Tax Enforcement

230B: Public Economics
Emmanuel Saez

Berkeley
Tax Enforcement Problem

Most models of optimal taxation (income or commodity) assume away enforcement issues. In practice:

1) Enforcement is costly (eats up around 10% of taxes collected in the US) when combining costs for government (tax administration) and private agents (tax compliance costs)

2) Substantial tax evasion (15% of under-reported income in the US federal taxes). Tax evasion much worse in developing countries

Two widely used surveys:

Andreoni, Erard, Feinstein JEL 1998

Slemrod and Yitzhaki Handbook of PE, 2002
ALLINGHAM-SANDMO JPUBE’72 MODEL

Seminal in the theoretical tax evasion literature. Uses the Becker crime model

Individual taxpayer problem:

$$\max_w (1 - p) \cdot u(w - \tau \cdot \bar{w}) + p \cdot u(w - \tau \cdot \bar{w} - \tau(w - \bar{w})(1 + \theta)),$$

where $w$ is true income, $\bar{w}$ reported income, $\tau$ tax rate, $p$ audit probability, $\theta$ fine factor, $u(.)$ concave.

Let $c^{No Audit} = w - \tau \cdot \bar{w}$ and $c^{Audit} = w - \tau \cdot \bar{w} - \tau(w - \bar{w})(1 + \theta)$

FOC in $\bar{w}$: $-\tau(1 - p)u'(c^{No Audit}) + p\theta \tau u'(c^{Audit}) = 0 \Rightarrow$

$$\frac{u'(c^{Audit})}{u'(c^{No Audit})} = \frac{1 - p}{p\theta}$$

SOC $\Rightarrow \tau^2(1 - p)u''(c^{No Audit}) + p\tau^2\theta^2u''(c^{Audit}) < 0$
ALLINGHAM-SANDMO JPUBE’72 MODEL

Result: Evasion $w - \bar{w} \downarrow$ with $p$ and $\theta$

Proof $d\bar{w}/dp > 0$: Differentiate FOC with respect to $p$ and $\bar{w}$:

$$-dp \cdot \tau u'(c_{No\ Audit}) - d\bar{w} \cdot \tau^2 (1-p) u''(c_{No\ Audit}) = dp \cdot \theta \tau u'(c_{Audit}) + d\bar{w} \cdot p \theta^2 \tau^2 u''(c_{Audit})$$

$$\Rightarrow d\bar{w} \cdot [-\tau^2 (1-p) u''(c_{No\ Audit}) - p \theta^2 \tau^2 u''(c_{Audit})] = dp \cdot [\theta \tau u'(c_{Audit}) + \tau u'(c_{No\ Audit})]$$

Similar proof for $d\bar{w}/d\theta > 0$

Huge literature built from the A-S model [including optimal auditing rules]
Why is tax evasion so low in OECD countries?

**Key puzzle:** US has low audit rates \( (p \simeq 0.01) \) and low fines \( (\theta \simeq 0.2) \). With reasonable risk aversion (say CRRA \( \gamma = 1 \)), tax evasion should be much higher than observed empirically.

Two types of explanations for puzzle

1) **Unwilling to Cheat:** Social norms and morality [people dislike being dishonest and hence voluntarily pay taxes]

2) **Unable to Cheat:** Probability of being caught much higher than observed audit rate because of *3rd party reporting*:

Employers double report wages to earners and govt (W2 forms), companies and financial institutions double report capital income paid out to individuals and govt (US 1099 forms)
DETERMINANTS OF TAX EVASION

Large empirical literature studies tax evasion levels and the link between tax evasion and (a) tax rates, (b) penalties, (c) audit probabilities, (d) prior audit experiences, (e) socio-economic characteristics

Early literature relies on observational [non-experimental] data which creates serious identification and measurement issues:

(1) Evasion is difficult to measure

(2) Most independent variables [audits, penalties, etc.] are endogenous responses to evasion and also difficult to measure

⇒ Requires to use experimental data or to find good instruments: (a) IRS National Research Program (NRP), (b) lab experiments, (c) field experiments
Tax gap in the United States

Results from latest National Research Program (NRP) studies (IRS 2019) for 2011, 2012, 2013

IRS carries out random audits to specifically estimate the tax gap

1) Total tax gap (\(=\) taxes evaded / taxes owed) around 14%

2) Tax gap concentrated among income items with no 3rd party reporting (such as self-employment income)

3) Withholding reduces tax gap (liquidity constraint \(\Rightarrow\) some taxpayers can never pay taxes owed unless withheld at source)
## Tax Gap Estimates for Tax Years 2011–2013

(Money amounts are in billions of dollars; estimates are annual average amounts.)

### Estimated Total True Tax Liability*
- **$2,683B**
  - Tax Paid Voluntarily & Timely
  - **$2,242B** (83.6% Voluntary Compliance Rate (VCR))
  - Gross Tax Gap
  - **$441B**
  - Enforced & Other Late Payments
  - **$60B**
  - Net Tax Gap (Tax Not Collected)
  - **$381B** (85.8% Net Compliance Rate (NCR))

### Calculating the Net Tax Gap

#### Nonfiling
- Underreporting + Underpayment

#### Gross Tax Gap
- $441
- $43 (14%)
- $271

#### Enforced & Other Late Payments
- $60
- $38

#### Net Tax Gap
- $381

### By Type of Tax

<table>
<thead>
<tr>
<th>Total True Tax Liability</th>
<th>Tax Paid Voluntarily &amp; Timely</th>
<th>Gross Tax Gap</th>
<th>Underpayment</th>
<th>Gross Tax Gap</th>
<th>Enforced &amp; Other Late Payments</th>
<th>Net Tax Gap (Tax Not Collected)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$2,683</strong></td>
<td><strong>$2,242</strong></td>
<td></td>
<td></td>
<td></td>
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</table>

#### Individual Income Tax

<table>
<thead>
<tr>
<th>By Type</th>
<th>Tax Paid Voluntarily &amp; Timely</th>
<th>Gross Tax Gap</th>
<th>Underpayment</th>
<th>Gross Tax Gap</th>
<th>Enforced &amp; Other Late Payments</th>
<th>Net Tax Gap (Tax Not Collected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonfiling</td>
<td>$39</td>
<td>+$352</td>
<td>+$50</td>
<td>$441</td>
<td>$60</td>
<td>$381</td>
</tr>
<tr>
<td>Underreporting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$1,398</strong></td>
<td><strong>$1,084</strong></td>
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<td></td>
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</table>

#### Corporation Income Tax

<table>
<thead>
<tr>
<th>By Type</th>
<th>Tax Paid Voluntarily &amp; Timely</th>
<th>Gross Tax Gap</th>
<th>Underpayment</th>
<th>Gross Tax Gap</th>
<th>Enforced &amp; Other Late Payments</th>
<th>Net Tax Gap (Tax Not Collected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonfiling</td>
<td>$251</td>
<td>+$37</td>
<td>+$5</td>
<td>$42</td>
<td>$10 (24%)</td>
<td>$32</td>
</tr>
<tr>
<td>Underreporting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$294</strong></td>
<td><strong>$251</strong></td>
<td></td>
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#### Employment Tax

<table>
<thead>
<tr>
<th>By Type</th>
<th>Tax Paid Voluntarily &amp; Timely</th>
<th>Gross Tax Gap</th>
<th>Underpayment</th>
<th>Gross Tax Gap</th>
<th>Enforced &amp; Other Late Payments</th>
<th>Net Tax Gap (Tax Not Collected)</th>
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</thead>
<tbody>
<tr>
<td>Nonfiling</td>
<td>$839</td>
<td>+$6</td>
<td>+$6</td>
<td>$81</td>
<td>$5 (6%)</td>
<td>$77</td>
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<tr>
<td>Underreporting</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$920</strong></td>
<td><strong>$839</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
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</table>

#### Estate Tax

<table>
<thead>
<tr>
<th>By Type</th>
<th>Tax Paid Voluntarily &amp; Timely</th>
<th>Gross Tax Gap</th>
<th>Underpayment</th>
<th>Gross Tax Gap</th>
<th>Enforced &amp; Other Late Payments</th>
<th>Net Tax Gap (Tax Not Collected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonfiling</td>
<td>$13</td>
<td>+$2</td>
<td>+$&lt;0.5</td>
<td>$3</td>
<td>$2 (55%)</td>
<td>$1</td>
</tr>
<tr>
<td>Underreporting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$16</strong></td>
<td><strong>$13</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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 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.

