The Political Economy of Health Care Finance

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(2008-2010: On leave at Universidad Pablo de Olavide)

and

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Yale University

SCW Meeting, Moscow; July 21-24, 2010
Financing health care is a priority on the political agenda of advanced democracies

Over the past half century, these democracies have usually spent a rising share of total economic resources on health.
Financing health care expenditures

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For instance, aggregate health expenditures in the US were:

- 5.1 percent of GDP in 1960,
- 9.4 percent in 1975, and
- 16.2 percent in 2007.
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For instance, aggregate health expenditures in the US were:
- 5.1 percent of GDP in 1960,
- 9.4 percent in 1975, and
- 16.2 percent in 2007.

Most of the OECD countries share a similar trend, as health expenditures represented an average of:
- 5.4 percent in 1970,
- 7.7 percent in 1990, and
- 8.9 percent in 2007.
General government expenditure on health as a percentage of total government expenditure

- Czech Republic
- Denmark
- Finland
- Italy
- Japan
- Norway
- Portugal
- Sweden

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Per capita total expenditure on health

- Czech Republic-Per capita total expenditure on health (PPP int. $)
- Denmark-Per capita total expenditure on health (PPP int. $)
- Finland-Per capita total expenditure on health (PPP int. $)
- Italy-Per capita total expenditure on health (PPP int. $)
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Some data from the World Health Organization

Government expenditures on health as percentage of total government expenditures

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- aging of the population,
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However, most analysts have concluded that the bulk of the long-term rise resulted from the health care system’s use of new medical services that were made possible by technological advances.

Our aim in this paper is to explore this hypothesis, which has received growing attention throughout the last decade, from a political-economy perspective.
Financing health care expenditures

Countries typically finance the bulk of their health care expenditures with mixed systems:

- Some emphasize taxes
- Others emphasize social insurance
- Others still emphasize private insurance and out-of-pocket payments

In general, there is substantial variation across countries in both the way revenue is raised within each source and the relative importance of each source.
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In general, there is substantial variation across countries in both the way revenue is raised within each source and the relative importance of each source.

We propose that the particular system of health care finance of a given democratic country can be seen as an outcome of political competition therein.
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Recently, there has been a growing interest in providing formal models of political competition in general elections.

The most commonly used theory is the Downs-Hotelling model whose principal result is the so-called median voter theorem:

- It posits unidimensional political competition
- It assumes that candidates do not care about ideology
- The sole motivation for running is to enjoy the power and privileges of holding office.
In this paper

We present a theory of political competition to analyze the problem of health care finance:

- In a multi-dimensional policy space
- With policy-oriented candidates
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Our results provide support for the technology effect:

▶ There exist equilibria in which parties propose to use the most technologically advanced health interventions that exist, even though they are the most expensive
▶ In a dynamic framework, public health expenditures would increase as a consequence of the evolution of technology
The literature on the political economy of publicly provided private goods mostly comprises

- **Public-choice** models examining the interaction between voter demand and the supply of publicly provided private goods (e.g., Epple and Romano, 1996; Gouveia, 1997)

- **Normative models** focussing on the efficiency enhancing role of publicly provided private goods (e.g., Guesnerie and Roberts, 1984; Boadway et al., 1998)
Related Literature

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Blomquist and Christiansen (1999) synthesize the two strands in a political-economy framework which, in general, yields an efficient choice of distributional policy, under plausible information constraints

Ours is a more specific model but, as we shall see later, shares with Blomquist and Christiansen (1999) the relevance of the redistributive element in the political economy of health care.
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- A multi-dimensional model of political competition with endogenous political parties
- Competition over the tax rate and the allocation of the revenues between income redistribution and public education
- Agents differ in their income and in their age
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She finds that

- If the cohort size of the young is not too large then the coalition formed by the rich and the young allows to obtain public education as a political compromise
- Otherwise, income redistribution crowds out public provision of education in the political equilibrium
The model

We assume a society that consists of a continuum of citizens each characterized by her (pre-tax) income level $y$.

Income is distributed in this society according to the probability distribution $F(y)$, whose mean is $\mu$. 

$\mu \in (0, 1)$ is the relative salience of the public good.
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Income is distributed in this society according to the probability distribution $F(y)$, whose mean is $\mu$

All individuals have identical preferences over disposable income, a public good and health status:

$$U(x, G, H) = \log x + \alpha \log G + (1 - \alpha) \log H,$$

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The health status of the individual is:

- $H = H^*$, some constant, if healthy
- $H = \varphi(z)$, a function of its treatment cost, if sick
The model

A healthy individual enjoys the following utility:

\[ U^h = \log \left( \left( 1 - \frac{h + g}{\mu} \right) y \right) + \alpha \log g + (1 - \alpha) \log H^*, \]

where:

- \( h \) is the amount that funds the public medical care budget
- \( g \) is the amount devoted to fund the public good

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A sick individual, however, enjoys the following utility:

\[ U^s = \log \left( \left( 1 - \frac{h + g}{\mu} \right) y - c \right) + \alpha \log g + (1 - \alpha) \log \varphi \left( c + \frac{h}{p} \right), \]

where:
- \( c \) is the private contribution to the treatment of the illness
- \( p \) is the average probability of illness in the society
- \( z = c + \frac{h}{p} \) is the total expenditure on an episode of illness
The model

Medical technology is improving rapidly with time
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Let the state-of-the-art treatment cost at time $\tau$ be $z_\tau$

At time $\tau$, the citizenry can choose any method of medical care used in the past, up to the present state-of-the-art method

