CENTER FOR ECONOMIC BEHAVIOR & INEQUALITY

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Workshop on Empirical Analysis of Tax Compliance

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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?
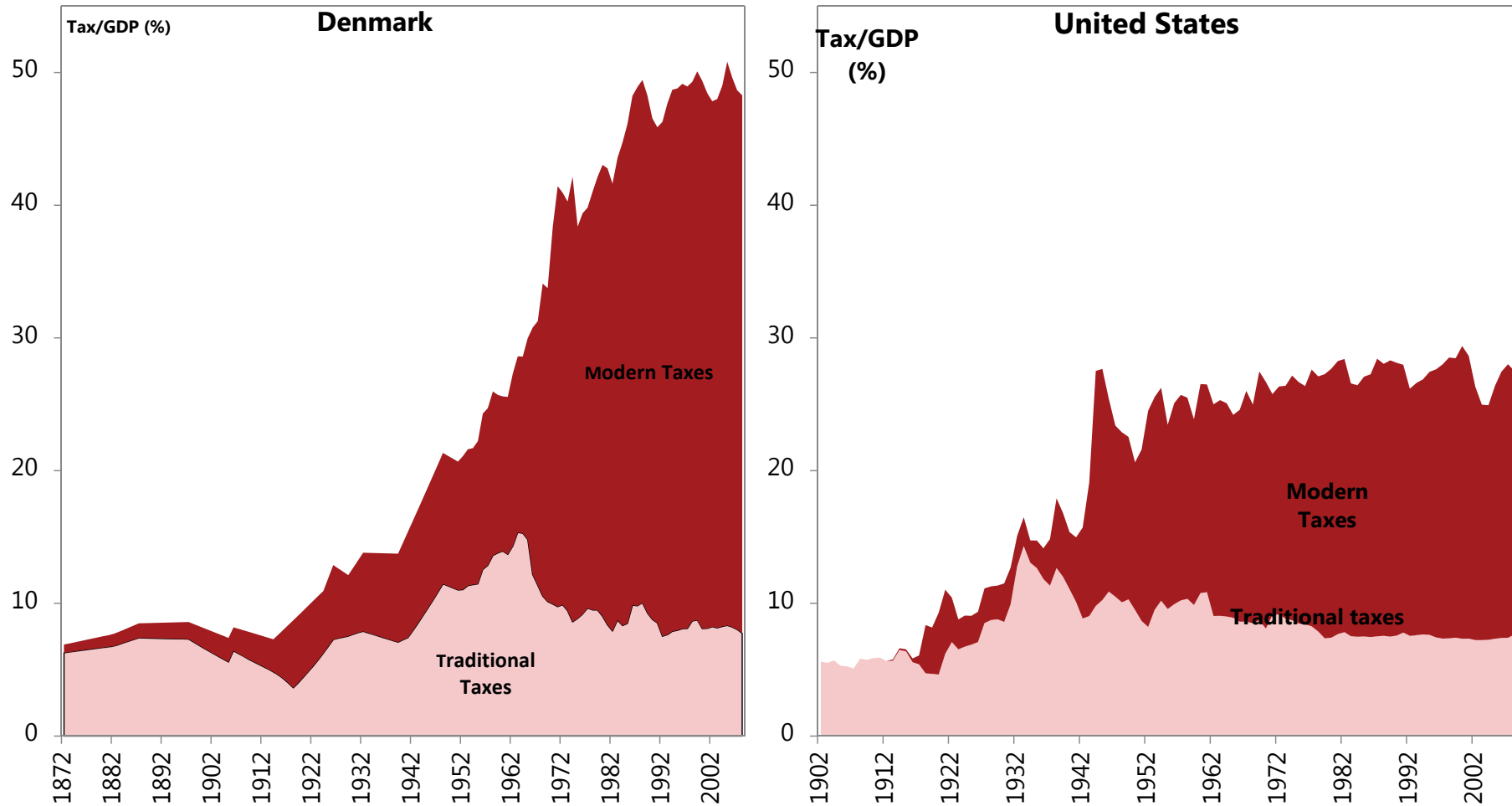
Sources: Kleven, Kreiner, Saez Economica 2016

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

How important is tax compliance for society?

