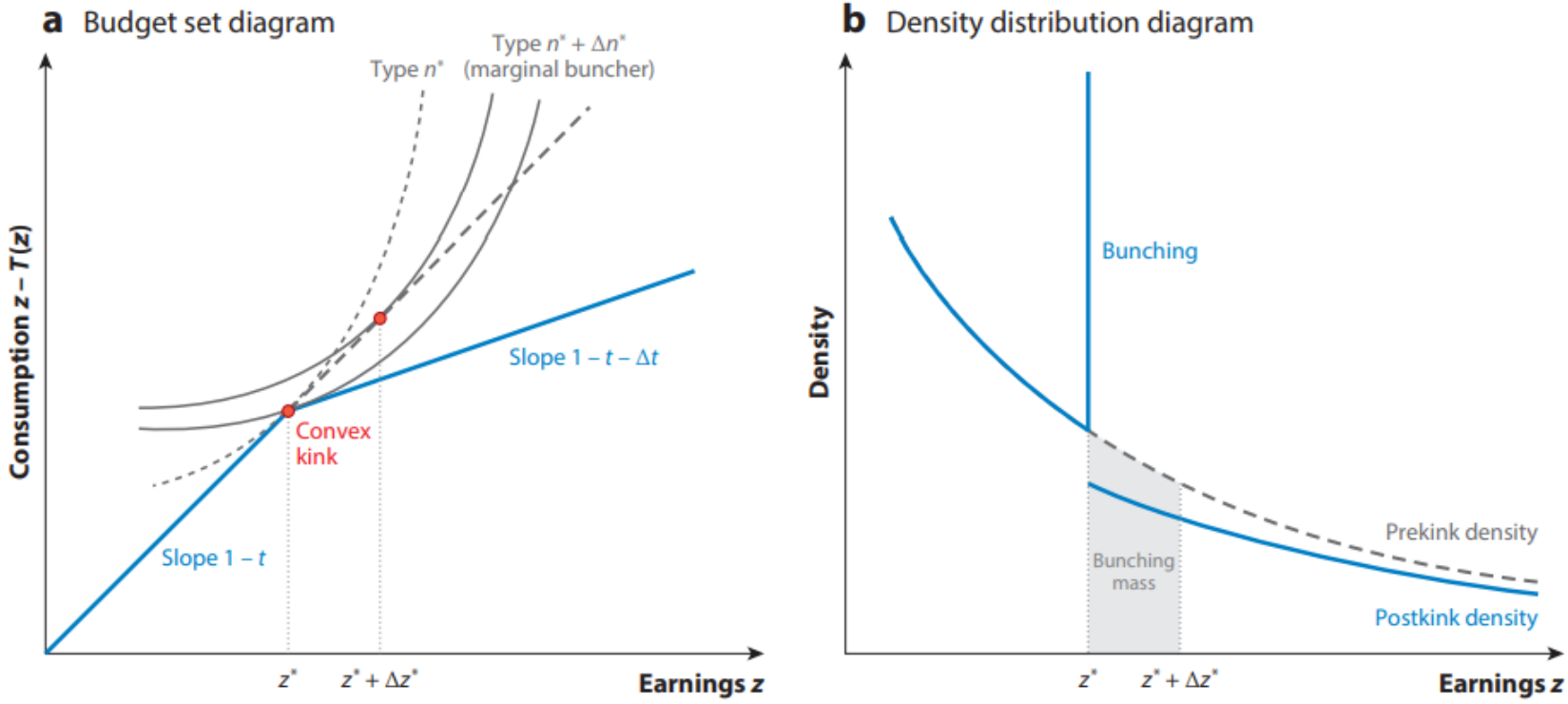
- Marginal tax rate changes create non-linear budget constraints
- A group of marginal workers optimize at the "kink," but would work more under the counterfactual linear budget constraint
- The implied reduction in taxable income by these marginal workers is used to calculate an elasticity

Notch estimation (discontinuities in average tax rate)

- Suppose the tax liability jumps at some income threshold, which creates a discontinuity in the average tax rate
- Creates region where reducing earnings raises consumption and leisure, then a region where preferences take over
- Elasticity harder to measure because level change does not map to derivative in the elasticity formula

Estimate a counterfactul earnings density (usually assume "smoothness" without kink/notch) to use these methods

Bunching at a Kink: Graph



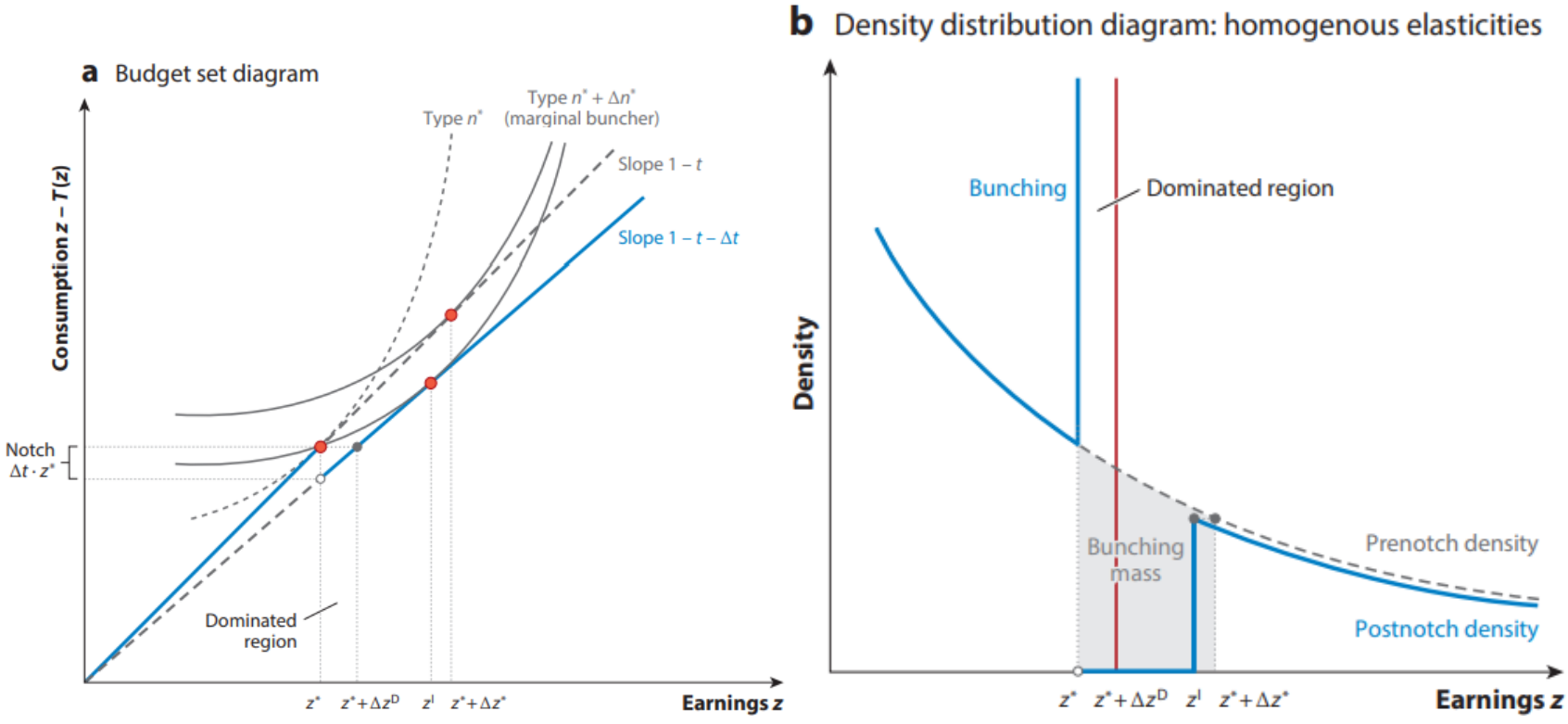
From Kleven (2016) "Bunching" at a kink point

