POLITICAL COMPETITION OVER DISTORTIONARY TAXATION

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Models of electoral competition

Income taxation and its distortionary effects have been largely analyzed in the economics literature.

A distortion can be broadly defined as a taxpayer’s reaction to his level of tax burden (in the sense that his behavior is altered by the existence of the tax).

Most of the studies dealing with distortions focus on the inefficiency that income taxation creates in a normative manner (for example maximizing some social welfare function). In contrast with such a strand of literature, we adopt a positive perspective.
The following observation is the starting point of our model:

“As strategic political parties anticipate distortions, they adapt their electoral promises in order to maximize their probability of victory”.

The main question one might wonder when confronted with previous observation is how do political parties adapt their electoral promises?

In other words, how does the presence of distortions modify what a political party should publicly support in an electoral campaign?
We build a simple model of electoral competition.

2 strategic parties compete to hold office. To do so, they propose income tax functions to selfish voters with endowed income. Given a size of the government, voters vote for the party that proposes them to pay less taxes.

Problems: in general, a Pure Strategy equilibrium does not exist.

Possible solutions:

→ Restricting policy space (linear/quadratic tax functions).

→ Probabilistic voting à la Lindbeck and Weibull (1987) in which voters have some ideology.

Recent idea → the use of Mixed Strategies.
What do we know so far? Positive approach ⇒ understanding why do we have progressive taxation in most OECD countries?

→ In an endowment economy, any progressive tax is preferred to any regressive tax by majority voting (given that the median income is lower than the mean one).

→ If parties have to advocate either progressive or regressive taxation, they advocate progressive taxation (the political appeal for progressivity).

→ Without any restriction over the possible taxation, parties advocate progressive taxation with probability strictly less than one.
The setting without distortion

Some income distribution function $f$

Income $x$
The setting without distortion

$T_1$ is a progressive tax function

$T_1(x)$

Income $x$
The setting without distortion

$T_2$ is a regressive tax function

$T_2(x)$

$Income \ x$
Any progressive tax function is preferred to any regressive one by the majority of the population.
Political game: two parties that maximize their relative popular support. If party 1 proposes $T_1$ and party 2 proposes $T_2$, then party 1’s payoff equals the share of voters who pay less with $T_1$ than with $T_2$ minus the share of voters who pay less with $T_2$ than $T_1$.

The game matrix is such that:

<table>
<thead>
<tr>
<th></th>
<th>$T_1$</th>
<th>$T_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_1$</td>
<td>(0, 0)</td>
<td>(+, −)</td>
</tr>
<tr>
<td>$T_2$</td>
<td>(−, +)</td>
<td>(0, 0)</td>
</tr>
</tbody>
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and hence the unique equilibrium is both parties playing $T_1$
General criticism to these models: they do not take into account voters’ reactions to the income tax functions.

We assume that voters vote AND make a decision that has some impact on their final income. Parties anticipate the distortions created by tax functions and its impact over redistribution.

Examples of distortion:

- Labour decision
- Tax sheltering activities (not paying taxes).
Models of electoral competition

Main results:

- Existence of equilibrium in such a setting.
- Parties uniquely propose efficient tax functions at equilibrium.

On the shape of tax functions at equilibrium:

- Low income voters need not prefer progressive income taxation.
- Parties propose progressive tax functions at equilibrium under mild conditions: Political appeal of progressivity is robust to the introduction of distortions.
The Model

There is continuum of voters in $[0, 1]$ which only differ by their endowed income $x$. Incomes are distributed according to distribution function $F$.

The set of voters with endowed income in the set $A$ is denoted by $p_F(A)$ with $p_F(A) = \int_0^1 1_A dF$.

Voters want to maximize their final income on which they have an impact through two channels: the choice of the political party they will vote for and the effort they will provide (0 or 1).
The Model

An ex-ante tax function is a function $T \in \mathbb{C}[0, 1]$ with

- $0 < T(x) < x$
- $T(x)$ and $x - T(x)$ are increasing functions.

Taxes are distortionary in the sense that voters can make an effort in order not to pay their official amount of income taxation. For any ex-ante tax function $T$, the function $c(T)$ stands for the cost of exerting an effort.

If a voter with income $x$ does not exert an effort, he pays $T(x)$, exerts an effort, he pays $c(T)(x)$.

The voter decides whether to exert an effort maximizing his final income $\max\{x - T(x), x - c(T)(x)\} \equiv \min\{T(x), c(T)(x)\}$. 
The Model

Examples

Flat tax case
\[ c(T)(x) = ax \] with \( a \) non negative real number.

A voter with income \( x \) chooses between paying \( T(x) \) and spending a proportional amount of their endowed income \( ax \) (in a similar manner to a flat tax).

Labor decision
\[ c(T)(x) = -bx + T((1 + b)x) \] with \( b \) non negative real number.

A voter with income \( x \) chooses between paying \( T(x) \) and getting an extra-amount of income of \( -bx \) and paying \( T((1 + b)x) \) to the government (idea of different productivities within the population).

