Inspectors or Google Earth? Optimal fiscal policies under uncertain detection of evaders

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- Unrealistic assumption: detection rates vary between 30% (Erard and Feinstein, 2009) and 50% (Feinstein, 1991).

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- Is the detection probability exogenous or endogenous?
  - Theoretical consideration.
  - Empirical issue: governments invest resources to improve their tax administration's capacity to detect evaders.

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- This is precisely the purpose of our paper.
- We characterize these optimal investments and we show how they interact with other dimensions of an optimal fiscal policy.

Outline of the presentation

- The model

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- Optimal fiscal policy under asymmetric information

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- Presents two class of active agents: individuals, government.

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  - $\theta \in]0, 1]$: fraction of dishonest (rich) taxpayers.

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- The strictly increasing and concave utility function u satisfies

$$u(0) = 0 \quad \lim_{q \to 0} u_q = \infty \quad \lim_{q \to \infty} u_q = 0.$$

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- but delegates its implementation to a tax administration.

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  - π, f : enforcement policy
  - The tax law has to verify taxpayers' ex-post limited liability, horizontal and vertical equity.

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- With all revenues collected (taxes and fines, net of investment and audit costs), the government finances the public good g.

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  - $\nu > 0$: investment productivity.

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- First stage: we find the optimal level of investment $\widehat{\kappa}$.

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- Mookherjee and Png (1989): no need to audit a taxpayer that reported to be rich$\longrightarrow$ π_p.
- The optimal tax law solves the following problem

$$\left\{\begin{array}{ll}
\underset{t_p,t_r,f_{r,p},\pi_p,g}{Max} \quad \mu u(y_r - t_r) + (1-\mu)u(y_p - t_p) + g & \\
subject\ to & \\
0 \leq \pi_p \leq 1 & \\
t_p \leq y_p & (LL_p) \\
t_r + f_{r,p} \leq y_r & (LL_r) \\
u\left(y_r - t_r\right) \geq \left(1-\delta\pi_p\right) u\left(y_r - t_p\right) + \delta\pi_p u\left(y_r - t_r - f_{r,p}\right) & (IC) \\
g = \mu t_r + (1-\mu)t_p - (1-\mu)\pi_p c - \kappa & (B)
\end{array}\right.$$

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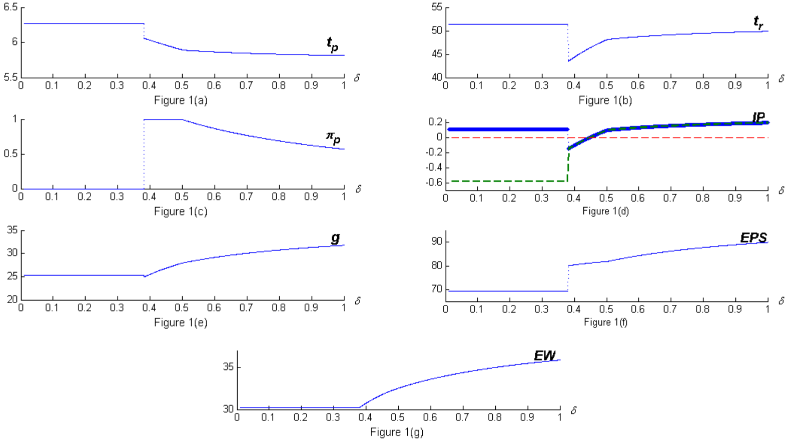
- When δ is relatively low, the tax law will not be enforced.
- When some rich taxpayers are honest, the government can collect higher taxes from them.
- In this case, there is no complete revelation of individual types.
- Dishonest rich taxpayers misreport and evasion occurs.
- The government solves

$$\begin{cases} \underset{t_p, t_r, g}{Max} \quad \mu\left[(1-\theta)u(y_r - t_r) + \theta u(y_r - t_p)\right] + (1-\mu)u(y_p - t_p) + g \\ subject\ \ to \\ g = \left[1 - \mu(1-\theta)\right] t_p + \mu(1-\theta) t_r \end{cases}$$

Let $\underline{\delta} \leq 1$ be the threshold that characterizes when each regime emerges.

Stage



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- Characterization of the optimal investment $\widehat{\kappa}$
  1. We find κ^A : the level of investment that maximizes $\mathbb{E}W^A$.
  2. Provided both regimes of audit emerge, we compare $\mathbb{E}W^A(\kappa^A)$ with $\mathbb{E}W^{NA}(0)$.

- Under the audit regime, the optimal investment κ^A solves the following problem

$$\begin{cases} \underset{\kappa}{Max}\, \mu\left[u(y_r - t_r^A) + t_r^A\right] + (1-\mu)\left[u(y_p - t_p^A) + t_p^A\right] - (1-\mu)\pi_p^A c - \kappa \\ \textit{subject to} \\ \delta = \delta(\kappa, \nu) \\ \max\{0, \underline{\kappa}\} \leq \kappa \\ \kappa \leq \mu t_r^A + (1-\mu) t_p^A - (1-\mu)\pi_p^A c \end{cases}$$

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  - The constraint set may be empty.
  - As the expected welfare $\mathbb{E}W^A$ is not generally concave, the first-order conditions are useless to completely characterize the maximum.
  - The comparison between $\mathbb{E}W^{NA}$, $\mathbb{E}W^A(\kappa^A)$ and $\mathbb{E}W^{FA}(\kappa^{FA})$ is not straightforward because it is a comparison of levels.

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- Taxpayers are characterized by a CRRA utility function

$$u(q) = u(q) = \frac{q^{1-\sigma}}{1-\sigma}.$$

- The detection probability function $\delta(\kappa, \nu)$ is formalized as a logistic

$$\delta(\kappa, \nu) = \delta_\iota + \nu \frac{1 - e^{-\frac{\kappa}{a}}}{1 - ne^{-\frac{\kappa}{a}}},$$

where $a = 0.235$ and $n = 0.99$.

Parameter values of the model

PARAMETER	DEFINITION	BASELINE VALUE
σ	Coefficient of relative risk aversion	0.71
μ	Percentage of rich taxpayers	67
y_r	Income of the rich	\$52.304
y_p	Income of the poor	\$6.747
θ	Percentage of dishonest taxpayers	36
c	Cost of a single audit	\$14.833
δ_ι	Initial detection probability	0.4
ν	Investment productivity	0.225

All money values are in thousands of dollars.

Effects of investment

SOLUTIONS	WITHOUT INVESTMENT	WITH INVESTMENT
$\widehat{\kappa}$	0	\$0.059
$\widehat{\delta}$	0.4	0.62 (+55%)
$\widehat{t_p}$	\$6.03	\$5.83 (+2.9%)
$\widehat{t_r}$	\$44.35	\$47.4 (+6.9%)
IP	−0.087	0.176
$\widehat{\pi}_p$	1	0.89 (−11%)
$\widehat{g}$	\$26.81	\$30.58 (+14.06%)
EPS	85.3%	85.5% (+2.4%)

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- Investing optimally may not be sufficient to eliminate the regressiveness that characterizes the tax structure when the government cannot improve the tax administration's detection technology.
- Improvements in the investment productivity generate better results, in quantitative terms, than improvements in the initial detection probability.
- The public good's provision and the efficiency of the public sector increase with investment.

Conclusions

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- We simulate the model to identify the solutions but also to study how the optimal investment interacts with the other components of the optimal fiscal policy.
- Clearly this model suggests that one needs to incorporate such investments into the currently used definitions of 'tax effort' in empirical models.