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: $(1 - p)t - pFt > 0 \quad \Rightarrow$

$$\frac{1 - p}{p} > F$$

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 θ 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.

detection prob. (p)
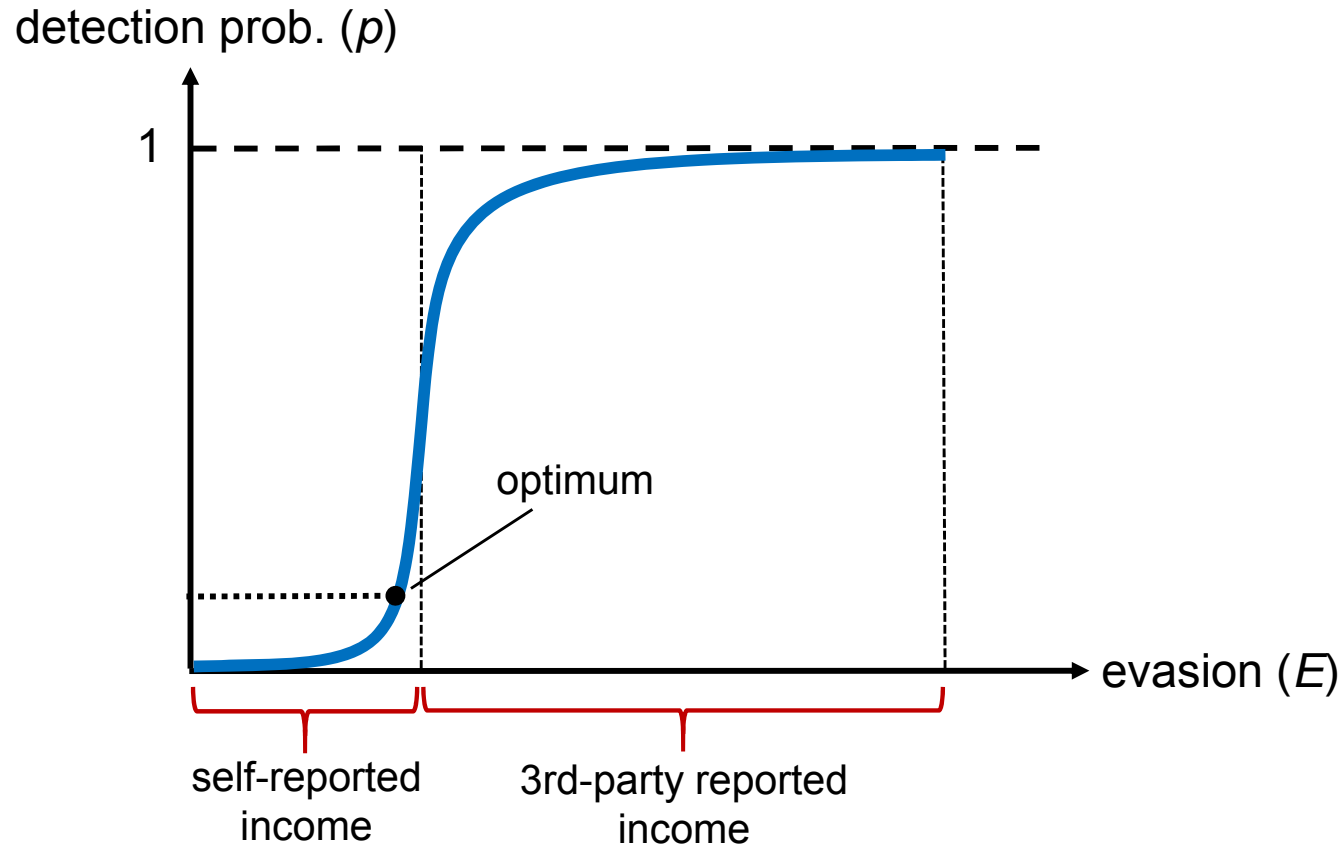
3rd party info/withholding effective in reducing tax evasion

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
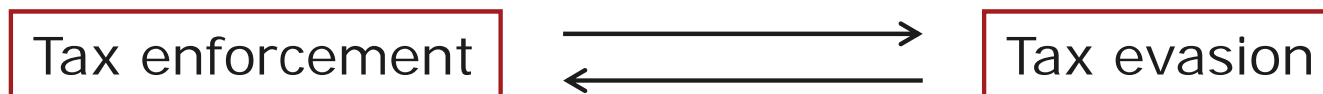
Empirical evidence
The Danish tax compliance experiment

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:

Kleven, Knudsen, Kreiner, Pedersen and Saez (2011). "Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark." Econometrica 79, 651-692.