Revised 09/2019
Figure 3. Effect of Information Reporting on Individual Income Tax Reporting Compliance, Tax Years 2011–2013

"Visibility" Chart:
Tax Year 2011-2013\(^{[1]}\) Individual Income Tax Underreporting Tax Gap and Net Misreporting Percentage\(^{[2]}\) Estimates
By "Visibility" Category of Income Items

I. Income subject to substantial information reporting and withholding\(^{[3]}\)
- $9B
- 1%

II. Income subject to substantial information reporting\(^{[4]}\)
- $12B
- 5%

III. Income subject to some information reporting\(^{[5]}\)
- $36B
- 17%

IV. Income subject to little or no information reporting\(^{[6]}\)
- $109B
- 55%

\(^{[1]}\) The TY 2011–2013 estimate is the annual average for the TY 2011, 2012, and 2013 timeframe. This chart displays the tax gap attributable to the underreported income category and the rate at which that income is misreported as measured by the Net Misreporting Percentage.

\(^{[2]}\) The Net Misreporting Percentage is the ratio of the net misreported amount to the sum of the absolute values of the amounts that should have been reported, expressed as a percentage. For categories I - IV, the net misreported amount is understatements of income less overstatements of income. On net, income is understated for these categories.

\(^{[3]}\) Includes wages & salaries.

\(^{[4]}\) Includes pensions & annuities, unemployment compensation, dividend income, interest income, taxable Social Security benefits.

\(^{[5]}\) Includes partnership\'s corp. income, capital gains, alimony income.

\(^{[6]}\) Includes nonfarm proprietor income, other income, rents and royalties, farm income, Form 4797 income.
NRP: METHODOLOGICAL ISSUES

Numbers from NRP are rough estimates because audits cannot uncover all evasion

⇒ Thorough audits detect evasion of only about 4% of income

IRS uses a parametric econometric model with auditors’ fixed effects to blow up evasion found by factor 3 (Feinstein ’91):

Detection Controlled Estimation (DCE) methodology:
Key idea: some auditors are better than others

⇒ Very sensitive to assumptions

Guyton et al. 21 point out that NRP misses (a) offshore tax evasion and (b) evasion in passthrough business tax returns

⇒ Tax evasion more concentrated toward the rich than NRP
Figure 1: Unreported Income Detected in Random Audit Data Before DCE Correction

(a) Unreported Income (% of True Income)

Notes: This figure shows the pattern of income under-reporting uncovered in NRP random audit data for 2006-2013, without any correction for undetected evasion (in particular before DCE correction). Tax units are ranked by their exam-corrected market income (defined as total income reported on form 1040 minus Social Security benefits, unemployment insurance benefits, alimony, and state refunds). We observe that detected unreported income decreases sharply within the top 1% of the income distribution. Misreporting of Schedule C income comprises the bulk of evasion detected in NRP random audits. We also observe that by contrast, very little evasion is detected for partnership and S-corporation business income and financial capital income, which are important sources of income at the top.
FIGURE 2: UNREPORTED INCOME IN RANDOM AUDIT DATA AFTER DCE CORRECTION

(a) Unreported Income (% of True Income)
Note: This figure shows the distribution of under-reported income in the 2006-2013 NRP data with the DCE adjustment. In the top panel we compare our estimates to those in Johns and Slemrod (2010), which are based on the 2001 NRP data and use the same DCE adjustment. Because the top group reported in Johns and Slemrod (2010) is the top 0.5%, we proceed similarly in that panel. In the bottom panel, we show smaller groups at the top (as in Figure 1). Taxpayers are ranked by Adjusted Gross Income (AGI) in Johns and Slemrod (2010) and market income in our series (defined as total income reported on form 1040 minus Social Security benefits, unemployment insurance benefits, alimony, and state refunds), both after DCE adjustment. The difference between these definitions of income is negligible for under-reporting gaps at the top.
FIGURE 5: ACCOUNTING FOR UNDETECTED OFFSHORE FINANCIAL INCOME

(a) Unreported Income (% True Income)

Note: This figure plots the estimated income under-reporting rates with and without adding offshore tax evasion. The top panel shows our preferred scenario and the bottom panel reports our sensitivity analysis. Taxpayers are ranked by exam-corrected market income in the NRP data, and offshore adjustments are made on the basis of positive market income; this is the best available estimate of “true income” before DCE adjustments. We find that income under-reporting rates increase significantly at the top of the income distribution when accounting for offshore evasion, reversing the sharp drop-off in estimated evasion at the top seen in uncorrected random audit data. The point estimate for the top 0.01 percent increases by 4 percentage points in our benchmark scenario.
FIGURE 7: ACCOUNTING FOR PASS-THROUGH BUSINESS EVASION

(a) Unreported Income (% True Income)

Note: This figure shows estimates of unreported income by income group in the raw NRP (before DCE adjustment) and after adding estimates of pass-through business evasion. Taxpayers are ranked by exam-corrected income in NRP data, and pass-through adjustments are made on the basis of reported market income; this is the best available estimate of “true income” before DCE adjustments. In our benchmark scenario (top panel), we assume that 20% of pass-through business income, 5% of pass-through capital gains, and 3% of pass-through interest and dividends are under-reported, and that under-reported pass-through income is distributed like duly reported pass-through income. We remove all business-level pass-through evasion detected in the NRP before adding our estimates of business-level pass-through evasion. In the bottom panel, we report a high-end scenario in which 28% of pass-through business income, 10% of pass-through capital gains, and 6% of pass-through dividends and interest are unreported, and a low-end scenario in which only 12% of pass-through business income is unreported, while all pass-through investment income is duly declared.
Figure 8: The Distribution of Noncompliance in the U.S.: Benchmark Estimates

(a) Unreported Income (% True Income)

Benchmark estimates
NRP without DCE plus sophisticated evasion
NRP without DCE

Position in the income distribution (true income)
LAB EXPERIMENTS

Multi-period reporting games involving participants (mostly students) who receive and report income, pay taxes, and face risks of being audited and penalized

1) Lab experiments have consistently shown that penalties, audit probabilities, and prior audits increase compliance (e.g., Alm, Jackson, and McKee, 1992)

2) But when penalties and audit probabilities are set at realistic levels, their deterrent effect is quite small [Alm, Jackson, and McKee 1992] ⇒ Laboratory experiments tends to predict more evasion than we observe in practice

Issues: Lab environment is artificial, and therefore likely to miss important aspects of the real-world reporting environment [3rd party information and social norms]
FIELD EXPERIMENTS