Thus, assuming that these costs are rising with time, the expected health outcome for the patient can be any value $\varphi(z)$, for $z \leq z_\tau$
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Instances for the choice of $\varphi$:

- $\varphi(z) = \exp(z)$
- $\varphi(z) = H^* - \delta e^{-\gamma z}$ for given positive parameters $(\delta, \gamma)$.
The model

Assume that the probability of getting sick is given by a function $p(y)$ of individual income
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Then, the (expected) utility function of an agent with income $y$, is

$$U = p(y) \cdot U^s + (1 - p(y)) \cdot U^h$$
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Upon rearranging and eliminating constant terms,

$$U(c, g, h; y) = p(y) \left( \log((\mu - h - g)y - c\mu) + (1 - \alpha) \log \varphi \left( c + \frac{h}{p} \right) \right)$$

$$+ (1 - p(y)) \log (\mu - h - g) + \alpha \log g$$
Assume there are two political parties: **Left** and **Right**
The political process

Assume there are two political parties: Left and Right

- Each party proposes a policy triple \((c, g, h)\) in its manifesto and then citizens vote for one of the parties.

- Citizens vote for the party whose policy leads them to a higher individual utility.

- Party \(L\) (party \(R\)) represents the agents with income levels below (above) a certain income \(\hat{y}\) that we call the pivot income.
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Both parties have preferences on policies.

We assume that the utility function of each party \((V^J, J = L, R)\) coincides with the utility function of its average constituent.
We assume that parties are made of two factions:

- **Opportunists**, who aim at maximizing the probability of victory of the party.
- **Militants**, who aim at maximizing the utility of the party.
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The policy proposed by each party is the outcome of efficient bargaining among the factions of the party.

An equilibrium would be a pair of policies, each of which being a bargaining solution among the factions of a party, when facing the policy proposed by the other.
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Formally,

- \((c^1, g^1, h^1) \succeq_O (c^2, g^2, h^2) \iff \pi(c^1, g^1, h^1) \geq \pi(c^2, g^2, h^2),\)
- \((c^1, g^1, h^1) \succeq_M (c^2, g^2, h^2) \iff V(c^1, g^1, h^1) \geq V(c^2, g^2, h^2)\)
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- \((c^1, g^1, h^1) \succeq_M (c^2, g^2, h^2) \iff V(c^1, g^1, h^1) \geq V(c^2, g^2, h^2)\)

The preferences of the party will be the intersection of the above preference relations, i.e.,

- \((c^1, g^1, h^1) \Pi^J(c^2, g^2, h^2) \iff \begin{cases} (c^1, g^1, h^1) \succeq_{OJ} (c^2, g^2, h^2) \\ (c^1, g^1, h^1) \succeq_{M^J} (c^2, g^2, h^2) \end{cases}\)
The game that models the political process is

\[ G = \{\{L, R\}, A, \{\Pi^L, \Pi^R\}\} \]

- Parties \( L \) and \( R \) are the players
- \( A \) (the set of policies \((c, g, h)\)) is the set of strategies
- The payoff functions \( \Pi^J \) are the representations of the parties’ preferences described above
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A PUNE is a Nash equilibrium of \( G \).
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A **PUNE** is a Nash equilibrium of \(G\).

We presume that the observed policy in a society will be some compromise between the average of the two policies in each PUNE
We consider a hypothetical society whose income distribution follows a lognormal distribution with $\mu = 50$ and $m = 40$.

Assume the probability distribution is given by $p(y) = \frac{200-y}{200}$. 

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Assume the probability distribution is given by $p(y) = \frac{200 - y}{200}$

From the upcoming simulations, we observe that, in each PUNE,

$$z^R = c^R + \frac{h^R}{p} = \zeta = c^L + \frac{h^L}{p} = z^L$$

which says that both parties propose, in equilibrium, policies that are at the technological frontier at each date.
### PUNEs (SCW)

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Graphical representation of the PUNEs

Graphical representation of the pairs \((h^L, h^R)\) from the list of PUNEs
Beyond static equilibrium observations, we are interested in using the model to provide some dynamic predictions and therefore to offer some explanation of what has happened and/or will happen in the finance of health care.
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What happens to (relative) public health expenditures as technology advances?
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We perform a comparative statics analysis in which we model a technology advancement by increasing the cost of the most expensive available technology ($\zeta$) and observe the effects of this change over the endogenous variables of the model.
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As technology advances, (relative) public health expenditures increase.
Comparative statics

We consider a hypothetical society whose income distribution follows a lognormal distribution with $\mu = 50$ and $m = 40$.

Assume the probability distribution is given by $p(y) = \frac{200-y}{200}$. 
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Assume the probability distribution is given by \( p(y) = \frac{200 - y}{200} \)

\[
\begin{align*}
 h &= F(\hat{y})h^L + (1 - F(\hat{y}))h^R \\
 g &= F(\hat{y})g^L + (1 - F(\hat{y}))g^R
\end{align*}
\]

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The paper is an attempt to explain why, in advanced countries, health budgets are growing as a fraction of GNP.
Summary

We have presented a political economy model to study the finance of health care in advanced democracies.

The paper is an attempt to explain why, in advanced countries, health budgets are growing as a fraction of GNP.

Our results provide support for the technology effect:

- There exist equilibria in which parties propose to use the most technologically advanced health interventions that exist, even though they are the most expensive.

- In a dynamic framework, government expenditures on health as percentage of total government expenditures would increase as a consequence of the evolution of technology.