"Tax Payer Compliance." Report of the Danish Tax Agency (SKAT), 2009

"Tax evasion and the administration of the Danish Tax System" Chapter 4 in the Report of the Danish Economic Council, 2011.

"What makes tax payers comply? Lessons from a tax audit experiment in Denmark." Kreiner, European Economy Papers 463. European Commission, 2012.

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

		Total audit adjustment	Under-reporting	Over-reporting
Net income	Amount	2,2%	2,3%	-0,1%
	Individuals	10,7%	8,6%	2,2%
Total tax	Amount	2,8%	3.0%	-0,1%
	Individuals	10,6%	8,4%	2,2%

Empirical evidence
Income types, 3rd party information and tax evasion

	Share of total net income (%)	Evasion rate(%)
Total net income	100	2,3
Personal income	102	1,1
Deductions	-4	2,2
Capital income	-5	2,6
Stock income	3	5,0
Self-employment income	5	15,7
Third-party reported income	95	0,3
Self-reported income	5	41,5

Empirical evidence
Income types, 3rd party information and tax evasion

	Social factors		Socio-economic factors		Information factors		All factors	
Constant	**12.72**	(1.06)	**10.13**	(1.12)	**1.18**	(0.25)	**3.72**	(1.01)
Female	**-5.56**	(0.63)	**-4.17**	(0.65)			**-2.06**	(0.62)
Married	1.22	(0.70)	-0.55	(0.72)			**-1.50**	(0.72)
Member of church	-1.59	(0.98)	**-2.27**	(0.97)			-0.94	(0.92)
Copenhagen	-1.49	(1.52)	-0.01	(1.51)			-0.25	(1.47)
Age above 45	-0.72	(0.67)	-0.63	(0.67)			-0.56	(0.61)
Home owner			**5.49**	(0.65)			0.15	(0.66)
Firm size below 10			5.07	(1.26)			**3.47**	(1.05)
Informal sector			4.37	(1.15)			0.27	(0.92)
Self-Reported Income					5.58	(0.75)	**5.59**	(0.80)
Self-Reported Income > 20K					21.68	(1.38)	**21.09**	(1.40)
Self-Reported < -10K					14.99	(1.42)	**14.74**	(1.42)
Audit Flag					13.22	(1.58)	**13.07**	(1.53)
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

Change in reported net income 2007-2008 due to audit correction in 2007

	Audit correction in 2007	Difference: 100% vs. 0% control group			IV-effect of correction
	Net income	**Net income**	**Self-reported**	**Third-party reported**	**Net income**
Amount (DKK)	**8491**	**2557**	**2331**	225	**0,301**

Empirical evidence
Size of problem, behavioral model, impact of policy parameters

Tax gap reasonably low (≈ 2-3%) 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 ⇒ "**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: $T(z) = T_0 + t$ and $T(0) = T_0$

Non-workers receive T_0 and utility $u_n = -T_0$

Workers earn pre-tax income of z and utility:

$$u_w(q) = \begin{cases} z - T(z) & \text{White} \\ z - T_0 - q - a & \text{Black} \end{cases},$$

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: $\varepsilon \equiv -\dfrac{\partial E(\bar{q})}{\partial t} \dfrac{t}{E(\bar{q})}$

How many resources on tax enforcement?
A theory

Social planner objective:

$$\Omega = \beta \int_0^{\bar{q}} S(u_w(q))f(q)dq + \beta \int_{\bar{q}}^{\infty} S(u_w(q))f(q)dq + (1 - \beta)S(u_n),$$

Government budget constraint: $\quad \beta[1 - F(\bar{q})]t + T_0 - c(a) \geq \bar{R},$

Social optimum: $\qquad\qquad\qquad\qquad\qquad 1 - \omega_{ww} = \varepsilon,$

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

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, ω_{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

	All	Self-employed	Wage Earners	Wage earners: Flag	Wage earners No flag
Population share	----------------------- Percent -----------------------				
	100	8	92	11	80
Revenue	----------------------- 2009-DKK -----------------------				
Mechanical	1.150	9.100	400	2.250	100
Behavior	600	3.450	350	2.350	50
Audit cost	1.900	14.600	700	700	700
Net effect	**-150**	**-2.050**	**50**	**3.900**	**-550**

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)