1) Blumenthal, Christian, Slemrod NTJ’01 study the effects of normative appeals to comply: treatment group receives letter encouraging compliance on normative grounds “support valuable services” or “join the compliant majority”, control group [no letter]

⇒ No (statistically significant) effect of normative appeals on compliance overall

2) Slemrod, Blumenthal, Christian JPubE’01 study the effects of “threat-of-audit” letters

⇒ Statistically significant effect on reported income increase, especially among the self-employed [“high opportunity group”] but very small sample size

Recently: (a) Hallsworth et al. ’17 show that normative appeals help in collecting overdue taxes [but small quantitatively], (b) Bott et al. 2020 for a randomized experiment in Norway on foreign income [threat of audit more effective than normative appeal], (c) see survey Luttmer-Singhal ’14
### Either Letter

<table>
<thead>
<tr>
<th></th>
<th>Federal Taxable Income</th>
<th>MN Tax Liability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treated</td>
<td>Control</td>
</tr>
<tr>
<td>1994</td>
<td>$26,927</td>
<td>$26,940</td>
</tr>
<tr>
<td>1993</td>
<td>$26,346</td>
<td>$26,449</td>
</tr>
<tr>
<td>1994–1993</td>
<td>$580</td>
<td>$491</td>
</tr>
<tr>
<td>% with 94–93</td>
<td>54.3</td>
<td>53.9</td>
</tr>
<tr>
<td>n</td>
<td>31,149</td>
<td>15,624</td>
</tr>
</tbody>
</table>

Notes:
- Number in parentheses is the standard error.
- The mean of "Treated–Control" may differ from the mean of "Treated" minus the mean of "Control" due to rounding error.

Source: Blumenthal et al. (2001), p. 131
Table 4
Average reported federal taxable income: differences in differences for the whole sample

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>Control</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>23,781</td>
<td>23,202</td>
<td>579</td>
</tr>
<tr>
<td>1993</td>
<td>23,342</td>
<td>22,484</td>
<td>858</td>
</tr>
<tr>
<td>94−93</td>
<td>439</td>
<td>717</td>
<td>−278</td>
</tr>
<tr>
<td>S.E.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%w/increase</td>
<td>54.4%</td>
<td>51.9%</td>
<td>2.5%***</td>
</tr>
<tr>
<td>n</td>
<td>1537</td>
<td>20,831</td>
<td></td>
</tr>
</tbody>
</table>

Source: Slemrod et al. (2001), p.466

Low income

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>Control</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>7473</td>
<td>3992</td>
<td>3481</td>
</tr>
<tr>
<td>1993</td>
<td>971</td>
<td>787</td>
<td>183</td>
</tr>
<tr>
<td>94−93</td>
<td>6502</td>
<td>3204</td>
<td>3298</td>
</tr>
<tr>
<td>S.E.</td>
<td></td>
<td>2718</td>
<td></td>
</tr>
<tr>
<td>%w/increase</td>
<td>65.4%</td>
<td>51.2%</td>
<td>14.2%*</td>
</tr>
<tr>
<td>n</td>
<td>52</td>
<td>123</td>
<td></td>
</tr>
</tbody>
</table>

Source: Slemrod et al. (2001), p.466
TAX AUDIT EXPERIMENT FROM DENMARK

Kleven-Knudsen-Kreiner-Pedersen-Saez ’11 analyze bigger Danish income tax auditing experiment [stratified sample 40,000]

Overall detected evasion [no adjustment] is around 2.5% but:

1) Evasion rate for self-reported items is almost 40%

2) Evasion rate for third party reported items is only 0.3%

3) Overall evasion rate is so low because 95% of income is third party reported in Denmark

Role of 3rd party reports [information structure] seem to trump social factors and economic factors:
## Self-Reported vs. Third-Party Reported Income

<table>
<thead>
<tr>
<th></th>
<th>Pre-audit net income</th>
<th>Under-reporting of income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Third-party</td>
</tr>
<tr>
<td><strong>Amount</strong></td>
<td>206,038</td>
<td>195,969</td>
</tr>
<tr>
<td></td>
<td>(2,159)</td>
<td>(1,798)</td>
</tr>
<tr>
<td><strong>Percent</strong></td>
<td>98.38</td>
<td>98.57</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.08)</td>
</tr>
</tbody>
</table>

Source: Kleven et al. (2010)
Panel A displays the density of the ratio of evaded income to self-reported income (after audit adjustment) among those with a positive tax evasion, using the 100% audit group and population weights. Income is defined as the sum of all positive items (so that self-reported income is always positive). Panel A shows that, among evaders, the most common is to evade all self-reported income. About 70% of taxpayers with positive self-reported income do not have any adjustment and are not represented on panel A.

Panel B displays the fraction evading and the fraction evaded (conditional on evading) by deciles of fraction of income self-reported (after audit adjustment and adding as one category those with no self-reported income). Panel B also displays the fraction of third-party income evaded (unconditional). Income is defined as positive income.

In both panels, the sample is limited to those with positive income above 38,500 kroner, the tax liability threshold (see Table 1).
Panel A displays the density of the ratio of evaded income to self-reported income (after audit adjustment) among those with a positive tax evasion, using the 100% audit group and population weights. Income is defined as the sum of all positive items (so that self-reported income is always positive). Panel A shows that, among evaders, the most common is to evade all self-reported income. About 70% of taxpayers with positive self-reported income do not have any adjustment and are not represented on panel A.

Panel B displays the fraction evading and the fraction evaded (conditional on evading) by deciles of fraction of income self-reported (after audit adjustment and adding as one category those with no self-reported income). Panel B also displays the fraction of third-party income evaded (unconditional). Income is defined as positive income.

In both panels, the sample is limited to those with positive income above 38,500 kroner, the tax liability threshold (see Table 1).
TAX AUDIT EXPERIMENT FROM DENMARK

Kleven et al. ’11 also provide experimental causal effects of:

1) Marginal tax rates: use bunching evidence before and after audit: Most bunching not due to evasion but avoidance ⇒ Effect of MTR on evasion is modest

2) Prior-audit effects: compare next year outcomes of 100% audit group and a 0% audit group [as audited tax filers may update upward beliefs on \( p \)] ⇒ Find significant effects on reported income increases, concentrated among self-reported items [nothing on 3rd party income]: Extra tax collected through this indirect effect is about 50% of extra taxes collected due to base year audits

3) Threat-of-audit letters: Find significant effects on self-reported income increases [as in Slemrod et al.] and letter prob matters
Bunching at the Top Kink in the Income Tax

A. Self-Employed

Source: Kleven et al. (2010)
Bunching at the Kink in the Stock Income Tax

B. Stock-Income

Source: Kleven et al. (2010)
### Effect of Audits on Subsequent Reporting

Amount of income change from 2006 to 2007

<table>
<thead>
<tr>
<th>Baseline audit adjustment amount</th>
<th>Difference: 100% vs. 0% audit group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total income</td>
<td></td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td><strong>Total income</strong></td>
</tr>
<tr>
<td>5629</td>
<td>2554</td>
</tr>
<tr>
<td>(497)</td>
<td>(787)</td>
</tr>
<tr>
<td><strong>Total tax</strong></td>
<td><strong>1377</strong></td>
</tr>
<tr>
<td>2510</td>
<td></td>
</tr>
<tr>
<td>(165)</td>
<td>(464)</td>
</tr>
</tbody>
</table>

Source: Kleven et al. (2010)
## Effect of Audit Threats on Subsequent Reporting

### Probability of upward adjustment in reported income (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Both 0% and 100% audit groups</th>
<th>Letter – No Letter</th>
<th>50% Letter – No Letter</th>
<th>100% Letter – 50% Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net income</strong></td>
<td></td>
<td>1.51</td>
<td>1.04</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.28)</td>
<td>(0.33)</td>
<td>(0.33)</td>
</tr>
<tr>
<td><strong>Total tax</strong></td>
<td></td>
<td>1.54</td>
<td>0.99</td>
<td>1.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.28)</td>
<td>(0.33)</td>
<td>(0.33)</td>
</tr>
</tbody>
</table>

Source: Kleven et al. (2010)
EXPLAINING ACTUAL TAX POLICIES

Income \( w = w_t + w_s \) where \( w_t \) is third party reported (observed by govt at no cost) and \( w_s \) is self-reported (as in standard Allingham-Sandmo model).

