Tax Compliance: Key questions and some answers

The key questions

Understanding compliance behavior
- Main theories in 10 minutes
- The Danish compliance experiment
- Tax enforcement strategy

Resources on tax enforcement?
- A theory
- Danish evidence

Some lessons for tax administrations
The key questions

- How important is tax compliance for society?

- Why do people comply or not comply?

- Optimal tax enforcement strategies to reduce noncompliance?

- How many resources should society devote to tax enforcement?
How important is tax compliance for society?

Resources spend on tax enforcement: ¼% of GDP in DK

Sources: Kleven, Kreiner, Saez Economica 2016
How important is tax compliance for society?

Buried treasure

A new study details the wealth hidden in tax havens

But even the new data are patchy and do not fully account for all wealth

Oct 7th 2017

SWITZERLAND, which developed cross-border wealth-management in the 1920s, was once in a league of its own as a tax haven. Since the 1980s, however, tax-dodgers have been spoilt for choice: they can hide assets anywhere from the Bahamas to Hong Kong. The percentage of global wealth held offshore has increased dramatically. But it has been hard to say how much that is, and who owns it.

Few offshore centres used to disclose such data. But in 2016 many authorised the Bank for International Settlements (BIS) to make banking statistics publicly available. Using these data, a new study by Annette Alstadhaug, Niels Johannesen and Gabriel Zucman, three economists, concludes that tax havens hoard wealth equivalent to about 10% of global GDP. This average masks big variations. Russian assets worth 50% of GDP are held offshore; countries such as Venezuela, Saudi Arabia and the United Arab Emirates climb into the 60-70% range. Britain and continental Europe come in at 15%, but Scandinavia at only a few per cent.

One conclusion is that high tax rates, like those in Denmark or...
Theory of tax compliance behavior
Model 1: Risk neutrality, no honesty effects, constant detection prob.

Tax payer maximizes expected utility $U^e$ wrt. $E$:

$$U^e = (1 - p)C^{nc} + pC^c$$

$$= (1 - p)[(1 - t)Y + tE] + p[(1 - t)Y - FtE]$$

Optimal to increase evasion $E$ if: $(1 - p)t - pFt > 0$  $\Rightarrow$

$$1 - p > F$$

Evasion prediction for realistic parameter values?

$$\frac{1 - 0.05}{0.05} \approx 20 > 2$$
Theory of tax compliance behavior

Model 2: Risk aversion, no honesty effects, constant detection prob.

A-S model includes concavity in utility of consumption:

\[ U^e = (1 - p)u(C^{nc}) + pu(C^c) \]

Optimal to increase evasion \( E \) if:

\[ (1 - p)u'(c^{nc})t - pFu'(c^c)t > 0 \quad \text{or} \quad \frac{1 - p}{p} > F \frac{u'(c^c)}{u'(c^{nc})} \]

\[ u'(c^c) \approx u'(c^{nc}) + u''(c^{nc})\Delta c \quad \Rightarrow \quad \frac{1 - p}{p} > F(1 + \theta \frac{\Delta c}{c}) \]

where \( \theta \) is the CRRA parameter.

Evasion prediction for realistic parameter values?

\[ \frac{1 - 0.05}{0.05} \approx 20 > 2(1 + 2 \cdot 0.5) = 4 \]
Theory of tax compliance behavior

Model 3: Risk aversion, *honesty effects*, constant detection prob.

Include disutility from cheating (morale, guilt, shame, norms...):

\[ U^e = (1 - p)C^{nc} + pC^c - \chi tE \]

Optimal to increase evasion \( E \) if:

\[ (1 - p)t - pFt - \chi t > 0 \Rightarrow \]

Exists \( \hat{\chi} = 1 - p(1 + F) \) such that individuals fall into two groups:

- Individuals with \( \chi > \hat{\chi} \) report truthfully (honest)
- Individuals with \( \chi < \hat{\chi} \) will evade (dishonest)

In a population with many honest people, evasion will be low even when \( p \) and \( F \) are low \( \Rightarrow \) Explanation of evasion puzzle:

**Taxpayers are able but unwilling to cheat**
Theory of tax compliance behavior

Model 4: Risk aversion, honesty effects, *endogenous* detection prob.