If kink is small, the local "compensated" tax elasticity of taxable earnings is

$$\varepsilon = -\frac{\Delta z^*/z^*}{\Delta t/(1-t)}$$

Technical note: Actual tax rate does not change, so there are no "income effects" making this the compensated elasticity (see Saez (2010) for details and exceptions)

Bunching at a Notch: Graph



From Kleven (2016) "Bunching" at a notch points. Δz^D is area for which reducing earnings increases consumption and leisure.

Approximate elasticity with upper bound (see Kleven & Waseem (2013)):

$$e_R \approx \frac{(\Delta z^*/z^*)^2}{\Delta t/(1-t)}$$

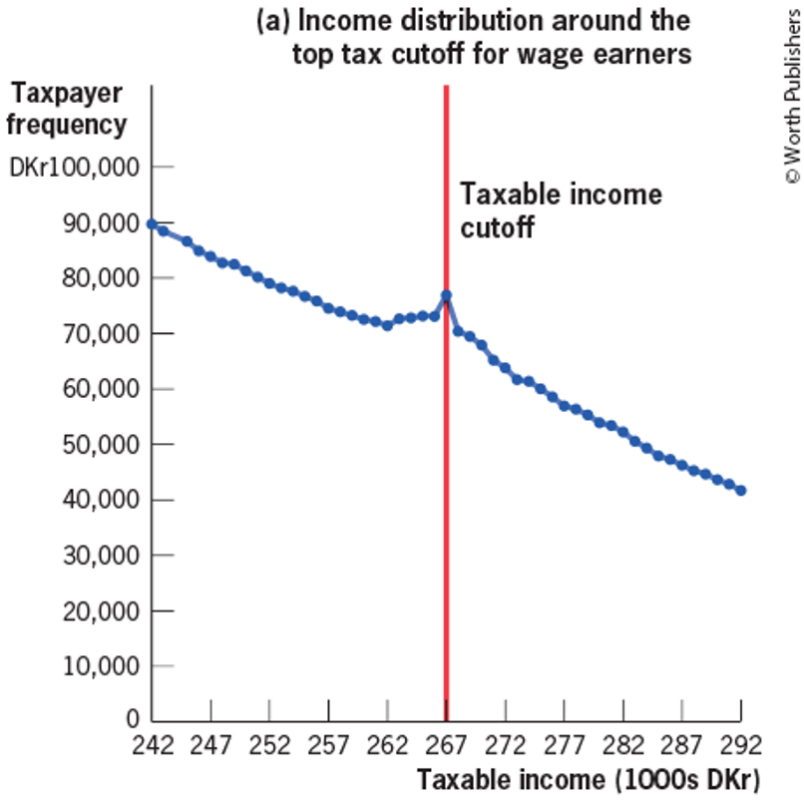
Limitations to bunching estimation

- Requires "smoothness" in absence of the discontinuity, so discontinuities in wage settings/hours worked can create issues
- Are estimates from one part of the income distribution externally valid? Need a model to map to rest of distribution
- Highly salient tax discontinuities get bigger bunches, underinformed taxpayers may underoptimize
- It is costly to adjust earnings, so kinks/notches discontinuities with smaller changes may underestimate elasticity

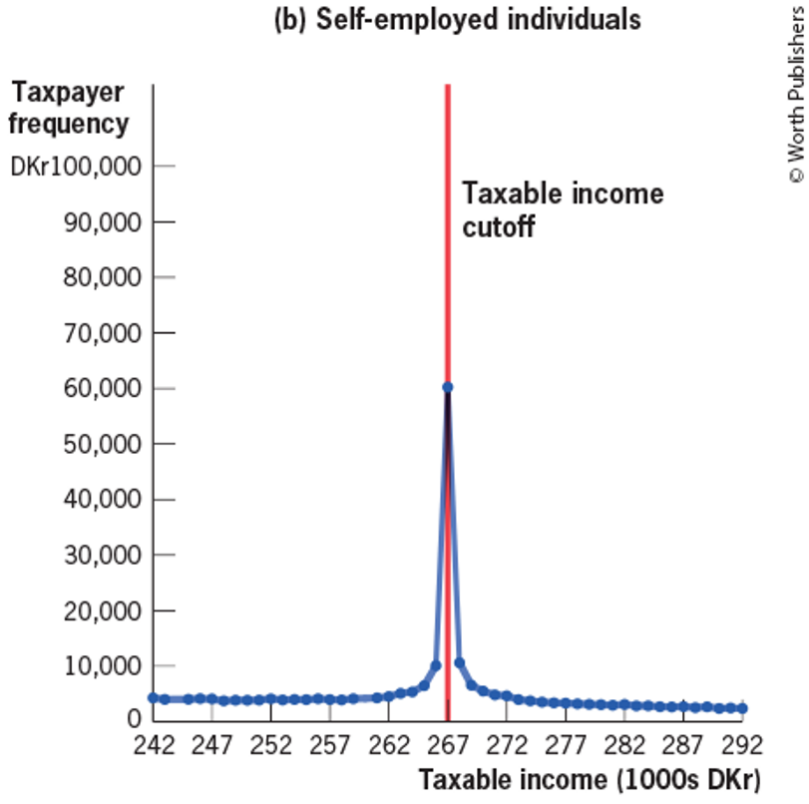
Behavioral responses - examples

- "Bunching" of taxpayers in place where marginal tax rates change (Chetty et al, Quarterly Journal of Economics, 2011).
- Introduction of the flat tax in Poland in 2004 (Kopczuk, 2013): a tax reduction at the top of the distribution for people with business incomes – and "suddenly" the rich got richer?
- Importance of tax evasion (Kleven et al. "Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark," Econometrica, 2011)