Incorporating 3rd party reporting solves puzzles of the Allingham-Sandmo model:

1) Evasion rates are high in \( s \) sector (consistent with Allingham-Sandmo) and low in \( t \) sector

2) IRS sets audit rate \( p \) higher when \( \bar{w}_s < 0 \) (small business losses, undocumented deductions, etc.) to protect \( w_t \) base

3) \( \bar{w}_s \) losses not allowed against \( w_t \) (example: US limits capital gain losses and passive business losses)

4) Use of schedular income taxes (tax separately various bases): Earliest income taxes (1800-1900) are schedular
SIMPLER MODEL OF TAX EVASION

\[ u = (1 - p(\bar{w})) \cdot [w - \tau \cdot \bar{w}] + p(\bar{w}) \cdot [w \cdot (1 - \tau) - \theta \cdot \tau \cdot (w - \bar{w})] \]

FOC \( du/d\bar{w} = 0 \Rightarrow [p(\bar{w}) - p'(\bar{w})(w - \bar{w})](1 + \theta) = 1 \)

Introduce the elasticity of the detection probability with respect to undeclared income: \( \varepsilon = -(w - \bar{w})p'(\bar{w})/p(\bar{w}) > 0 \)

\[ 1 = p(\bar{w}) \cdot (1 + \theta) \cdot (1 + \varepsilon) \]

If \( \varepsilon = 0 \), then always evade if \( 1 > p \cdot (1 + \theta) \)

If \( \varepsilon > 0 \), then evading more increases risk of being caught on all infra-marginal evaded taxes \( \Rightarrow \) Even with \( \theta = 0 \), full evasion is not always optimal

Shape of \( p(\bar{w}) \) depends crucially on 3rd party income
Figure 1: Probability of Detection under Third-Party Reporting

\[
\text{detection probability (p)}
\]

\[
\text{reported income (w)}
\]

\[
\text{3rd-party reported income } w_t
\]

\[
\text{self-reported Income } \bar{w}_s
\]

\[
\frac{1}{1 + \theta}
\]

\[
\frac{1}{(1 + \theta)(1 + \varepsilon)}
\]

Source: Kleven et al. (2010)
WHY DOES THIRD PARTY REPORTING WORK?

In theory, employer and employee could collude to evade taxes ⇒ third-party does not help (Yaniv 1992)

In practice, such collusion is fragile in modern businesses bc:

1) Accounting and payroll records that are widely used within the firm [records need to report true wages in order to be useful to run a complex business]

2) A single employee can denounce collusion between employer and employees. Likely to happen in a large business [disgruntled or new employee, whistle blower seeking govt reward]

⇒ Taxes can be enforced even with low penalties and low audit rates [Kleven-Kreiner-Saez 2016, Jensen 2022]

Caveat: partial tax evasion with fraction of wage in cash prevalent in middle income countries (Feinman-Lauletta-Roche ’22)
Interesting to understand why taxes develop the way they do [Webber-Wildavsky ’86 book, Ardant ’71 book in French]

During most of history, governments were under the tax enforcement constraint: they were collecting as much taxes as possible given the economic / informational conditions

Many developing countries today still face such tax enforcement constraints

Earliest taxes are tributes: conquerors / rulers realize that it is more lucrative to raise periodic tributes than outright raiding
FROM ARCHAIC TO MODERN TAXES

1) Coercive state from 3000BC-1900AD: rise of despotic kingdoms, invent taxes (and writing) and forced labor to serve power of hierarchical state (Scott 2017)

Governments try to extract revenue through rules without destroying economic activity and without generating tax revolts: “plucking the goose while minimizing hissing” (Colbert)

Combination of poll taxes, land taxes, product taxes (tithe), excise taxes, tolls, govt monopolies (govt size ≤ 10% of GDP supports only regalian public goods)

European countries have largest states and largest military to colonize world (Piketty 2020)

2) Rise of social state in 20th century: modern taxes based on formal businesses (payroll taxes, income taxes, VATs) with big govt 30-50% of GDP serve population rather than state
Taxation as the Origin of States

States first arise through warfare and conquest in productive areas (e.g. Nile Valley) to extract taxes (see Carneiro, 1970)

Modern test of this theory: Sanchez JPE’20 surveys Eastern Congo villages in war areas

Bandits establish “local states” (＝order and taxes) when village tax potential is high

(a) villages with coltan mineral have tax potential particularly when coltan price is high

(b) villages with gold mineral do not have tax potential (bc gold can be easily hidden)

Likelihood of taxation of coltan mining sites follows coltan price
Figure 2: Local prices of coltan and gold

Notes: This figure plots the yearly average price of gold and coltan in Sud Kivu, in USD per kilogram, as measured in the survey. The price of coltan is scaled on the left vertical axis and the price of gold in the right axis. Source: United States Geological Survey (2010).

Source: Sanchez (2015)
Figure 9: Demand shock for coltan and presence of taxation

Notes: This figure plots the average number of sites where an armed actor collects taxes regularly on years. I take this variable from the site survey, in which the specialists are asked to list past taxes in the site. Taxes by an armed actor are defined in the survey as a mandatory payment on mining activity which is regular (sporadic expropriation is excluded), stable (rates of expropriation are stable) and anticipated (villagers make investment decisions with knowledge of these expropriation rates and that these will be respected). The solid line graphs the average number of mining sites where an armed actor collects regular taxes for mining sites that are endowed with available coltan deposits, and the dashed line reports the same quantity for mining sites that are not endowed with coltan deposits.

Source: Sanchez (2015)
Taxation and State Building

Weigel QJE’20 shows that citizens’ engagement increases when taxes are enforced better.

Field experiment randomizing property tax collection improvements across 356 neighborhoods of a large city in Congo (door to door registration and in-person appeals to pay).

First stage: property tax compliance: 0.1% in control to 11.6% in treatment.

Second stage: town hall attendance meetings or submitting local govt evaluations increased 5 points (or 31%).