3rd party info/withholding effective in reducing tax evasion

*Explanation of evasion puzzle:* 

**Taxpayers are willing but unable to cheat**
Theory of tax compliance behavior

Conclusions

Determinants of tax evasion behavior:

Tax rate

Degree of punishment (time use, fine, prison...)

Degree of risk aversion

Probability of detection

- 3rd party info/withholding, audit selection
- Resources spend on audits

Tax morale, social norms, guilt, shame...

Empirical question: Unwilling or unable to cheat?
Empirical evidence
Empirical measurement is difficult

Measurement problems
- Not possible to measure noncompliance directly in standard register data
- People don’t tell the truth, even in anonymous surveys (and large samples of individuals are too expensive)

Identification problems
- A relationship between resources used on tax enforcement and degree of tax evasion may not be casual
Empirical evidence
The Danish tax compliance experiment

A tax audit experiment carried out in Denmark in 2007-08 with more than 40,000 individual income tax filers.

Academic publication and policy reports:


Empirical evidence
The Danish tax compliance experiment

Experimental design
A stratified random sample of about 20,000 individuals were selected for tax audits in 2007 [100% audit group]

Audits: not pre-announced, did not use audit flags, very rigorous.

⇒ Data from audited and filed tax returns used to analyze overall level of compliance, type of income, effect of the marginal tax rate, best predictors of evasion...

Randomly selected 0% audit group + randomly selected audit-threat letter group in 2008

⇒ Effects of tax enforcement (audit correction and audit probability) on future reporting behavior
## Empirical evidence

**Detectable tax evasion in Denmark**

<table>
<thead>
<tr>
<th></th>
<th>Total audit adjustment</th>
<th>Under-reporting</th>
<th>Over-reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount</td>
<td>2.2%</td>
<td>2.3%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Individuals</td>
<td>10.7%</td>
<td>8.6%</td>
<td>2.2%</td>
</tr>
<tr>
<td><strong>Total tax</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount</td>
<td>2.8%</td>
<td>3.0%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Individuals</td>
<td>10.6%</td>
<td>8.4%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>
# Empirical evidence

## Income types, 3rd party information and tax evasion

<table>
<thead>
<tr>
<th>Income Type</th>
<th>Share of Total Net Income (%)</th>
<th>Evasion Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total net income</td>
<td>100</td>
<td>2.3</td>
</tr>
<tr>
<td>Personal income</td>
<td>102</td>
<td>1.1</td>
</tr>
<tr>
<td>Deductions</td>
<td>-4</td>
<td>2.2</td>
</tr>
<tr>
<td>Capital income</td>
<td>-5</td>
<td>2.6</td>
</tr>
<tr>
<td>Stock income</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>Self-employment income</td>
<td>5</td>
<td>15.7</td>
</tr>
<tr>
<td>Third-party reported income</td>
<td>95</td>
<td>0.3</td>
</tr>
<tr>
<td>Self-reported income</td>
<td>5</td>
<td>41.5</td>
</tr>
</tbody>
</table>
## Empirical evidence