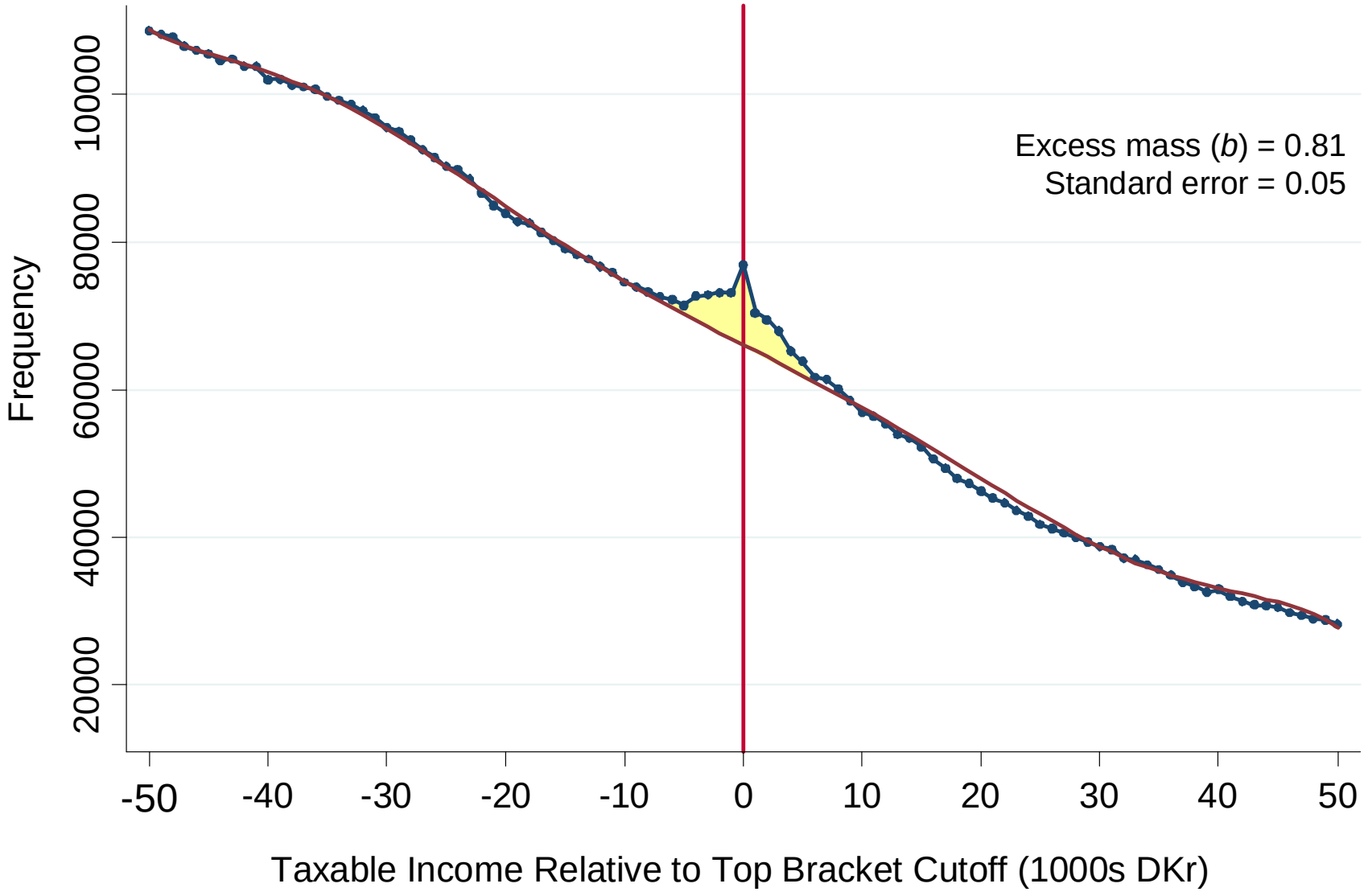
Bunching at the cutoff



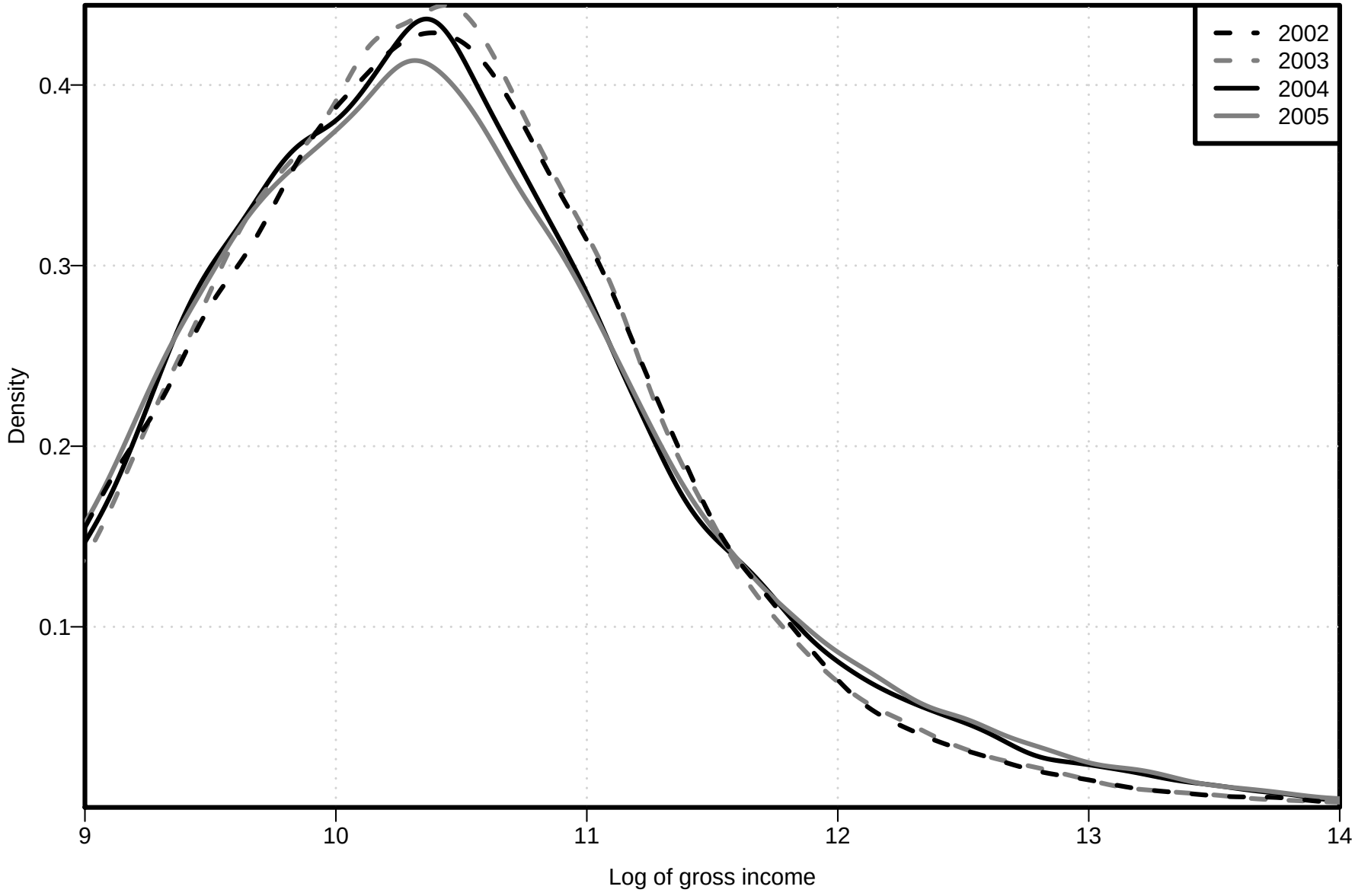
(a) Y-axis is # of