2020年度寡占理論 (9)
The Relationship between Privatization and Corporate Taxation Policies

今日の講義の構成

(a) 混合寡占

(b) 部分民営化・最適民営化政策

(c) 法人税と公企業の行動

(d) Today's paper

論文情報

Title

The Relationship between Privatization and Corporate Taxation Policies

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Discussion Paper (MPRA Paper No. 89784)

Plan of the Presentation

(1) Mixed Oligopolies

(2) Optimal Degree of Privatization in Mixed Oligopolies.

(3) The Effects of Tax Policies in Mixed Oligopoly.

(4) Motivation

(5) The Model

(6) Results and Implications

Mixed Oligopolies

State-owned public firms compete against private firms

Examples of public enterprises in mixed oligopolies (Japan)

Banking: Postal Bank, DBJ, Iwate Bank

Housing Loan: the Public House Loan Corporation

Private Funds: DBJ, Industrial Revitalization Corporation of Japan

Life Insurance: Postal Life Insurance (Kampo)

Overnight Delivery: Japan Post

Energy: Public Gas Corps (Narashino, Fukui,...) TEPCO

Broadcasting: NHK

Examples of public enterprises in mixed oligopolies (other countries)

Banking: Postal Banks, Korea Development Bank, Korea Investment Corporation, Industrial and Commercial Bank of China

Automobiles: Renault, VW

Defense, Aviation: EADS, Airbus

Airline: National airlines (Swiss, Belgian, France,...)

Overnight Delivery: USSP, Deutsche Post DHL, Korea Post, Royal Mail

Energy: Electricite de France, Areva, Petro China Company, KOGAS

Broadcasting: BBC, Korea TV, France 24, Australian Broadcasting Corporation

Differences between public and private firms

(1)Public firms are less efficient than private firms.

→Many empirical works do not support this view (and many other papers do support this view).

(2) Difference of objective function

→Private firms maximize their own profits, whereas public firms might care about social welfare.

Partial Privatization

De Fraja and Delbono: The public sector holds whole shares in the firm (nationalization) or the private sector holds whole shares in the firm (privatization)

In the real world, we observe many firms with mixture ownership (partial privatization)

NTT, JT, Iwate Bank, TEPCO, KEPCO, HEPC, VW, Renault, Areva, Petro China Company, Industrial and Commercial Bank of China

Matsumura (1998)

(1) Cournot-type (quantity-setting competition, simultaneous-move, no product differentiation)
(2) No restrictions on the cost differences between public and private firms.
(3) The objective function of the public firm is the weight sum of social welfare and its own profits.
（Partial Privatization)

$U_0 = (1-\alpha) W + \alpha\pi_0$

(4) General demand and general costs.
The government chooses α. After observing α, firms compete in the product market.

Results

$\alpha = 0$ is optimal only if it yields public monopoly.
→If we allow partial privatization, no privatization (full nationalization) never becomes optimal.

Using Matsumura's partial privatization approach, we can analyze the optimal degree of privatization (the relationship between the optimal degree of privatization and exogenous variables).

Binary Choice Approach by De Fraja and Delbono (1989) vs. Continuous Choice Approach by Matsumura (1998)

Let W(α) be welfare.
Binary Choice Approach→Analyzing W(1) - W(0).
Continuous Approach→Analyzing W'(α)
(1) In many cases, the latter is easier to analyze.
(2) Binary approach cannot capture the nonmonotone relationship (Fujiwara, 2008; Haraguchi et al, 2018; Sato and Matsumura, 2017, Liu et al, 2018, Cato and Matsumura, 2019).