### Income types, 3rd party information and tax evasion

<table>
<thead>
<tr>
<th></th>
<th>Social factors</th>
<th>Socio-economic factors</th>
<th>Information factors</th>
<th>All factors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>12.72</td>
<td>10.13</td>
<td>1.18</td>
<td>3.72</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>-5.56</td>
<td>-4.17</td>
<td>-2.06</td>
<td>-1.50</td>
</tr>
<tr>
<td><strong>Married</strong></td>
<td>1.22</td>
<td>-0.55</td>
<td>-1.50</td>
<td>0.72</td>
</tr>
<tr>
<td><strong>Member of church</strong></td>
<td>-1.59</td>
<td>-2.27</td>
<td>-0.94</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Copenhagen</strong></td>
<td>-1.49</td>
<td>-0.01</td>
<td>-0.25</td>
<td>1.47</td>
</tr>
<tr>
<td><strong>Age above 45</strong></td>
<td>-0.72</td>
<td>-0.63</td>
<td>-0.56</td>
<td>0.61</td>
</tr>
<tr>
<td><strong>Home owner</strong></td>
<td>5.49</td>
<td>0.15</td>
<td>0.15</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Firm size below 10</strong></td>
<td>5.07</td>
<td>3.47</td>
<td>3.47</td>
<td>1.05</td>
</tr>
<tr>
<td><strong>Informal sector</strong></td>
<td>4.37</td>
<td>0.27</td>
<td>0.27</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Self-Reported Income</strong></td>
<td>5.58</td>
<td>5.59</td>
<td>5.59</td>
<td>0.80</td>
</tr>
<tr>
<td><strong>Self-Reported Income &gt; 20K</strong></td>
<td>21.68</td>
<td>21.09</td>
<td>21.09</td>
<td>1.40</td>
</tr>
<tr>
<td><strong>Self-Reported &lt; -10K</strong></td>
<td>14.99</td>
<td>14.74</td>
<td>14.74</td>
<td>1.42</td>
</tr>
<tr>
<td><strong>Audit Flag</strong></td>
<td>13.22</td>
<td>13.07</td>
<td>13.07</td>
<td>1.53</td>
</tr>
</tbody>
</table>

| **R-square**       | 1.2%           | 2.5%                   | 16.2%               | 16.5%      |
| **Adjusted R-square** | 1.1%           | 2.4%                   | 16.1%               | 16.5%      |
## Empirical evidence

Income types, 3rd party information and tax evasion

<table>
<thead>
<tr>
<th>Audit correction in 2007</th>
<th>Difference: 100% vs. 0% control group</th>
<th>IV-effect of correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net income</td>
<td>Net income</td>
<td>Self-reported</td>
</tr>
<tr>
<td>Amount (DKK)</td>
<td>8491</td>
<td>2557</td>
</tr>
</tbody>
</table>

Change in reported net income 2007-2008 due to audit correction in 2007
Empirical evidence
Size of problem, behavioral model, impact of policy parameters

Tax gap reasonably low ($\approx 2\text{-}3\%$) in relation to standard theory and e.g. US...

... because it is “difficult to evade” (under reporting of 42% on self-reported income and 0.3% out of 3rd party reported income)

... because of extensive use of 3rd party information from employees, banks, trade unions etc. (95% of net income)

Socio economic factors have little predictive power compared to variables reflecting existence and size of income that is difficult to detect $\Rightarrow$ “go after the money”

Positive effect from tax rate to tax evasion (bunching evidence)

Tax enforcement has positive behavioral effects (audit adjustment raises self-reported income by 30% of the original adjustment the year after)
Effectiveness of 3rd party info/withholding

Milton Friedman in interview in 1995:
"I was an employee at the Treasury Department. We were in a wartime situation. How do you raise the enormous amount of taxes you need for wartime? ... You could not do that during wartime or peacetime without withholding. And so people at the Treasury tax research department, where I was working, investigated various methods of withholding... It was a very interesting and very challenging intellectual task. I played a significant role, no question about it, in introducing withholding. I think it's a great mistake for peacetime, but in 1941–43, all of us were concentrating on the war. I have no apologies for it, but I really wish we hadn't found it necessary and I wish there were some way of abolishing withholding now."
How many resources on tax enforcement?
A theory

Tax system: \( \tau(z) = T_0 + t \) and \( \tau(0) = T_0 \)

Non-workers receive \( T_0 \) and utility \( u_n = -T_0 \)

Workers earn pre-tax income of \( z \) and utility:

\[
\begin{align*}
    u_w(q) = \begin{cases} 
    z - T(z) & \text{White} \\
    z - T_0 - q - a & \text{Black} 
    \end{cases}
\end{align*}
\]

\( q \): taxpayer costs of sheltering income distributed by \( F(q) \)
\( a \): effort of the tax authority to reduce sheltering

Workers declare income if: \( q \geq \bar{q} = t - a \).