individuals at each earning level



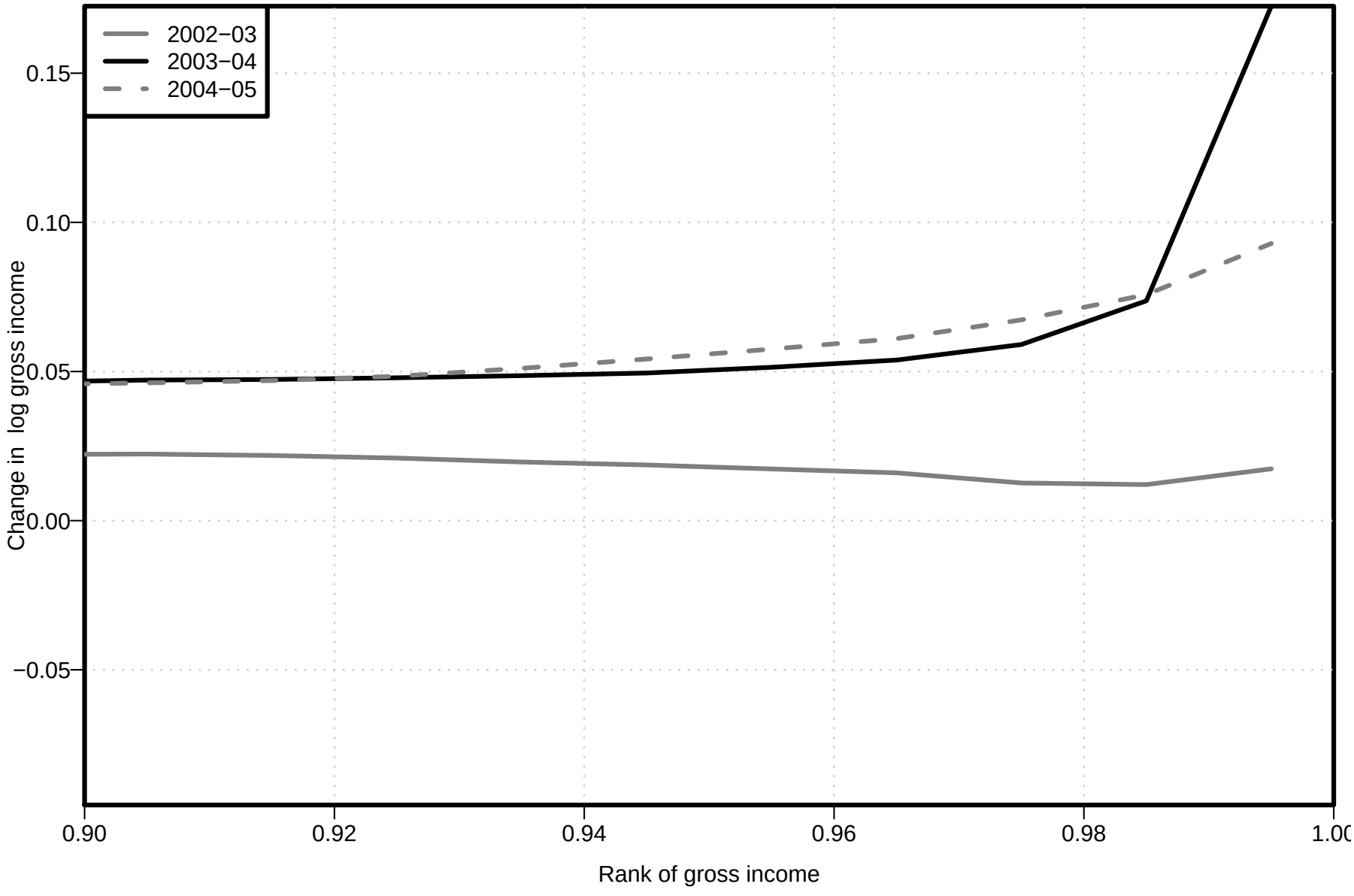
(b) Response could be changes in tax reporting