Reverse causality: From public goods to taxes: Krause ’21 finds in randomized experiment in Haiti that providing municipal garbage removal increases property tax compliance by 27% (and reduces localized political violence by 85%).
TABLE III

EFFECTS OF THE CAMPAIGN ON COLLECTOR VISITS, TAXPAYER REGISTRATION, PROPERTY TAX COMPLIANCE, AND REVENUES

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Visited by collector</th>
<th>Registered as taxpayer</th>
<th>Property tax compliance</th>
<th>Tax revenue per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit:</td>
<td>Household (1)</td>
<td>Household (2)</td>
<td>Household (3)</td>
<td>Neighborhood (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Household (5)</td>
<td></td>
<td>Neighborhood (6)</td>
</tr>
<tr>
<td>Campaign</td>
<td>0.815***</td>
<td>0.788***</td>
<td>0.103***</td>
<td>0.115***</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.009)</td>
<td>(0.007)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Stratum FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.640</td>
<td>0.577</td>
<td>0.054</td>
<td>0.396</td>
</tr>
<tr>
<td>Observations</td>
<td>27,443</td>
<td>27,443</td>
<td>27,443</td>
<td>356</td>
</tr>
<tr>
<td>Clusters</td>
<td>356</td>
<td>356</td>
<td>356</td>
<td>N/A</td>
</tr>
<tr>
<td>Control mean</td>
<td>0.0499</td>
<td>0.0000</td>
<td>0.0006</td>
<td>0.0005</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.5683</td>
</tr>
</tbody>
</table>

Notes. Visited by collector is an indicator for households reporting at least one visit by tax collectors in 2016. Registered as taxpayer is an indicator for households that were registered by collectors and assigned a unique tax ID. Property tax compliance is an indicator for households that paid the property tax in 2016. Tax revenue per person is the total property tax receipts per neighborhood divided by the estimated number of nonexempt property owners. See Section IVB for details on these variables. The unit of analysis in the first three columns is the individual household, and the data include the universe of potential taxpayers (excluding the commune of Nganza). The unit in the last two columns is the neighborhood, which reduces potential for measurement error in merging administrative data with household surveys to estimate tax compliance and revenues. Tax revenue is measured in Congolese francs. Data: midline survey merged with government tax database.
### TABLE IV
**Effects of the Campaign on Participation**

<table>
<thead>
<tr>
<th></th>
<th>Town hall meeting attendance (1)</th>
<th>Evaluation form submission (2)</th>
<th>Town hall or evaluation (3)</th>
<th>Town hall and evaluation (4)</th>
<th>Index (town hall &amp; evaluation) (5)</th>
<th>Cost of participation (transport) (6)</th>
<th>Cost of participation (transport &amp; opp.) (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campaign</td>
<td>0.045**</td>
<td>0.024**</td>
<td>0.050***</td>
<td>0.027***</td>
<td>0.145***</td>
<td>0.050***</td>
<td>0.071***</td>
</tr>
<tr>
<td>(0.020)</td>
<td>(0.012)</td>
<td>(0.016)</td>
<td>(0.009)</td>
<td>(0.043)</td>
<td>(0.017)</td>
<td>(0.021)</td>
<td></td>
</tr>
<tr>
<td>Covariates</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Stratum FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.068</td>
<td>0.055</td>
<td>0.071</td>
<td>0.039</td>
<td>0.073</td>
<td>0.054</td>
<td>0.058</td>
</tr>
<tr>
<td>Observations</td>
<td>1,934</td>
<td>2,913</td>
<td>2,913</td>
<td>2,913</td>
<td>2,913</td>
<td>2,913</td>
<td>2,913</td>
</tr>
<tr>
<td>Clusters</td>
<td>252</td>
<td>356</td>
<td>356</td>
<td>356</td>
<td>356</td>
<td>356</td>
<td>356</td>
</tr>
<tr>
<td>Control mean</td>
<td>0.17</td>
<td>0.099</td>
<td>0.16</td>
<td>0.035</td>
<td>−0.077</td>
<td>0.11</td>
<td>0.16</td>
</tr>
<tr>
<td>Dep. var.</td>
<td>Binary</td>
<td>Binary</td>
<td>Binary</td>
<td>Binary</td>
<td>Std. index</td>
<td>% Daily inc.</td>
<td>% Daily inc.</td>
</tr>
<tr>
<td>Rand. inf. $p$</td>
<td>0.023</td>
<td>0.058</td>
<td>0.0048</td>
<td>0.0048</td>
<td>0.0022</td>
<td>0.0072</td>
<td>0.0022</td>
</tr>
<tr>
<td>Bonferroni $p$</td>
<td>0.033</td>
<td>0.067</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Notes.** *Town hall meeting attendance* is an indicator variable that equals 1 if an individual attended a town hall meeting. *Evaluation form submission* is an indicator variable that equals 1 if an individual submitted an evaluation. *Town hall or evaluation* indicates that an individual either attended a town hall meeting or submitted an evaluation. *Town hall and evaluation* indicates that an individual attended a town hall meeting and submitted an evaluation. *Index (town hall & evaluation)* is the standardized sum of *Town hall meeting attendance* and *Evaluation form submission*. *Cost of participation (transport)* and *Cost of participation (transport & opp.)* are the estimated transport costs, or transport plus opportunity costs (respectively), incurred by individuals to attend a town hall and/or submit an evaluation as a share of average daily household income. See Section IV.B for details on all variables. Covariates include gender, age, age squared, wealth, a business owner dummy, and the quality of public lighting in the neighborhood, as discussed in Section IV.D. Online Appendix Section A4 shows other covariate regimes. The last two rows show $p$-values from randomization inference (with 5,000 iterations) and with Bonferroni adjustments, respectively. Data: endline survey merged with town hall attendance and submitted evaluation records as well as cost estimates from enumerator motorcycle taxi receipts. The sample size is smaller in column (1) because the government discontinued town halls after April 1 due to insecurity in Kananga. Endline respondents sampled after this date never had a chance to attend a meeting.

Source: Weigel QJE'20
VARIOUS SALES TAXES

**Turnover taxes** used to tax all sales: business to consumer (B-C) and business to business (B-B):

Creates multiple layers of taxes along a production chain ⇒ Higher total tax when B-B-C than B-C

**Retail Sales Tax** is imposed on B-C sales only [B-B exempt]: difficult to distinguish B-B and B-C (shifting), strong evasion incentive for B-C [sales tax does not work well with small retailers]

**Value-Added-Tax (VAT)** taxes only value added [sales minus purchases] in all transactions (B-B and B-C): equivalent to retail sales economically but easier to enforce [automatic upstream enforcement]

VAT first introduced in France in 1950s, has spread to most countries [US only rich country without VAT]
Randomized experiment with 445,000 firms in Chile: sent threat of VAT audit letters to sub-sample of businesses

**Key Results:**

1) Significant effect of letters on VAT collection (+10% over 12 months)

2) Smaller impact on reported transactions that already have a paper trail (intermediate sales) than on those which don’t (final sales)

3) Effect of random audit announcement is transmitted up the VAT chain, increasing compliance by firms’ suppliers
Figure 1: Impact of the three types of letters

Notes: This figure plots the monthly percent difference between the medians of the treatment and the control group for each type of letter: (median VAT treatment group - median VAT control group) / (median VAT control group), normalizing pre-treatment percent difference to zero. The y-axis indicates time, with monthly observations, and zero indicates the last month before the mailing of the letters. The vertical line marks mailing of the letters. The figure shows the first wave of mailing. For the second (much smaller) wave of mailing, see Figure A6.

