TAX AVOIDANCE AND OPTIMAL INCOME TAX ENFORCEMENT

22 September 2017

Duccio Gamannossi degl'Innocenti - Matthew D. Rablen

CONTENTS

INTRODUCTION

OVERVIEW

Tax structure, Non-compliance, and Tax Administration

Evasion and avoidance alter effective tax rates

Relevant phenomenon affecting all economic subjects

Numerous aspects of the phenomenon have not been addressed yet

RELATED LITERATURE

Becker, 1968; Yitzhaki 1974

Economics of Crime applied to Tax Evasion

Alm, 1988; Alm & MCCallin 1990

First models considering both Avoidance and Evasion

Feldstein 1999

Taxonomy of Avoidance Schemes

Slemrod 2001

Impact of Avoidance on Leisure-Work Choice

Hoopes et al. 2012

Effectiveness of Anti-Avoidance Deterrence

RESEARCH GOALS

Provide a model accounting for both **avoidance** and **evasion**

Allow for a **general specification** of the problem

Characterize **full compliance optimal auditing**

Analyse the impact of **agent characteristics**, **tax structure** and **tax enforcement** on compliance

MODEL

AVOIDANCE AND EVASION

Evasion is costless but carries a fine if detected

Avoidance is costly but is not fined when detected

Avoidance bought from promoters - “no saving, no fee”

Simultaneous avoidance/evasion decision

Both **avoidance** and **evasion** are discovered upon audit

MODELLING FEATURES AND ASSUMPTIONS

Taxpayers are **heterogeneous in income**

Stigma costs arise if non-compliance is uncovered

Tax agency **able to commit** to an audit and penalty function

Tax agency enforces **truth-telling probability**

MODELLING FEATURES AND ASSUMPTIONS

Relevant Parameters and variables:

w Taxpayer exogenous income $[\overline{w}, \underline{w}]$

$\phi \in (0,1)$ Linear fee on avoided tax

A, E, x Avoided, Evaded and Declared income

General specification of **Tax**, **Fine**, **Stigma** functions:

$t(.)$ Tax function s.t. $t' \geq 0$

$f(.)$ Fine function s.t. $f(0) = 0$, $f' > 0$

$S(w - x)$ Stigma function s.t.

$$S(w-x) = 0 \quad \text{if } x = w$$
$$S(w-x) = s > 0 \quad \text{if } x \neq w$$

Stigma cost dependent on concealed income considered in extensions

ANALYSIS

OPTIMAL AVOIDANCE, EVASION AND DECLARATION

Taxpayer's Problem

$$\max_{A,E} \mathbb{E}[U] = (1-p)\,U(w^n) + p\,U(w^a - S(w-x))$$

Where:

Disposable income if **not audited**

$$w^n = w - t(x) - \phi[t(x+A) - t(x)]$$

Disposable income if **audited**

$$w^a = w - t(x+A) - f(t(w) - t(x+A)) - \phi[t(x+A) - t(x)]$$

TAX AGENCY MECHANISM

A mechanism for the tax agency consists of

- a set of possible **income reports** $M \in [0, w]$
- a **tax** function $t(\cdot)$
- an **audit** function $p(\cdot)$
- a **penalty** function $f(\cdot)$

Remarks

- Revelation principle does not hold
- Incentive compatible mechanism (or equiv.) considered
- **Focus on audit function** for a given penalty and tax function

DETERRENCE PROBLEM

Taxpayers will **report truthfully** if:

$$[1 - p(x, A, w)]\, U(w^n) + p(x, A, w)\, U(w^a - S(w - x)) \leq U(w - t(w))$$

Then, **perfect compliance** is ensured by:

Truthtelling Probability

$$p(x, A, w) \geq \frac{U(w^n) - U(w^a - S(w - x))}{U(w^n) - U(w - t(w))}$$

since **audits are costly** and that A and w are **private information** of the taxpayer, **the audit probability enforced is**:

$$p\,(x) = \max_{A,w} p\,(x, A, w)$$

LINEAR FINE FUNCTION

Assuming $f(z) = [1+h]\,z$, $h > 0$, it is

$$\max_{A,w} p(x, A, w) = \begin{cases} p(x, w - x, \overline{w}) & \phi < \hat{\phi} \\ p(x, 0, \overline{w}) & \phi > \hat{\phi} \end{cases}$$

Remarkably, a corner solution necessarily arises when $f'' \leq 0$

	$A^* = 0$	$A^* = w^* - x$
	$p(x)$	$p(x)$
x	$-$	$-$
$\overline{w}$	$+$	$+$
ϕ	0	$-$
s	$-$	$-$
pivot of $f(\cdot)$	$-$	0
pivot of $t(\cdot)$	$+$	$+$