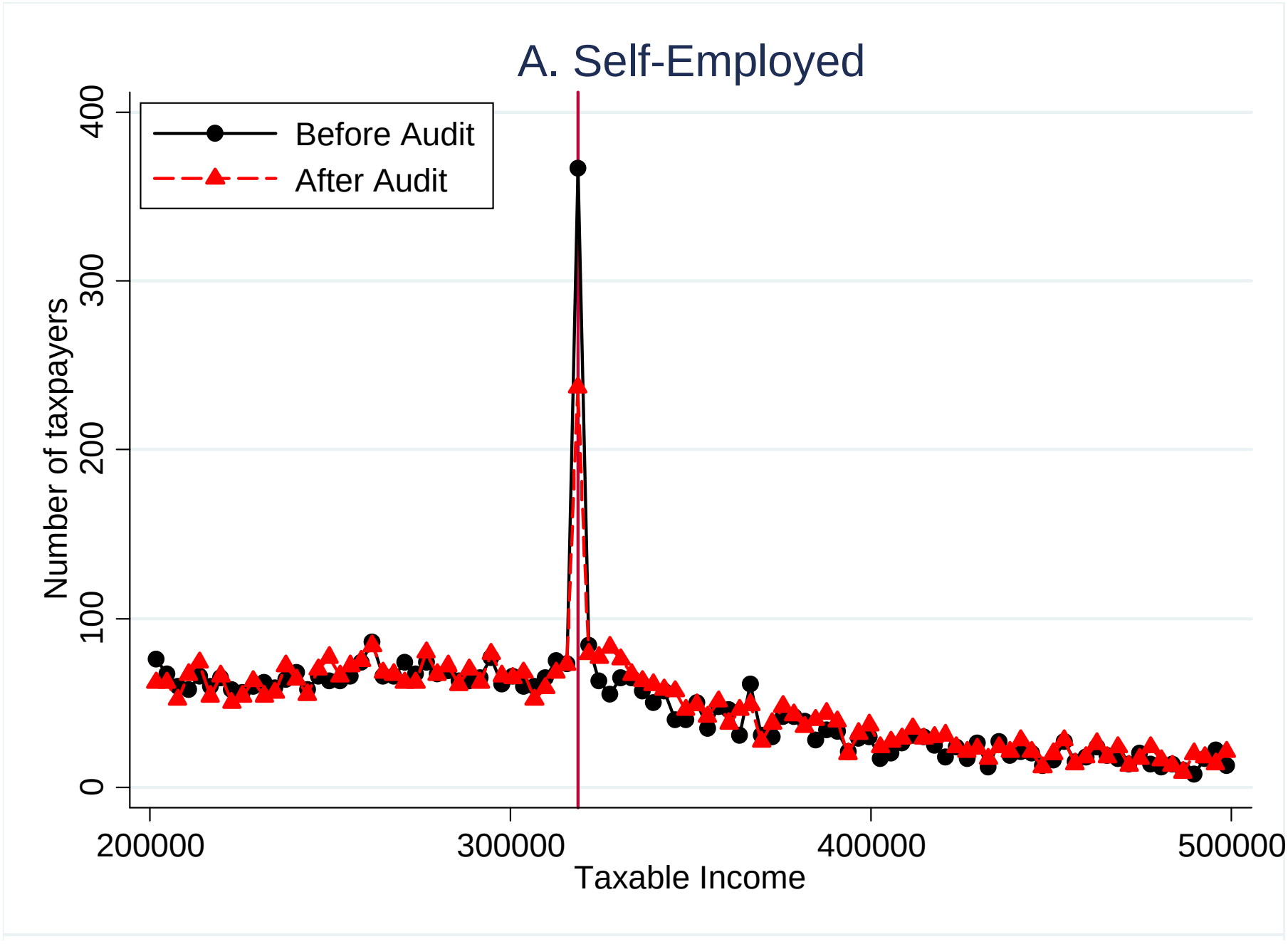
Earnings around the kink in the tax schedule — Denmark



Distribution of gross income inflation/GDP adjusted (business owners)



Change in reported income 2002-05 by location in the full income distribution; tax reduction took place mostly in the top 1%


A. Self-Employed
Before Audit
After Audit
Number of taxpayers
0
100
200
300
400
200000
300000
400000
500000
Taxable Income

Would you evade?

- How can someone avoid paying $100 in tax?
- Imagine you received $300 in cash for a side job. If you report, your tax liability goes up $100. Do you?
- If you donate $300, you can deduct $100 from tax liability
- Only donations over $250 require a receipt
- What would you do?
  - Just pay the $100
  - Donate $300 and deduct $100
  - Say you donated $300 and deduct $100
  - Say you donated $150 to two organizations and deduct $100
- You start renting your basement as an Airbnb, but rent infrequently. Can you deduct mortgage/utility costs?
- Turns out there are a lot of holes in the tax code – even more for the wealthy

Tax gap

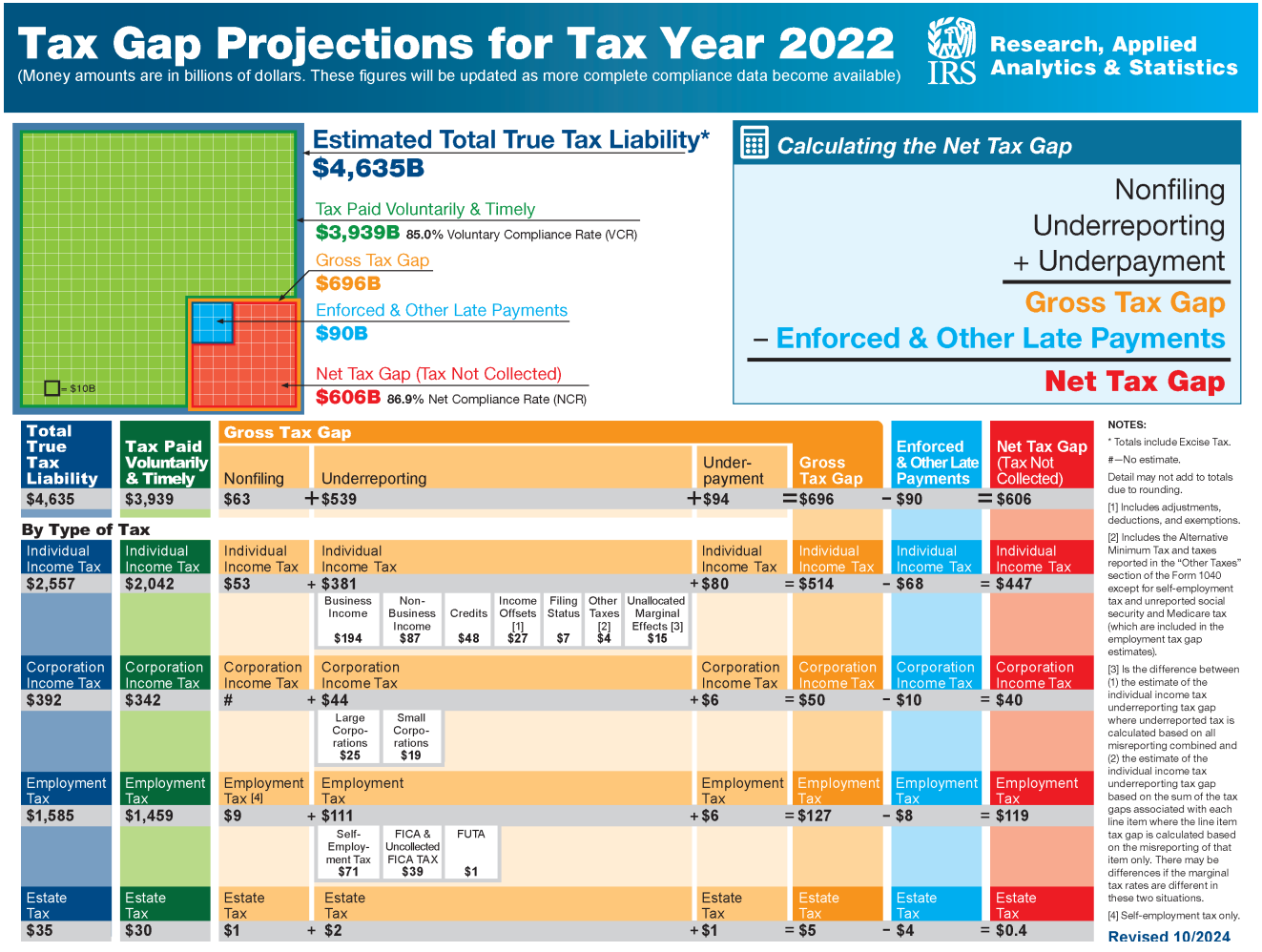
Tax gap: the difference between the tax that taxpayers should pay and what they actually pay on a timely basis.