Optimal Degree of Privatization

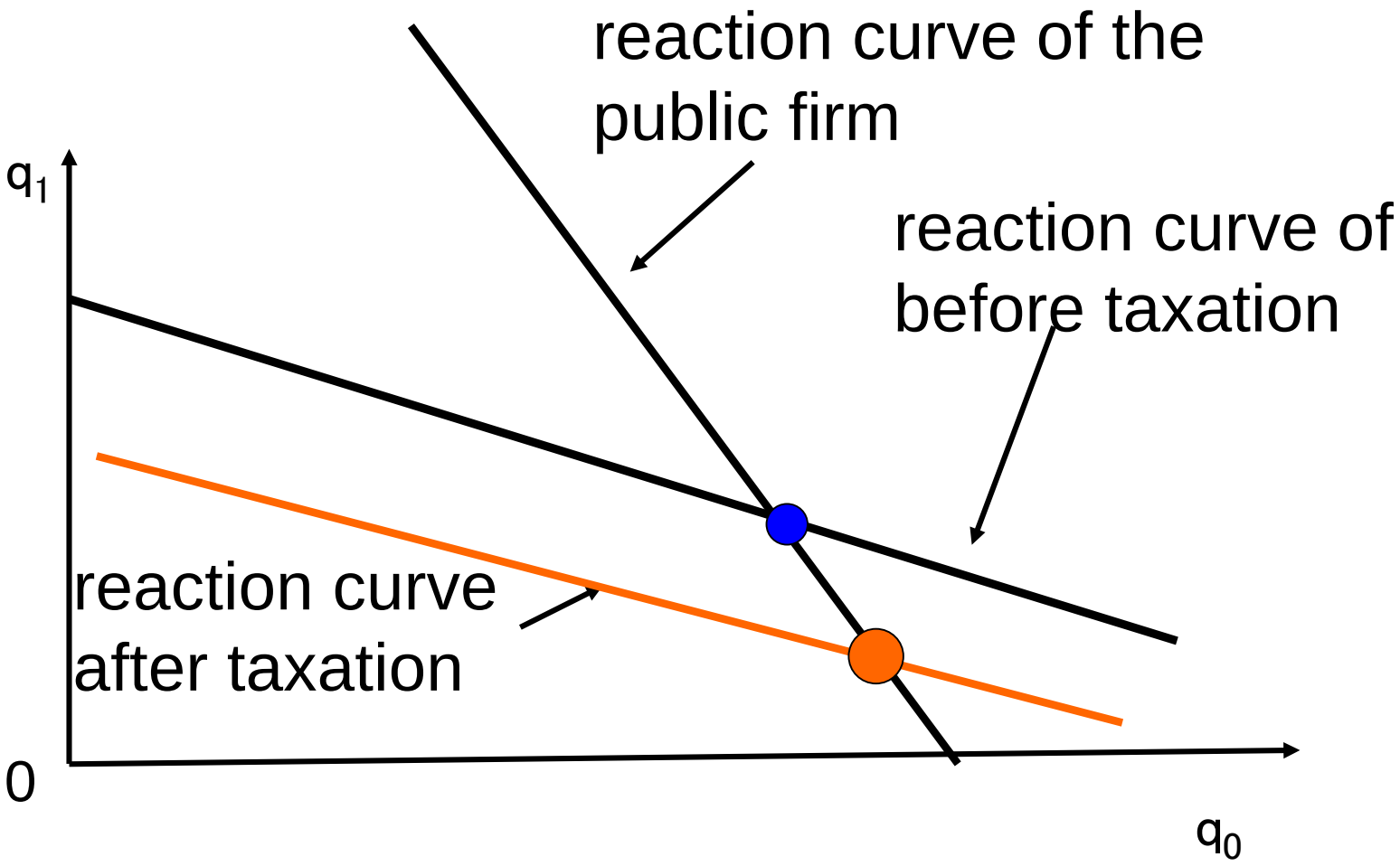
Optimal degree of privatization depends on
(i) competition structure such as the number of private firms (Lin and Matsumura, 2012), degree of competition (Matsumura and Okamura, 2015), product differentiation (Fujiwara, 2007), free entry or not (Matsumura and Kanda, 2005), competitive pressure from neighboring markets (Haraguchi et al, 2018)
(ii) timing of privatization (Xu et al, 2017; Lee et al, 2018)
(iii) existence of other policy instruments such as tax policy (Cato and Matsumura, 2013, 2015)
(iv) foreign penetration (Lin and Matsumura, 2012), Vertical Structure (Chang and Ryu, 2015) and so on.

The Effect of Tax-Subsidy Policy in Mixed Oligopolies

The Effect of Production Tax

Suppose that unit production tax is introduced.
Private firms reduces their output, whereas
the public firm does not change its output given the rivals' output.
→Through the strategic interaction, production substitution from the private sector to the public sector takes place.

Production substitution



Privatization Neutrality Theorem

Privatization Neutrality Theorem: Privatization does not matter under optimal subsidy policy.

It implies that if the optimal subsidy policy is adopted, discussing mixed oligopoly or privatization policy does not make sense.

Most of the results in mixed oligopoly literature have quite limited implications and importance if this theorem is really robust.

Distractive Result, Disaster for researchers in this field.

Intuition behind PNT

Suppose that all firms are symmetric. Consider the private oligopoly.

The first best is achieved when $P=c_i'$ (price =marginal cost) ~ all firms choose the same output level

It is achieved by the production subsidy s*.