Source: Pomeranz AER'14
Table 4: Letter Message Experiment: Intent-to-Treat Effects on VAT Payments by Type of Letter

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean VAT</td>
<td>Median VAT</td>
<td>Percent VAT &gt; Previous Year</td>
<td>Percent VAT &gt; Predicted</td>
<td>Percent VAT &gt; Zero</td>
</tr>
<tr>
<td>Deterrence letter X post</td>
<td>-1,114</td>
<td>1,326***</td>
<td>1.40***</td>
<td>1.42***</td>
<td>0.53***</td>
</tr>
<tr>
<td></td>
<td>(2,804)</td>
<td>(316)</td>
<td>(0.12)</td>
<td>(0.10)</td>
<td>(0.09)</td>
</tr>
<tr>
<td>Tax morale letter X post</td>
<td>-1,840</td>
<td>262</td>
<td>0.40</td>
<td>0.30</td>
<td>0.44**</td>
</tr>
<tr>
<td></td>
<td>(6,082)</td>
<td>(666)</td>
<td>(0.25)</td>
<td>(0.22)</td>
<td>(0.20)</td>
</tr>
<tr>
<td>Placebo letter X post</td>
<td>835</td>
<td>383</td>
<td>-0.11</td>
<td>-0.19</td>
<td>-0.14</td>
</tr>
<tr>
<td></td>
<td>(6,243)</td>
<td>(687)</td>
<td>(0.26)</td>
<td>(0.23)</td>
<td>(0.20)</td>
</tr>
<tr>
<td>Constant</td>
<td>268,810***</td>
<td>17,518***</td>
<td>47.50***</td>
<td>48.27***</td>
<td>67.30***</td>
</tr>
<tr>
<td></td>
<td>(1,799)</td>
<td>(112)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>Month fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm fixed effects</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Treatment Assignment</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Number of observations</td>
<td>7,892,076</td>
<td>1,221,828</td>
<td>7,892,076</td>
<td>7,892,076</td>
<td>7,892,076</td>
</tr>
<tr>
<td>Number of firms</td>
<td>445,734</td>
<td>445,734</td>
<td>445,734</td>
<td>445,734</td>
<td>445,734</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.40</td>
<td>0.14</td>
<td>0.28</td>
<td>0.47</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Column (1) shows a regression of the mean declared VAT on treatment dummies, winsorized at the top and bottom 0.1% to deal with extreme outliers. Column (2) shows a median regression of average VAT before treatment and in 4 months after each treatment wave. Columns (3)-(5) show linear probability regressions of the probability of an increase in declared VAT compared to the same month in the previous year, the probability of declaring more than predicted and the probability of declaring any positive amount. Observations are monthly in Columns (1) and (3)-(5) for ten months prior to treatment and four months after each wave of mailing. The four months after the second wave excludes firms treated in the first. Coefficients and standard errors of the linear probability regressions are multiplied by 100 to express effects in percent. Monetary amounts are in Chilean pesos, with 500 Chilean pesos approximately equivalent to 1 USD. Standard errors in parentheses, robust and clustered at the firm level for Columns (1) and (3)-(5). *** p<0.01, ** p<0.05, * p<0.1.

Source: Pomeranz AER'15
Table 5: Impact of Deterrence Letter on Different Types of Transactions

<table>
<thead>
<tr>
<th></th>
<th>(1) Percent Sales &gt; Previous Year</th>
<th>(2) Percent Input Costs &gt; Previous Year</th>
<th>(3) Percent Intermediary Sales &gt; Previous Year</th>
<th>(4) Percent Final Sales &gt; Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deterrence letter X post</td>
<td>1.17*** (0.22)</td>
<td>0.16 (0.21)</td>
<td>0.12 (0.19)</td>
<td>1.33*** (0.21)</td>
</tr>
<tr>
<td>Constant</td>
<td>55.39*** (0.13)</td>
<td>53.25*** (0.13)</td>
<td>38.37*** (0.12)</td>
<td>45.04*** (0.12)</td>
</tr>
<tr>
<td>Month fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of observations</td>
<td>2,392,529</td>
<td>2,392,529</td>
<td>2,392,529</td>
<td>2,392,529</td>
</tr>
<tr>
<td>Number of firms</td>
<td>133,156</td>
<td>133,156</td>
<td>133,156</td>
<td>133,156</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.25</td>
<td>0.22</td>
<td>0.30</td>
<td>0.32</td>
</tr>
</tbody>
</table>

Notes: Regressions of the probability of the line item (total sales, total input costs, intermediary sales, and final sales) being higher than in the same month the previous year. Sample of firms that have both final and intermediary sales in the year prior to treatment. The four months after the second wave excludes firms treated in the first wave. Coefficients and standard errors are multiplied by 100 to express effects in percent. Robust standard errors in parentheses, clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Source: Pomeranz AER'15
Table 6: Interaction of Firm Size and Share of Sales to Final Consumers

<table>
<thead>
<tr>
<th>Panel A:</th>
<th>Percent VAT &gt; Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Deterrence letter X final sales share</td>
<td>1.61***</td>
</tr>
<tr>
<td></td>
<td>(0.26)</td>
</tr>
<tr>
<td>Deterrence letter X size category</td>
<td>-0.17***</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
</tr>
<tr>
<td>Deterrence letter X log employees</td>
<td>-0.45***</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
</tr>
<tr>
<td>Deterrence letter</td>
<td>0.68***</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
</tr>
<tr>
<td>Constant</td>
<td>47.53***</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
</tr>
<tr>
<td>Final sales share X post</td>
<td>Yes</td>
</tr>
<tr>
<td>Size measure X post</td>
<td>No</td>
</tr>
<tr>
<td>Firm fixed effects</td>
<td>Yes</td>
</tr>
<tr>
<td>Month dummies</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of firms</td>
<td>406,834</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Notes: Regression of the probability of monthly declared VAT being higher than in the same month of the previous year (Panel A) and on being higher than predicted (Panel B). Coefficients and standard errors are multiplied by 100 to express effects in percent. Sample includes all firms in the deterrence treatment and in the control group. The four months after the second wave excludes firms treated in the first. Number of observations vary due to missing observations for some variables. Final sales share is not defined for firms with zero sales in preceding year, size category is not available for new firms. Robust standard errors in parentheses, clustered at the firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. 

Source: Pomeranz AER'15
### Table 7: Spillover Effects on Trading Partners’ VAT Payments

<table>
<thead>
<tr>
<th></th>
<th>(1) Percent VAT &gt; Previous Year</th>
<th>(2) Percent VAT &gt; Predicted</th>
<th>(3) Percent VAT &gt; Previous Year</th>
<th>(4) Percent VAT &gt; Predicted</th>
<th>(5) Percent VAT &gt; Previous Year</th>
<th>(6) Percent VAT &gt; Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit announcement X post</td>
<td>2.41** (1.14)</td>
<td>2.03* (1.11)</td>
<td>4.28*** (1.54)</td>
<td>3.92*** (1.50)</td>
<td>4.14*** (1.52)</td>
<td>3.83*** (1.52)</td>
</tr>
<tr>
<td>Audit announcement X</td>
<td></td>
<td></td>
<td>supplier X post</td>
<td>(1.64)</td>
<td>(1.51)</td>
<td>(1.67)</td>
</tr>
<tr>
<td>Audit announcement X</td>
<td></td>
<td></td>
<td>client X post</td>
<td>(1.64)</td>
<td>(1.51)</td>
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<td>52.07*** (0.95)</td>
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Notes: Regressions for trading partners of audited firms. Column (1), (3) and (5) shows the probability of an increase in declared VAT since the previous year, Column (2), (4) and (6) shows the probability of declaring more than predicted. The controls in Columns (5) and (6) are firm sales, sales/input-ratio, share of sales going to final consumers, and industry categorized as “hard-to-monitor.” Observations are monthly for ten months prior to treatment and six months after the audit announcements were mailed. Coefficients and standard errors are multiplied by 100 to express effects in percent. Robust standard errors in parentheses, clustered at the level of the audited firm. *** p<0.01, ** p<0.05, * p<0.1.

Source: Pomeranz AER’15
WEALTH IN TAX HAVENS ZUCMAN QJE’13

Official statistics substantially underestimate the net foreign asset positions of rich countries because they do not capture most of the assets held by households in off-shore tax havens.