The Tax Gap in 2022 (according to the IRS, numbers rarely updated): \$696B or 15% of overall tax liability.

These numbers do not account for enforcement and late payments which were estimated to reduce the gross tax gap by \$90 billion to \$606B (13.1% noncompliance)

Sources of tax gap: nonfiling, underreporting, underpayment. Underreporting accounts for 80% of the tax gap.

Tax evasion in the U.S.



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

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 10/2024

Figure: Source: https://www.irs.gov/pub/irs-pdf/p5869.pdf

The cost of tax evasion

Why is tax evasion bad? Is it?

- Tax evasion reduces revenue and requires adjusting other tax rates to make up revenue.
- One source of the social cost of tax evasion: excess burden due to higher taxes.
- Another source of cost: extra risk undertaken by tax evaders.
  - Worse off relative to everyone who pays same expected tax liability without taking risk
  - But, maybe we don't care about welfare of cheaters?
  - But what about people who make mistakes?
- Horizontal inequity: not everybody cheats.

Tax evasion

Assumptions: tax rate of t, probability of getting caught p, penalty of f, income of y. A risk neutral taxpayer wants to maximize

$$(1-p)\underbrace{[y-t(y-E)]}_{\text{evasion income}}+p\underbrace{[(1-t)y-fE]}_{\text{penalized income}},$$

where E is evasion.
Equivalently, the expected after-tax/penalty resources are

$$(1-t)y+[t(1-p)-pf]E$$

For what values $t(1-p)-pf$ does raising E raise taxable income?
For $t(1-p)-pf>0$.

Income tax audit rate is $p \approx 0.01$. If marginal tax rate, $t=0.35$, a penalty of $f=\$34.65$ per dollar cheated discourages evasion.

Similar logic if a person is risk averse: if the evasion lottery pays on average, then cheat a little bit... (as a treat)

Improving this framework

- The true audit probability is much bigger than 0.01. Why?
- Cross-referencing of wages and salaries with employer's reports means $p \approx 1$ for most taxpayers
  - Underreporting varies by the type of income: very low ($\approx 1\%$) for wages/salaries, closer to 30% for business income
  - Non-compliance generally increases with more options to withhold and more information sources needed to verify income
  - most effective ways of reducing non-compliance involve more third party reporting matched to individual reports
- Does $\uparrow E$ attract more attention, $\uparrow p$: "petty" cheating — underreporting by a few bucks — likely undetected.
- Perception of fairness in the tax code has been suggested as an important determinant of compliance

Tax evasion in the U.S.