Honest workers: \( E(\bar{q}) = 1 - F(\bar{q}) \)

White market participation elasticity wrt. disincentive: \( \varepsilon = -\frac{\partial E(\bar{q})}{\partial t} \frac{t}{E(\bar{q})} \)
How many resources on tax enforcement?
A theory

Social planner objective:

\[ \Omega = \beta \int_{0}^{\bar{q}} S(u_w(q)) f(q) dq + \beta \int_{q}^{\infty} S(u_w(q)) f(q) dq + (1 - \beta) S(u_n), \]

Government budget constraint:

\[ \beta[1 - F(\bar{q})] t + T_0 - c(a) \geq \bar{R}, \]

Social optimum:

\[ 1 - \omega_{ww} = \varepsilon, \]

\[ \beta[\varepsilon E(\bar{q}) - (1 - E(\bar{q})) \omega_{bw}] = c'(a). \]

Eq. 1: standard equity-efficiency trade-off when choosing \( T_0 \) and \( t \)
Eq. 2: the optimal tax enforcement policy \( a \)
How many resources on tax enforcement?
A theory

Main conclusions:
A standard CBA overestimates the net-gain in social welfare from increased tax enforcement but...
if the social planner assigns a negligible weight on an extra dollar to tax cheaters, \( \omega_{bw} \) is close to zero \( \Rightarrow \) standard CBA appropriate

Same conclusion with
- endogenous labor supply
- random detection of hidden income (instead of deterministic)
## How many resources on tax enforcement?

### Evidence

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Self-employed</th>
<th>Wage Earners</th>
<th>Wage earners: Flag</th>
<th>Wage earners No flag</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population share</strong></td>
<td>Percent</td>
<td>--------------</td>
<td>------------</td>
<td>--------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>8</td>
<td>92</td>
<td>11</td>
<td>80</td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
<td>2009-DKK</td>
<td>-----------------</td>
<td>------------</td>
<td>--------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Mechanical</td>
<td>1.150</td>
<td>9.100</td>
<td>400</td>
<td>2.250</td>
<td>100</td>
</tr>
<tr>
<td>Behavior</td>
<td>600</td>
<td>3.450</td>
<td>350</td>
<td>2.350</td>
<td>50</td>
</tr>
<tr>
<td>Audit cost</td>
<td>1.900</td>
<td>14.600</td>
<td>700</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td><strong>Net effect</strong></td>
<td>-150</td>
<td>-2.050</td>
<td>50</td>
<td>3.900</td>
<td>-550</td>
</tr>
</tbody>
</table>
Some lessons for tax administration

Optimal tax enforcement strategies?
- Third-party info very effective instrument to reduce underreporting
- Audit selection criteria: Should focus on income information variables. Socio-economic factors do not improve selection significantly

How many resources on tax enforcement (audits)?
- High evasion rate on self-employment income, but self-employed are also very expensive to audit
- Current level of audit resources in Denmark probably not far away from the revenue-maximizing level
Exiting new empirical evidence

Size of evasion responses (Slin 2018; Kosonen 2018; Escobar 2018; Kotakorbi 2018)

Effect of enforcement instruments on behavior (DeBacker 2018; Advani 2018; Torsvik 2018)

Effectiveness of 3rd party info: Collaborative behavior important (Kleven, Kreiner, Saez 2016; Bjørneby 2018)

Moral, guilt, shame, loss aversion (Treber 2018; Engström 2018)

Social networks (Telle 2018)