Example: US individual opens a Cayman Islands account and buys mutual fund shares (composed of US stock): Cayman Islands record a liability but US do not record an asset (because this is not reported in the US).

⇒ Total world liabilities are larger than world total assets.

Zucman compiles all financial stats and estimates that around 8% of the global financial wealth of households is held in tax havens (three-quarters of which goes unrecorded = 6%).

Top 1% holds about 50% of total financial wealth ⇒ 12% of financial wealth of the rich is hidden in tax heavens.

Alstadsaeter-Johannesen-Zucman JpubE’18 use Bank for International Settlements (BIS) data to distribute offshore wealth across countries of origin.
Top .01% wealth share and composition from 2000-2009

Source: Alstadsaeter, Johannesen and Zucman JpubE'18

The Online Appendix Tables A.9, A.10, and A.11, we consider how different distributions affect our results; for all ... 89–100

98

Top .01% wealth share and composition from 2000-2009

Source: Alstadsaeter, Johannesen and Zucman JpubE'18

very high even disregarding tax havens.17 We obtain similar qualitative more muted than in Europe, because U.S. top wealth shares are already ... wealth of the 0.01% richest households is held abroad. While vast majority of wealth at the top is held outside of the country. In the Kingdom of Norway, Sweden, and Denmark.

France appears more equal than Scandinavia when disregarding offshore assets, it becomes more unequal when factoring it in. The United Kingdom, because wealth inequality was much higher in the United States. In fact, the top 0.01% wealth share in the U.S. is as high as in early 20th century Europe.

Second, despite the more prevalent use of tax havens by Continental European countries, we find that accounting for offshore wealth also increases inequality, but the effect is much smaller than that found in Scandinavian economies—such as Scandinavian economies, including versus excluding offshore wealth might have changed over time. Financial innovation and globalization might have made it easier for only modest offshore from tax havens promised to exchange bank information automatically with foreign governments, and because some of them might still not be audited.

The main source of uncertainty involves the macro amount of wealth on the dynamic of wealth concentration is less marked in the United States. In fact, the top 0.01% wealth share in the U.S. is as high as in early 20th century Europe.

The post-World War II decades, it is in the 1980s and 1990s that it grew sizably, with a sizable margin of error is involved here, the broad patterns are likely to be robust: all the available evidence suggests that although the wealth hidden wealth was as concentrated in the past as today). Although a historical series for the amount of foreign wealth managed by Swiss banks back to the 1990s, two international commissions got access to the archives of Swiss banks. Drawing on the work of these commissions, Zucman (2015, chapter 1) constructs historical series for the amount of foreign wealth managed by Swiss banks back to the 1990s, two international commissions got access to the archives of Swiss banks.

One caveat, however, is that the fraction of offshore wealth duly declared to tax authorities is not well calibrated. We stress that our estimates of offshore wealth therefore likely understate the true level of offshore wealth, and our offshore wealth estimates are also similarly under-estimated, by a similar proportional factor. All wealth excluding offshore wealth is thus understated, and that accounting for offshore wealth does not change the underlying findings. First, when including offshore wealth before the 2000s, the stock of offshore wealth was already far from insignifiant in countries such as Scandinavian economies. Second, despite the more prevalent use of tax havens by Continental European countries, we find that offshore wealth is much more concentrated in the United Kingdom, because wealth inequality was much higher in the United Kingdom, than twice higher: 10% vs. 4%.

There are two notable similar trends in wealth concentration at the top over the 20th century. The main source of uncertainty involves the macro amount of wealth on the dynamic of wealth concentration is less marked in the United States. In fact, the top 0.01% wealth share in the U.S. is as high as in early 20th century Europe.

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DISTRIBUTIONAL WEALTH IN TAX HAVENS

Alstadsaeter-Johannesen-Zucman AER19 link data from HSBC leak of accounts to Norwegian tax data

Complete file of the clients of HSBC Switzerland was leaked in 2007 and obtained by tax authorities

HSBC: large bank (≈ 5% of Swiss offshore wealth)

Accounts frequently held through shell companies, but HSBC recorded identity of beneficial owners

Clear-cut way to identify evasion by linking to tax returns of clients: linking done in Scandinavia

Similar exercise done for Panama Papers leak and tax amnesty

Londono-Avila ’21 show that Panama Papers leak increased voluntary disclosure of evasion for Colombia wealth tax
Probability to own an unreported HSBC account, by wealth group

(HSBC leak)

Net wealth group
[millions of US$]

Source: Alstadsæter (2019)
Probability to appear in the "Panama Papers", by wealth group
(Shareholders of shell companies created by Mossack Fonseca)

Source: Alstadsæter (2019)
Probability to voluntarily disclose hidden wealth, by wealth group
(Swedish and Norwegian tax amnesties)

Probability to voluntarily disclose hidden wealth, by wealth group
(Swedish and Norwegian tax amnesties)

Source: Alstadsæter (2019)
Distribution of wealth: recorded vs. hidden

% of total recorded or hidden wealth

Position in the wealth distribution

Source: Alstadsæter (2019)
Figure 4: The distribution of offshore wealth and offshore tax evasion.

Offshore tax evasion, by wealth group

% of total taxes owed that are not paid

Position in the wealth distribution

Offshore tax evasion, by wealth group

Lower-bound scenario

High scenario

Notes: The top panel shows the distribution of wealth in Scandinavia (Norway, Sweden, Denmark) excluding offshore wealth, and the distribution of wealth held at HSBC and disclosed by amnesty participants. The bottom panel distributes the macro stock of offshore across wealth groups and computes the implied amount of taxes evaded. See text for a description of the benchmark, higher, and lower-bound scenarios. 95% confidence intervals based on bootstrapped standard errors. Source: Appendix Tables A.2, J.1, J.3, J.3b and J.3c.
they are significant but small. Second, the leak was followed by a spectacular increase in disclosures made by taxpayers identified in the Panama Papers across the wealth distribution. Third, the increase in disclosures following the leak only took place for taxpayers named in the Panama Papers. Arguably, without getting contacted by the government (and perhaps escaping the threat of detection via the TIEA with Panama), evaders do not appear to be more likely to acknowledge misbehavior.

We quantify the causal effect of the leak and subsequent events on tax compliance among very wealthy individuals, that is, taxpayers who file wealth taxes, using a difference-in-difference approach that compares outcomes between taxpayers who appear named (treated) and not (control) in the leak before and after it occurred. We use the following OLS specification:

\[ y_{it} = \alpha + \gamma_1 \text{In Panama Papers}_i + \lambda_1 \text{After Leak}_t + \beta \cdot \text{DID}_{it} + \mu_{it}, \]

In all, 37.5 percent (453 of 1,208) of taxpayers identified in the Panama Papers disclosed under the scheme. There are several reasons why this share is less than 100 percent. First, being a client of Mossack Fonseca does not imply tax evasion, and tax-compliant clients may have already been reporting their offshore entity to the Colombian tax authority. Second, the Panama Papers included Colombians having incorporated their offshore entity as far back as the 70s; thus, some clients could have deactivated their offshore entity by the time the disclosure scheme was introduced. Finally, risk-loving evaders may have chosen not to participate in the disclosure scheme and continue evading.