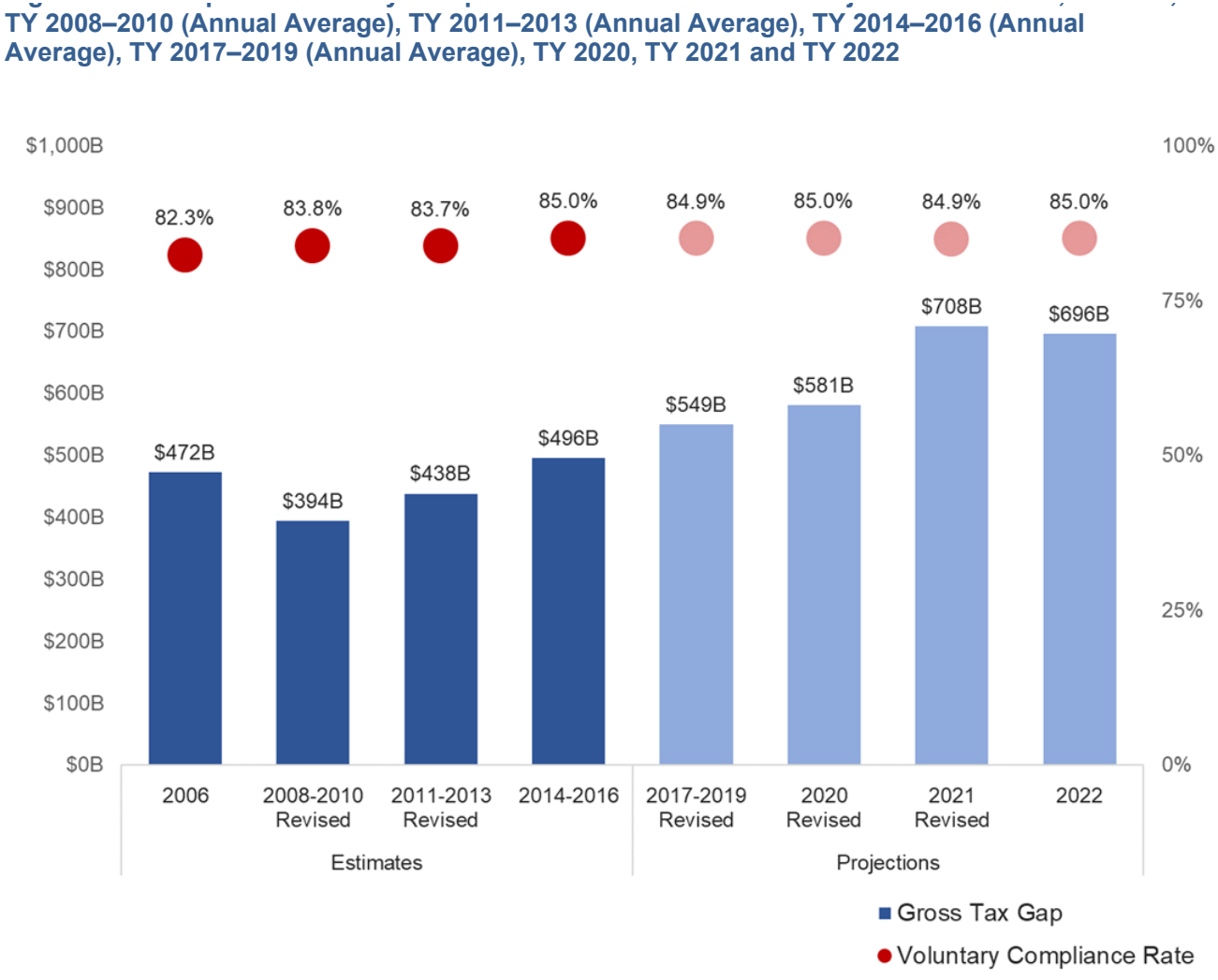


Figure: Source: https://www.irs.gov/pub/irs-pdf/p5869.pdf

Tax evasion in Denmark

TABLE II

AUDIT ADJUSTMENTS DECOMPOSITION[a]

Evasion: 0.3%

Evasion: 41.5%

		A. Total Income Reported				B. Third-Party vs. Self-Reported Income			
		Pre-Audit Income	Audit Adjustment	Under-reporting	Over-reporting	Third-Party Income	Third-Party Under-reporting	Self-Reported Income	Self-Reported Under-reporting
		1	2	3	4	5	6	7	8
I. Net Income and Total Tax									
Net income	Amounts	206,038	4532	4796	−264	195,969	612	10,069	4183
		(2159)	(494)	(493)	(31)	(1798)	(77)	(1380)	(486)
	% Nonzero	98.38	10.74	8.58	2.16	98.57	2.31	38.18	7.39
		(0.09)	(0.22)	(0.20)	(0.10)	(0.08)	(0.11)	(0.35)	(0.19)
Total tax	Amounts	69,940	1980	2071	−91				
		(1142)	(236)	(235)	(11)				
	% Nonzero	90.76	10.59	8.41	2.18				
		(0.21)	(0.22)	(0.20)	(0.10)				
II. Positive and Negative Income									
Positive income	Amounts	243,984	3776	3943	−167	223,882	516	20,102	3427
		(2511)	(485)	(485)	(27)	(1860)	(76)	(1693)	(478)
	% Nonzero	98.24	5.80	4.78	1.02	98.15	1.60	19.53	3.41
		(0.09)	(0.17)	(0.15)	(0.07)	(0.10)	(0.09)	(0.28)	(0.13)
Negative income	Amounts	−37,946	756	853	−97	−27,913	97	−10,033	756
		(1014)	(71)	(69)	(14)	(406)	(12)	(862)	(68)
	% Nonzero	79.09	6.45	5.13	1.32	78.21	0.75	29.49	4.99
		(0.29)	(0.18)	(0.16)	(0.08)	(0.29)	(0.06)	(0.33)	(0.16)

(*Continues*)

Evaders: 2.3% (2.31/98.57)

19.3% of evaders

Figure: Source: Kleven et al., Econometrica, May 2011

Tax evasion in Denmark (Kleven et al, 2011)