Intuition behind PNT

Suppose that one firm is nationalized. Suppose that

all of remaining firms do not change their output.

The nationalized firm, which is welfare-maximizer, never changes its output .

All remaining private firms obviously have no incentive to change their outputs.

$\rightarrow$s* yields the first best outcome in the mixed oligopoly.

Condition for PNT

When I explain the intuition behind PNT, I do not use any of

(1) Private firms are profit maximizers

(2) Homogeneous product market,

(3) Single public firm

and so on.

All we use is the condition that the first best is achieved at the symmetric equilibrium, the first best is achieved by the simple unit subsidy, and the pubic firm is welfare maximizer.

White (1996)

Introducing subsidy policy into the Cournot-type model of De Fraja and Delbono (1989).
The government chooses unit subsidy s so as to maximize resulting welfare

Results: Privatization affects neither optimal subsidy rate nor resulting welfare
→Privatization does not matter under optimal subsidy policy (Irrelevance Results)

Subsequent works

Poyago-Theotoky (2001): public firms' leadership;
Myles (2002):general demand and cost functions;
Tomaru (2006): partial privatization approach;
Hashimzade et al. (2007): product differentiation;
Kato and Tomaru (2007): various payoff functions of private firms.

Irrelevance result (especially irrelevance result on welfare) is quite robust.

General formulation and general result → Matsumura and Okumura (2013)

Exception

Fjell and Heywood (2004): Privatization is relevant under asymmetric order of moves among private firms.

Non-Robustness of PNT

(1) PNT obviously does not hold when there is cost difference between public and private firms. ~Lin and Matsumura (2018, Journal of Public Economic Theory)

(2) PNT does not hold unless all firms are domestic.~ Matsumura and Tomaru (2012, Japanese Economic Review), Lin and Matsumura (2018)

(3) PNT does not hold at free entry markets

~Cato and Matsumura (2013, FinanzArchiv)

→The relationship between the optimal tax and the degree of privatization is non-monotone (invertd U-shape)

Non-Robustness of PNT

(4) If there is an excess burden of taxation, PNT does not hold. ~Matsumura and Tomaru (2013, Canadian Journal of Economics)

(5) PNT does not hold if firms control two or more independent variables

The Effect of Entry-License Tax

(1) Entry-License Tax reduces the number of entering firm in both mixed and private oligopolies.
(2) Entry-License Tax is lower in mixed oligopolies than in private oligopolies.
(3) PNT doe not hold.

Cato and Matsumura (2013) .

The Effect of Import Tariff

(1) Optimal degree of privatization is increasing in the import tariff rate.
(2) Optimal import tariff is positive in non-free entry markets, whereas it can be zero nor even strictly negative in free entry markets.

Cato and Matsumura (2015, Economic Record) .

The Relationship between Privatization and Corporate Taxation Policies

joint work with
Yi Liu and Chenhang Zeng

The Effect of Profit Tax

In private oligopolies, given the rivals' output, the optimal output of each firm does not depend on the tax rate as long as it stays the market.
In mixed oligopolies, given the rivals' output, the optimal output of the pure public firm does not depend on the tax rate if the private firms are domestic.

Profit tax rate does not affect the behavior after the entry.
It is not true when the private firms are not domestic.
It is not true under partial privatization.

The Model

Cournot competition in a homogeneous product market
Firm 0 ~ Public firm
Firms 1 ~ Private Firm.
The foreign ownership share in private firms is $\beta \in [0,1]$.
The government's objective is domestic welfare.
Firm 1's objective is its own (after tax) profit.
Firm 0's is convex combination of welfare and its own (after tax) profit.
Constant marginal costs with disadvantage of firm 0.

Notations

π_i : before tax profit of firm i

α : the degree of privatization.

P(Q) : the demand function.

τ : Profit tax rate

c_i : marginal cost of firm i

W : domestic welfare

F : Minimal profit of the private firm

Welfare and Payoffs

$$W = CS + (1-\tau)\pi_0 + (1-\beta)(1-\tau)\pi_1 + \tau(\pi_0 + \pi_1).$$
$$= CS + \pi_0 + (1-\beta)\pi_1 + \beta\tau\pi_1.$$

$$U_0 = (1-\alpha)W + \alpha(1-\tau)\pi_0$$

$$U_1 = (1-\tau)\pi_1$$

The Time Line

Model 1
In the first stage, the government chooses α.
In the second stage, firms face Cournot competition.