Not paying taxes
\[ c(T)(x) = a + bT(x) \] with both \( a \) and \( b \) non negative real numbers.

A voter with income \( x \) chooses between paying \( T(x) \) and paying \( bT(x) \) to the government with a deadweight cost of concealing income equal to \( a \).
The Model

A cost function $c(T)$ is a continuous and differentiable function with

$$c(T)(x) = c_G(x) + c_P(x),$$

in which $c_G$ represents the money collected by the government and $c_P$ is the deadweight cost of making an effort.

For any tax function $T$, $E_T$ denotes the set of voters who pay full taxes:

$$E_T = \{x \in [0, 1] \mid T(x) < c(T)(x)\}.$$
The Model

A tax function is budget balanced if collects a given amount of money once voters have decided whether to exert an effort.

Given the set of voters who pay full taxes $E_T$,

the government collects \[
\begin{cases} 
T(x) \text{ if } x \in E_T, \\
c_G(x) \text{ if not.}
\end{cases}
\]

For some $r > 0$, a tax function is budget balanced whenever

\[
\int_{E_T} TdF + \int_{[0,1] \setminus E_T} c_G dF \geq r.
\]
Let $W(T_1, T_2)$ denote the share of voters that prefer ex-ante tax function $T_1$ to ex-ante tax function $T_2$.

The payoff to party 1 when advocating $T_1$ and party 2 advocating $T_2$ is equal to

$$u_1(T_1, T_2) = W(T_1, T_2) - W(T_2, T_1)$$

and similarly to party 2.

Hence, the game is a two-player zero-sum symmetric game $(R, (u_1, u_2))$. 
Timing

The game proceeds in three stages:

→ **Stage 1** Simultaneously, parties 1 and 2 announce their strategies $T_1$ and $T_2$ to voters.

→ **Stage 2** A voter votes for party 1 if $x - t_1(x) > x - t_2(x)$ and conversely for party 2. If a voter is indifferent, he randomizes over both parties as usual.

→ **Stage 3** The winner of the election sets up a tax function, and voters decide whether to pay full taxes or to exert an effort.
Traditional observation according to which low income voters prefer progressive income taxation is not anymore valid in our context. It can be the case that regressive income tax functions can be unanimously preferred.

An example in which an efficient regressive tax function is preferred to an inefficient progressive tax function.
ON THE SHAPE OF INCOME TAX FUNCTIONS

$T(x)$ is a progressive tax function.

Income $x$
ON THE SHAPE OF INCOME TAX FUNCTIONS

\[ S(x) \]

\[ S \text{ is a regressive tax function.} \]
The cost function is a flat tax $c(T)(x) = ax$. 

$T(x)$

$c(T)(x)$

$S(x)$

Income $x$
ON THE SHAPE OF INCOME TAX FUNCTIONS

\[ T(x) \]
\[ c(T)(x) \]

Income x
Under $T$ the government only collects 
money from low-income voters.
ON THE SHAPE OF INCOME TAX FUNCTIONS

\[ c(S)(x) \]

\[ S(x) \]

\[ \text{Income } x \]
Under $S$ the government collects money from all voters.
ON THE SHAPE OF INCOME TAX FUNCTIONS

Voters’ preferences depend on the minimum of the cost function and the tax function: $s$ and $t$. 
The Flat Tax game: \( c(T)(x) = ax \) with \( a > 0 \).

Electoral competition within a country in which voters can either pay full taxes or go abroad to pay a proportional amount of their income. What should a party publicly advocate to maximize his probability of victory?

**Condition 1:** The set of tax functions contains a progressive tax function with which every voter pays full taxes.

**Theorem 2:** In the flat tax game, parties uniquely advocate progressive taxation when restricted to propose progressive or regressive taxation.

As a corollary of our result with \( T(x) < ax \) for every \( x \in (0, 1) \).

**Political Appeal for progressivity** (Carbonell-Nicolau and Ok JET 2008): Parties uniquely advocate progressive taxation when restricted to propose progressive or regressive taxation.
Why does Theorem 2 hold?

**Proposition** (Marhuenda and Ortuño-Ortin (1995)): Any convex tax function $S$ is preferred by the majority of the voters to any concave tax function $T$ provided that $\int SdF \leq \int TdF$.

As the minimum of two concave functions is concave, the ex-post tax function $t = \min\{T, ax\}$ is concave. Hence, any ex-post tax scheme $s = S$ is preferred to any ex-post tax scheme $t$.

Theorem 2 holds for the class of smooth functions.

**Definition:** A cost function is smooth whenever $c(T)$ progressive (resp. regressive) iff $T$ progressive (resp. regressive).
We have studied the electoral competition between 2 strategic parties over distortionary taxation.

Furthermore, parties uniquely propose efficient tax functions at equilibrium. This result suggests a link between the results of the literature of probabilistic voting and the positive theory of income taxation.
On the shape of income tax functions at equilibrium.

It can be the case that a regressive tax function is unanimously preferred to a progressive function.

However, parties uniquely advocate progressive tax functions at equilibrium under mild conditions.