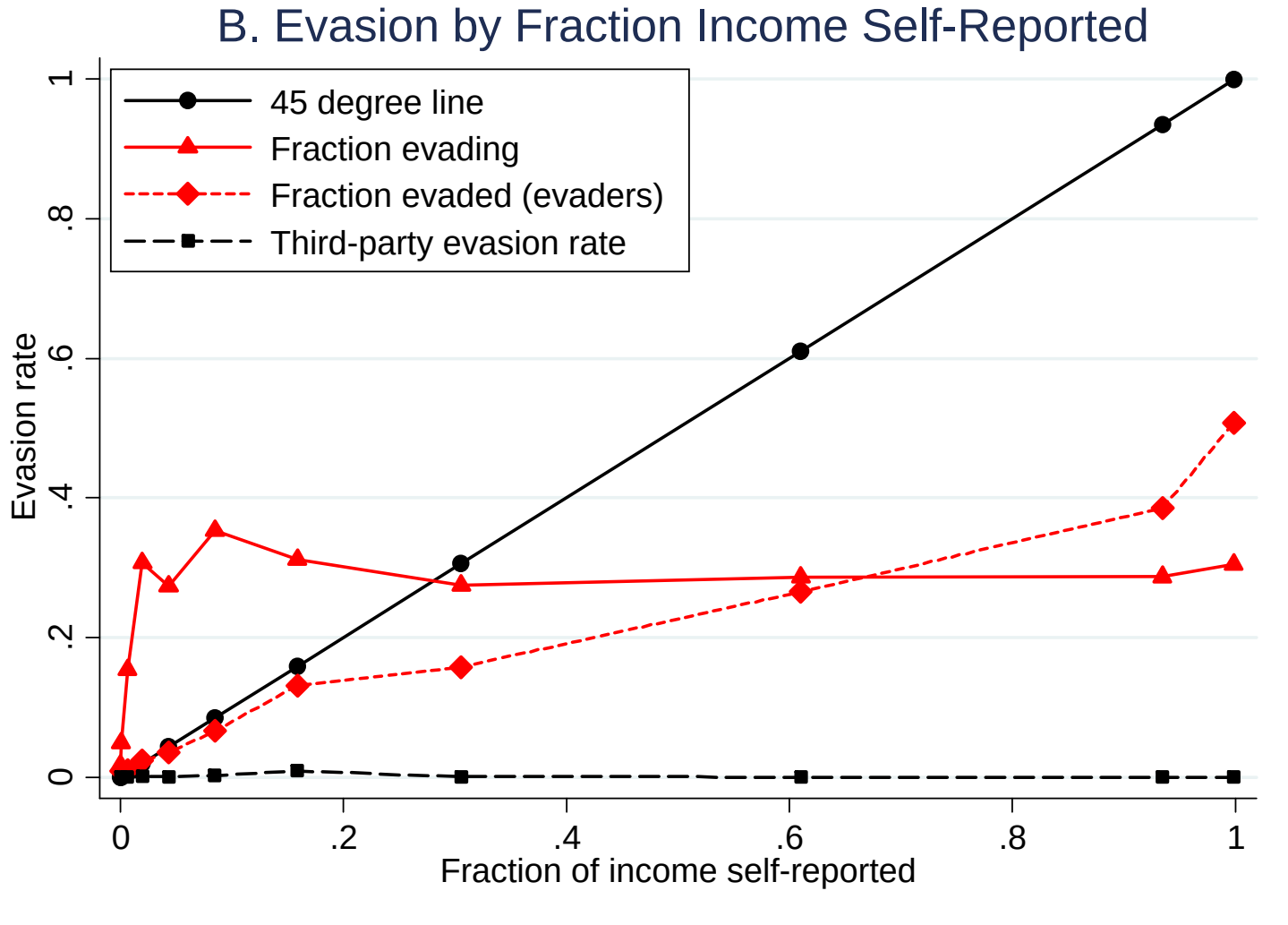


Figure: Source: Kleven et al., Econometrica, May 2011

Policy response

What should the government do to increase compliance?

- High penalties could deter cheating if detection is unlikely.
- "Optimal audit" strategies impractical with bounded penalties and costly audits:
  - Increase detection by using third-party reporting, P2P data, and taxpayer engagement.
  - Leverage network effects.
  - Improve public perception of the government and tax code.
- High detection rates don't always boost compliance; audits are often negotiations.
- Some noncompliance might be acceptable due to cost, redistributive effects, and limiting government growth.

Complexity of the Tax Code

- Economic Costs:
  - Direct compliance: time spent on tax returns and info gathering
  - More avoidance opportunities
  - Unintentional errors: e.g., EITC claim mistakes from misinterpreting a "qualifying" child
- Policy Implications:
  - Penalties may not effectively address unintentional errors
  - Enhance compliance via education, customer service, and tax professionals
  - This approach has been the US policy for 15 years
  - Downside: Accounting firms (e.g., H&R Block, TurboTax) may exploit the system

Special treatment and rates

- Lower rate for capital gains and dividends (0%, 15% or 20%, depending on income level)
- An additional net investment income tax (3.8%) for taxpayers above $250,000.
- 20% of business income reported on individual income tax returns (so called "pass-through" businesses - sole proprietors, S corporations, partnerships) may be deducted for some (many...) businesses as of 2018
- Reorganizing your earnings from wages to pass-through business income can be a way to pay less tax.
- And that's before we've touched illegal ways to pay less tax!

The Alternative Minimum Tax and Claimants

- AMT introduced in 1969
- Disallows most deductions, adds back some income
- Pay the *higher* of the regular or the AMT tax liability
- Basic structure:

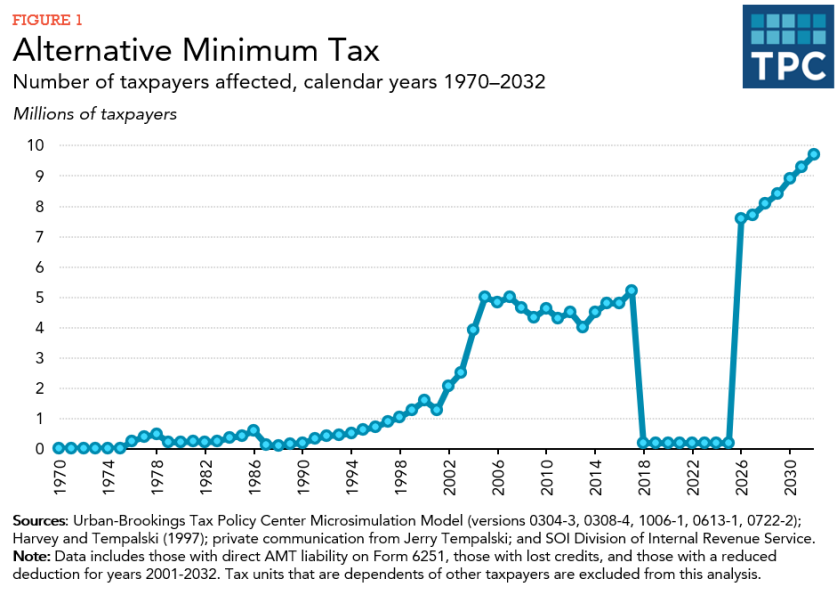


Figure: Skyrocket unlikely after One Big Beautiful Bill (Source: Tax Policy Center.)

Status	**Exemption**	**Phase-out**
Unmarried	$88,100	$626,350
Joint	$137,000	$1,252,700
Separately	$68,650	$626,350

Table: AMT Exemption Amounts and Phase-out Thresholds (2025)

Tax Audits: Revenue Maximization and Disparate Impact

- Imagine an auditor is seeking to maximize tax revenue:
  - Two types of likely tax evaders:
    - High-income individuals with resources for legal evasion
    - Low-income individuals without such resources
  - Which group does the auditor target?
  - Targeting the wealthy involves costly legal battles
- Disparate impact of audits:
  - IRS strategies aimed to minimize non-productive audits
  - Focus on erroneously claimed EITC rates and simpler returns
  - Higher audit rates for some groups, e.g., Black taxpayers audited at 2.9 to 4.7 times rate of others (Elzayn et al. (2023))
    - No evidence of racial animus, but impact remains concerning
  - Biden EO+Inflation Reduction Act shifted focus to wealthy evaders, but DOGE/Trump cuts reduced audit capabilities

Conclusion

- Responsiveness to taxation determines the costs associated with taxation and is key to setting optimal rates.
- Taxable income is a sufficient statistic for the cost of taxation, influenced by various margins beyond labor supply choices.
- Estimation requires (ideally exogenous) variation in rates, with non-linearities in budget constraints (kinks & notches) useful for estimating "local" tax elasticities.
- Tax evasion/fraud can exacerbate the social cost of taxation and is illegal; the government can mitigate this by increasing audit probability or penalties.
- Additional levers available to further reduce evasion.