**Figure 3. The Panama Papers Leak Raised Disclosures of Hidden Wealth**

*Notes:* This figure presents the effect of the Panama Papers leak on disclosing wealth under Colombia’s voluntary disclosure scheme. The markers plot raw means of the probability of first disclosing hidden wealth in 2015 (before the leak) and 2016 (after the leak) for taxpayers in the Panama Papers (round marker) and taxpayers not in the Panama Papers (square marker) by wealth group. The vertical lines represent the 95 percent confidence intervals. The Panama Papers leak in 2016 raised disclosures for those named in the leak. The sample is the universe of individuals filing income or wealth tax returns in 2015, 2016, or 2017, that is, 2,421,936 individuals—of which 1,167 appear named in the Panama Papers. Wealth groups are generated every year based on reported wealth including disclosures. The pre-leak differences in disclosures between taxpayers named versus not named in the Panama Papers are statistically significant (but economically negligible) for groups P99–P99.5 and P99.5–P99.9; they are not statistically significant for all other groups.
CURBING OFF-SHORE TAX EVASION

Rich individuals can evade taxes on wealth and capital income using offshore accounts in tax havens with bank secrecy.

US passed FATCA in 2010: requires foreign banks to report accounts owned by US persons to IRS or face stiff penalties.

⇒ Almost all banks complied (Panama papers leak risk).

⇒ Extended to all OECD+G20 countries in 2014: Common Reporting Standard.

⇒ No good empirical evaluation yet but likely harder today to evade taxes through offshore accounts.

2022 sanctions against Russian oligarchs shows need for transparency of offshore ownership.
Tax Avoidance of Multinational Corporations

**Multinational firms**: Firms that operate in multiple countries. Foreign branches of the firm are called subsidiaries.

**Territorial tax system**: Corporations earning income abroad pay taxes to countries in which the income is earned (most countries use this system)

**Global tax system**: Corporations are taxed by their home countries on their income regardless of where it is earned (with tax credit for foreign corporate taxes paid)

US had global tax system before 2018 (but foreign profits were taxed only when “repatriated”)
Repatriation Tax Holidays (before 2018)

In US pre-2018, owners eventually wanted the income repatriated from abroad and paid out to them as dividends

Corporations paid normal (old) corporate tax 35% tax on foreign profits upon repatriation

Massive amount of profits accumulated abroad (about $2.5 Tr by 2018) ⇒ Temptation for politicians to offer repatriation tax holiday

American Jobs Creation Act of 2004: Reduced tax rate on repatriated profits from 35% to 5.25% for 2005 only: surge in repatriations in 2005 (by $250bn) followed by reductions in repatriations in subsequent years

⇒ Net tax loser and no surge in investment

2018 Trump tax reform forces repatriations over 2018-2025 with 15.5% tax on cash and 8% on other assets and imposes min tax of 10.5% on new foreign profits with foreign tax credit
Exhibit 5: Earnings repatriated by all US firms as of 2Q 2016

Repatriated foreign earnings by US firms (rolling 4-quarter sum)

- 2005: $300 bil
- 2Q 2016: $100 bil

Source: Bureau of Economic Analysis, Goldman Sachs Global Investment Research
Tax Avoidance of Multinationals (Zucman ’14)

Share of profits made abroad by US corporations is about 1/3 today (was less than 5% in the 1930s)

50% of foreign profits of **multinationals** are reported in tax havens (such as Ireland)

Multinational companies are particularly savvy to avoid corporate income tax by reporting most of their profits in low tax countries using **transfer pricing**: one subsidiary buys/sells to another at manipulated prices to transfer profits

Example: Google located its search engine algorithm in Bermuda and Google Bermuda leases it to Google US, Google EU, etc.

Profits are moving to tax havens but not workers nor real capital ⇒ This is a tax avoidance story
Google US had an incentive to charge less than the then-current market value of its technologies, but we do not know if it was able to do so or if the arm's length rules were strictly enforced—the purchase price is not public information. In any case, since Google's market value increased enormously after its 2003 initial public offering, it is apparent that Google US was able—whether intentionally or not—to "sell" its intangibles to its offshore subsidiary for what, in retrospect, was a low price.

The Irish/Bermuda hybrid then created another Irish subsidiary, "Ireland Limited," and granted it a license to use Google's technologies. In turn, this subsidiary puts Google's intangible capital to use by licensing it to all Google affiliates in Europe, the Middle East, and Africa. (A similar strategy, with Singapore in lieu of Ireland, is used for Asia.) Google France, for instance, pays royalties to "Ireland Limited" in order to have the right to use the firm's technologies. At this stage, the bulk of Google's non-US profits end up being taxable in Ireland only, where the corporate tax rate is 12.5 percent.

The next step involves stripping the profits out of Ireland and making them appear to have occurred in Bermuda, where the corporate tax rate is zero percent. This is done by having "Ireland Limited" make a royalty payment to "Google Holdings." There are two potential obstacles here. Ireland, first, withholds a tax on royalty payments to Bermuda; to avoid this tax, a detour by the Netherlands is necessary.

**Figure 1**

**The Share of Profits Made Abroad in US Corporate Profits**

Source: Author’s computations using National Income and Product Accounts data.

Notes: The figure reports decennial averages (that is, 1970–79 is the average for years 1970, 1971, through 1979). Foreign profits include dividends on foreign portfolio equities and income on US direct investment abroad (distributed and retained). Profits are net of interest payments, gross of US but net of foreign corporate income taxes.

Source: Zucman JEP 2014
Profits booked by US firms in tax havens
(% of foreign profits of US firms)

- Ireland
- Switzerland
- Caribbean
- Singapore
- Puerto Rico
- Netherlands & Luxembourg

Graph showing the percentage of foreign profits of US firms booked in various tax havens from 1966 to 2017.
Capital, profits & wages of US firms in tax havens
(% foreign capital, profits, and wages of US firms)

Profits booked in tax havens
Capital in tax havens
Wages paid to employees in tax havens
Issues with new US Corporate Tax System

Since 2018, US has a very low corporate tax rate of 21%

⇒ Strong incentives for successful business owners to incorporate and keep profits inside the corporation and pay only 21% (instead of higher top individual tax rate)

⇒ This can undermine the progressive individual income tax

If business is a multinational: profits abroad are taxed at an even lower 10.5% tax rate (with foreign tax credit) and only on supernormal profits in excess of 10% of capital abroad.

⇒ Multinationals still have strong incentives to shift profits abroad in tax havens (Garcia-Bernardo, Jansky, Zucman ’21)

Declining corporate tax rates worldwide due to harmful tax competition (re-inforces inequities created by globalization)
The race to the bottom is accelerating.
Taxing Multinational Companies more Effectively

Current territorial system where multinationals choose where to report profits is easy to game. Need a better system: Several possibilities:

1) Tax on global profits in real time (each country taxes its multinationals on global profits with credit for foreign taxes)

2) Minimum tax on foreign profits country-by-country: min tax needs to be high enough to discourage use of tax havens

3) Apportioning profits based on sales in each country [as states are doing within the US and as EU new digital tax]

Probably need to combination of these and have strong anti-inversion regulations so that it’s hard for multinationals to change nationality [Saez-Zucman 2019 discussion]
2021 Global minimum tax agreement

Recent international agreement October 2021 (136 countries)

Each country will police its own multinationals by imposing a minimum tax of 15% on foreign profits country-by-country:

Apple pays 5% on its profits in Ireland, US charges extra 10%

⇒ Kills the pure tax haven model but 3 weaknesses:

a) 15% is low relative to domestic corporate tax rates

b) Carveout: Min tax applies only on profits in excess of 5% of payroll+tangible capital deployed ⇒ Multinationals have incentives to move real operations to low tax places

c) Sales apportionment replacing EU digital tax is tiny

Conclusion: tax low but shows this is technically solvable. US has not passed it yet (legislation is part of stalled Build Back Better bill)
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