Competition Stage: The Effect of Profit Tax Rate

Lemma 1

(i) If $\alpha<1$, then q_0^S and Q^S are increasing (decreasing) in τ, and q_1^S is decreasing (increasing) in τ as long as $\pi_0>0$ ($\pi_0<0$).

(ii) If $\alpha=1$, then q_0^S, Q^S a, and q_1^S are independent of τ.

Competition Stage : The Effect of Foreign Ownership Share

Lemma 2
(i) If $\alpha<1$, then q_0^S and Q^S are increasing in β, and q_1^S is decreasing in β.
(ii) If $\alpha=1$, then q_0^S, Q^S a, and q_1^S are independent of β.

Standard result in the literature (Lin and Matsumura, 2012, JoE).

Intuition behind Lemma 2

An increase in firm 0's output reduces firm 1's profit and thus reduces the foreign outflow.
Therefore, firm 0 has a stronger incentive to reduce its output when the foreign ownership share in firm 1 unless firm 0 is fully privatized.

Competition Stage: The Effect of Profit Tax Rate

Lemma 1 (increasing marginal cost version)
(i) If $\alpha<1$, then q_0^S and Q^S are increasing (decreasing) in τ, and q_1^S is decreasing (increasing) in τ as long as $p>c_0'$ ($p<c_0'$).
(ii) If $\alpha=1$, then q_0^S, Q^S a, and q_1^S are independent of τ.

Intuition behind Lemma 1

(1) $\tau \to 1$, domestic welfare $\to$global welfare
(2) $\tau \to 1$, firm 1's objective $\to$welfare maximizer

Given the rival's output, welfare maximizer adopts marginal cost pricing (i. e., the pure public firm chooses x_0 to equalize the price to its marginal cost).

As $\tau \uparrow$, marginal cost firm 0 $\to$ the price.
Thus, q_0^S is increasing (decreasing) in if $p>c_0'$ ($p<c_0'$).

First Stage: The Effect of Profit Tax Rate to the Optimal Degree of Privatization

Proposition 1
The optimal degree of privatization α^E increases with the corporate tax rate τ as long as $\alpha^E<1$.

Intuition behind Proposition 1

An increase in α increases q_1
→Welfare-improving production substitution from firm 0 to firm 1 takes place if $p - c_0'$ is small.

α that induces appropriate price-cost margin in firm 0 is optimal (Matsumura, 1998).

An increase in τ reduces price-cost margin in firm 0.
To offset this effect, the government increases α when
τ becomes larger.

First Stage: The Effect of Foreign Ownership Share in the Private Firm to the Optimal Degree of Privatization

Proposition 2
The optimal degree of privatization α^E decreases with the foreign ownership share β as long as long as $\alpha^E<1$.

Standard Results in the literature (Lin and Matsumura, 2012, JoE)

Model 2

Timeline
In the first stage, the government chooses α.
In the second stage, firm 1 choose whether or not to enter the market.
In the their stage, firms face Cournot competition.

⇒Firm 1 enters the market if and only if expected after tax profit is larger than or equal to the minimal after tax profit F.

First Stage: The Effect of Profit Tax Rate and Foreign Ownership Share to the Optimal Degree of Privatization

Proposition 3
Under the minimum after-tax profit constraint, the optimal degree of privatization (α^C), (i) increases with the corporate tax rate (τ) if (but not only if)$\pi_0 \geqq 0$; (ii) increases with the foreign ownership share in private firm as long as the constraint is binding.

First Stage: The Effect of Profit Tax Rate and Foreign Ownership Share to the Optimal Degree of Privatization

Propositions 1 and 3(i) implies that
the optimal degree of privatization increases with the corporate tax rate (τ) as long as if $\pi_0 \geqq 0$;
Propositions 2 and 3(ii) suggests that the relationship between the optimal degree of privatization and the foreign ownership share in private firm is non-monotone (U-shape).

Model 3

Timeline
In the first stage, the government chooses αand τ.
In the second stage, firm 1 choose whether or not to enter the market.
In the their stage, firms face Cournot competition.

⇒The minimal after tax profit is always binding.

Result

Proposition 4
(i)The optimal degree of privatization is increasing in β.
(ii)The optimal corporate tax rate is decreasing in β if (but not only if) $\pi_0 \geqq 0$.

Summary

(1) The optimal degree of privatization increases with the profit tax rate.
(2) The relationship between optimal degree of privatization and foreign ownership share in private firms may nonmonotone.

Thank you very much for your kind attention!!

非常感謝!!