Comparative statics at the corner for A^*

INTERNAL EQUILIBRIUMS

When the **fine function is convex** internal equilibrium may arise

Not possible to have **internal** A^* and w^* **simultaneously**

If $A^* \in (0, w - x) \rightarrow w^* = \overline{w}$

If $w^* \in (x + A, \overline{w}) \rightarrow A^* = 0$

Focus on the internal equilibrium for A^*

RISK NEUTRAL CASE, INTERNAL A^*

Necessary conditions for $A^* \in (0, w^* - x)$

Convex fine function

$$f'' > 0$$

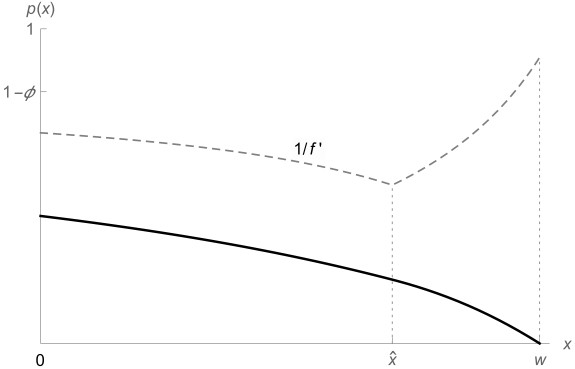
Stigma cost is sufficiently high

$$s > \varepsilon_f (t(\overline{w}) - t(x + A^*)) - 1$$

Both evasion and avoidance are marginally profitable

$$\frac{\partial R(A,E)}{\partial E} = \frac{\partial R(A,E)}{\partial A} > 0$$

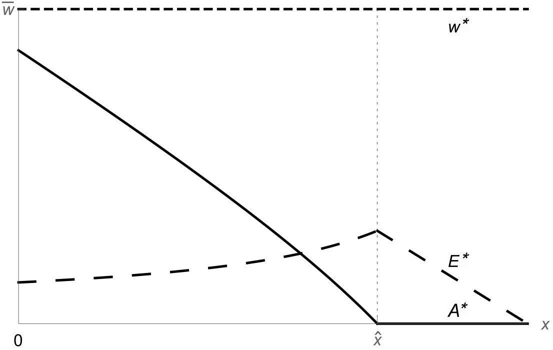
AUDIT FUNCTION, INTERNAL A^*



Audit function for $A^* \in (0, w^* - x]$

Audit probability decreases with declared income

A^*, E^*, W^*; INTERNAL A^*



$\{A^*, E^*, w^*\}$ for $A^* \in (0, w^* - x]$

Avoidance share decreases with declared income

Evasion share rise with x up to $A^* = 0$ and then falls

COMPARATIVE STATICS

	$A^* \in (0, w^* - x)$		$w^* \in (x + A^*, \overline{w})$	
	A^*	$p(x)$	w^*	$p(x)$
x	$-$	$-$	$+$	0
$\overline{w}$	$+$	$+$	0	0
ϕ	$-$	$-$	0	0
s	$-$	$-$	$+$	$-$
pivot of $f(\cdot)$	$+$	$-$	$-$	$-$
pivot of $t(\cdot)$	$+$	$+$	$-$	0

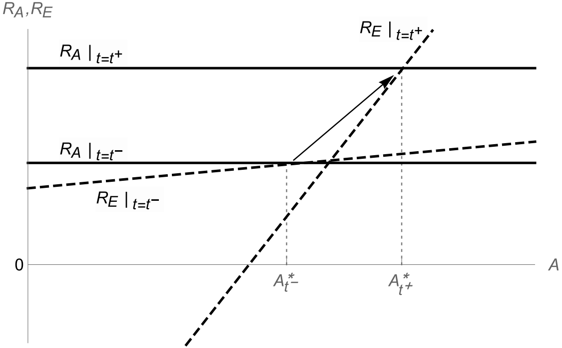
Comparative statics at internal A^*, w^*

YITZHAKI PARADOX, REVERSED

	$A^* \in (0, w^* - x)$		$w^* \in (x + A^*, \overline{w})$	
	A^*	$p(x)$	w^*	$p(x)$
x	$-$	$-$	$+$	0
$\overline{w}$	$+$	$+$	0	0
ϕ	$-$	$-$	0	0
s	$-$	$-$	$+$	$-$
pivot of $f(\cdot)$	$+$	$-$	$-$	$-$
pivot of $t(\cdot)$	$+$	$+$	$-$	0

Comparative statics at internal A^*, w^*

YITZHAKI PARADOX, REVERSED

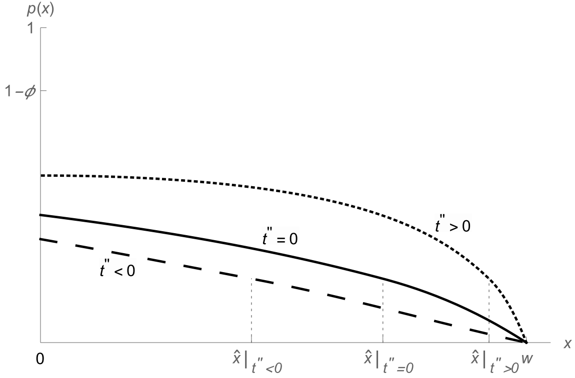


Effect of a multiplicative shift of tax function on marginal returns

- Expected returns of avoidance rise with tax rates
- Expected returns of evasion could rise or fall with tax rates
- Overall incentives for non-compliance grow

EXTENSIONS

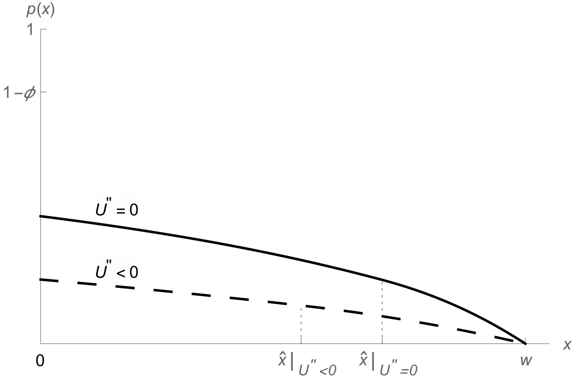
NON-LINEAR TAX FUNCTION



Audit function for a progressive, linear, and regressive tax function

Enforcement cost is increasing in tax-scheme progressivity

RISK AVERSION



Effect of risk aversion on $p(x)$

Enforcement cost is decreasing in risk aversion

Steepness of audit function is decreasing in risk aversion

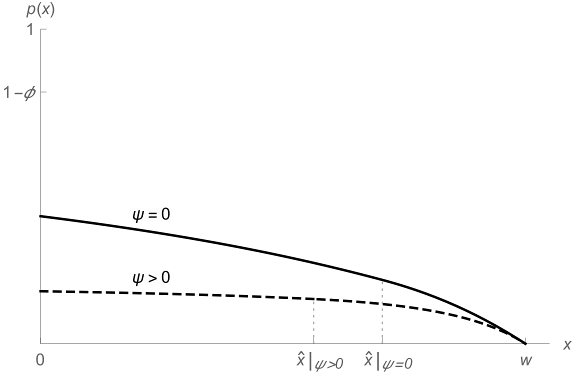
VARIABLE STIGMA COST

Assuming the stigma cost to be dependent on the concealed income as:

$$S(w-x)=\begin{cases} 0 & \text{if } x=w; \\ s+\psi[w-x]>0 & \text{otherwise}; \end{cases}$$

where $\psi \geq 0$

VARIABLE STIGMA COST



Effect on $p(x)$ of adding variable stigma

The audit function shifts downward

The audit function becomes flatter

CONCLUSIONS

CONCLUDING REMARKS

In plausible circumstances, the wealthiest taxpayer is the most difficult to deter from underreporting

"Yitzhaki puzzle" does not hold if declaration simultaneously addresses avoidance and evasion

If the penalty function is convex, internal equilibrium for both avoidance and evasion could arise

Avoidance has a higher share of the amount underdeclared as:

- the market of avoidance schemes gets more competitive
- the lower the reported income
- the lower the stigma associated with non-compliance

FURTHER RESEARCH

Allow for reference dependent utility

Investigate the supply- and demand-side of the market for avoidance schemes

Embed model within a general equilibrium framework

Thank You!

Questions?

Appendix

NON-COMPLIANCE EXPECTED RETURNS

A key variable in taxpayer's decision is the **expected return**:

$$R(A, E) = (1 - p)w^n + p(w^a - s) - (w - t(w))$$

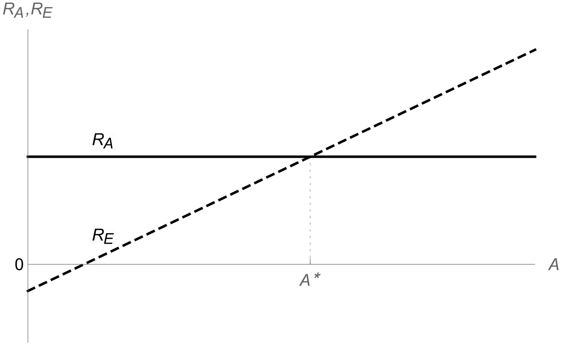
The **marginal impact** of avoidance on expected return is:

$$\frac{\partial R(A,E)}{\partial A} = (1 - p - \phi)t'(w - A - E)$$

While the one of evasion is:

$$\frac{\partial R(A,E)}{\partial E} = [p(1 - f') + \phi]t'(w - E) + \frac{\partial R(A,E)}{\partial A}$$

MARGINAL RETURNS, INTERNAL A^*



Expected returns to avoidance and evasion for $A^* \in (0, w^* - x)$

Both avoidance and evasion expected returns are positive

RISK NEUTRAL CASE, INTERNAL W^*

Necessary conditions for $w^* \in (x + A, \overline{w})$

Convex fine function

$$f'' > 0$$

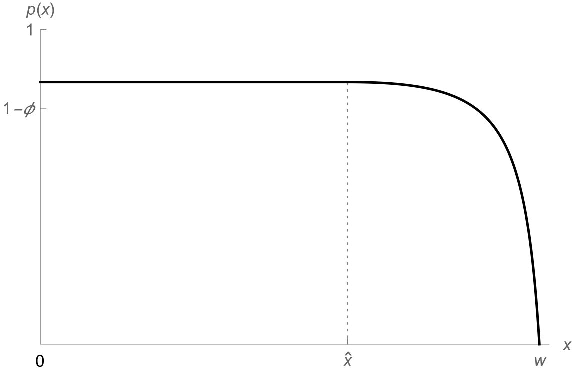
Stigma cost is sufficiently low

$$s < \varepsilon_f (t(w^*) - t(x)) - 1$$

Neither evasion nor avoidance is profitable at the margin

$$\partial R(A, E) / \partial E = 0 > \partial R(A, E) / \partial A$$

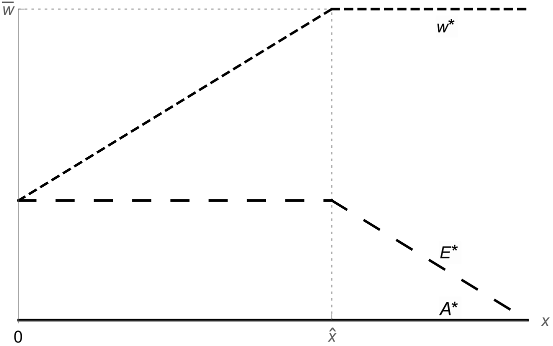
AUDIT FUNCTION, INTERNAL W^*



Audit function for $w \in (x + A^*, \overline{w}]$

Audit probability is independent of x until $w^* = \overline{w}$

A^*, E^*, W^*, INTERNAL W^*

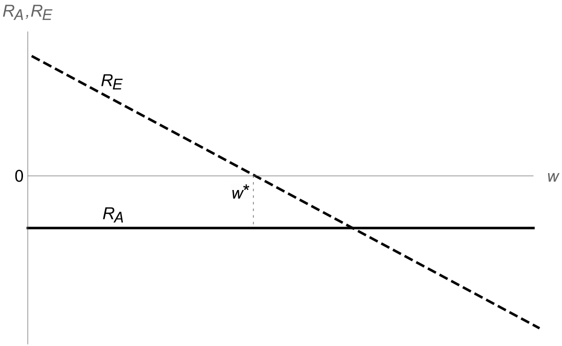


$\{A^*, E^*, w^*\}$ for $w^* \in (x + A^*, \overline{w}]$

The share of noncompliance falls with declared income

More generally $\frac{\partial w^*}{\partial x} = \frac{\partial t'(x)}{\partial t'(w)}$

MARGINAL RETURNS, INTERNAL W^*

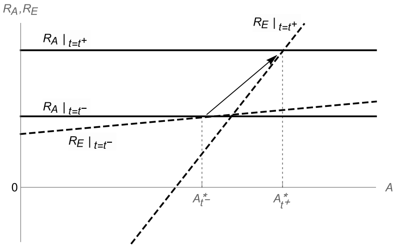


Expected returns to avoidance and evasion for $w^* \in (x + A^*, \overline{w})$

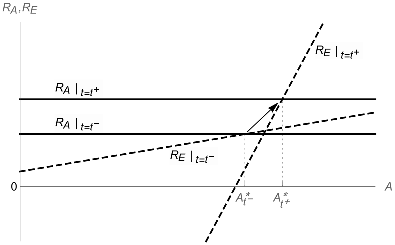
Returns of avoidance are negative

YITZHAKI PARADOX - RISK AVERSION AND RISK NEUTRALITY

Effect of a multiplicative shift of tax function on expected returns



Risk Aversion



Risk Neutrality

An increase in marginal tax rate leads to the reversal of "Yitzhaki Puzzle" irrespective of risk