ORIGINAL ARTICLE

JOURNAL OF PUBLIC ECONOMIC THEORY WILEY

On the Neutrality of Profit Taxation in a Mixed Oligopoly

Horn-In Kuo[1] | Cheng-Hau Peng[2] | K. L. Glen Ueng[3]

[1]Department of International Business, Ming Chuan University, Taipei, Taiwan

[2]Department of Economics, Fu Jen Catholic University, New Taipei City, Taiwan

[3]Department of Public Finance, National Chengchi University, Taipei, Taiwan

Correspondence
Department of Economics, Fu Jen Catholic University, 510 Chung Cheng Road, Hsinchuang District, New Taipei City 24205, Taiwan.
Email: chpon@mail.fju.edu.tw

Abstract

This paper investigates the neutrality of profit taxation in a mixed oligopoly where one (partially) public firm competes with private firms. We find that the neutrality of a profit tax is robust under a general cost and a general demand function as long as the degree of privatization is endogenously determined. This result is also true when product heterogeneity is considered under both Cournot and Bertrand competition. By contrast, if the degree of privatization is exogenously given, the profit tax neutrality holds only in the cases where the public firm is fully privatized or fully state-owned; otherwise, the neutrality breaks down.

KEYWORDS
Mixed oligopoly, Privatization, Profit tax neutrality

JEL CLASSIFICATION
H21, L11, L22, L23

1 | INTRODUCTION

According to the conventional wisdom, a tax on a profit-maximizing firm's profit has no effect on its optimal output level. For example, in their seminal work, Atkinson and Stiglitz (1980) show that a profit tax does not affect the outputs of the firms. Musgrave and Musgrave (1980) also find that a general tax on profits would not be effective in correcting monopolistic behavior. The intuition for this result is clear and straightforward: the tax on a firm's profit proportionally reduces the decision-maker's objective function (i.e., gross profit), but it has no marginal effect on the firm's production decision.

Along this line of research, Wang and Conant (1988) and Yaniv (1996) further find that the neutrality of profit taxation holds if the decision to evade tax is endogenous.[1] By contrast, Lee (1998), Ueng and Wu (2009), Goerke and Runkel (2006), and Wu (2016) show that the neutrality will not hold under tax evasion. In addition, studies also suggest that the neutrality of profit taxation will not hold under international oligopoly (Parai, 1999) or in a dynamic oligopoly model (Baldini & Lambertini, 2011).

The common feature of the above literature is that the objective of the firms in the market is to maximize their own profits. A stylized fact is that many industries consist of both private and public firms, for example, the energy, transportation, telecommunications, and banking industries in China, Japan, Korea, Singapore, and Taiwan, etc.

To the best of our knowledge, existing studies on profit tax neutralization all assume that the firms belong to the private sector, which is able to explain only part of the reality. In other words, whether profit taxation is neutral or not in a mixed oligopoly is unclear. To bridge this gap, this paper aims to investigate whether a profit tax is neutral in a mixed oligopolistic market structure. The paper that is most relevant to ours is Wu and Yang (2011). They consider the corporate tax evasion of firms and find that the neutrality of a profit tax does not hold when the firms' objective is not profit maximization. From a different angle, we will show that the neutrality is sustained in the mixed oligopoly as long as the government is able to determine the optimal privatization level.

This paper is also relevant to Matsumura and Tomaru (2013, 2015) which discuss the excess burden of taxation in a mixed oligopoly. They show that a tax policy alters firms' objective functions and thereby deteriorates social welfare owing to output distortion. This paper complements their research. We show that a profit taxation policy is neutral under a mixed economy if the government is able to determine the optimal privatization level of the public firm. In this circumstance, the imposition of a profit tax can be identical to a lump-sum tax which allows revenue to be raised, and redistribution to be achieved with no efficiency cost. More importantly, this neutrality result is robust, not only under a general cost structure and a general demand function, but also with product heterogeneity under Cournot and Bertrand competition. By contrast, if the privatization level is given, the profit tax neutrality holds only in the cases where the public firm is fully privatized or completely state-owned. That is, it does not hold under partial privatization. More recently, the studies on mixed oligopoly focus on how the optimal privatization level is affected by technology licensing (Wang et al., 2020), or the number of suppliers (Escrihuela-Villar et al., 2020). In addition, Klumpp and Su (2019) investigate how competition modes affect the pricing and quality strategies of the firms in a mixed oligopoly.

The remainder of this paper is organized as follows. Section 2 introduces the basic model. Section 3 investigates the neutrality of the profit tax under the optimal privatization policy. Section 4 examines the neutrality under a mixed duopoly model with differentiated products. Section 5 concludes the paper.

2 | THE BASIC MODEL

We consider a mixed oligopoly model in which a partially public firm (hereafter, the public firm), jointly owned by both the public and private sectors, produces an identical product and competes with n profit-maximizing private firms, i.e., firm i, where $i = 1,...n$. We assume that x_0

---

[1]This result is robust not only in a monopolistic market, but also in an oligopolistic market.

is the output of the public firm and x_i is the output of firm i. The production cost function is $c_i(x_i)$, with the properties $c_i'(x_i) > 0$ and $c_i''(x_i) > 0$. The total output of the firms is defined as $X = \sum_{i=0}^{n} x_i$. The inverse demand, $p(X)$ with $p' < 0$, is assumed to be strictly log-concave (i.e., $pp'' - p'^2 < 0$).[2]

Under these specific assumptions, the Cournot equilibrium is unique and thus globally stable. In addition, the private firms and the public firm each have to pay a profit tax to the domestic government. Given the above settings, the net profits of firm i can be specified as follows:

$$\pi_i \equiv (1 - t)\Pi_i, \quad \text{for} \quad i = 0...n, \tag{1}$$

where t is the profit tax rate, with $0 < t < 1$, and $\Pi_i = p(X)x_i - c_i(x_i)$ is the gross profit of firm i. As the main purpose of our paper is to explore the neutrality of the profit tax, we take t as given, and then discuss the impact of the change in the tax rate on the market equilibrium and social welfare.[3]

The welfare function, W, consists of the consumer's surplus, CS, producer's surplus, $\sum_{i=0}^{n} \pi_i$, and the profit tax revenue, $t\sum_{i=0}^{n} \Pi_i$. Thus, the welfare function can be specified as follows:

$$W = CS + \sum_{i=0}^{n} \pi_i + t\sum_{i=0}^{n} \Pi_i = \int_0^X p(q)dq - \sum_{i=0}^{n} c_i(x_i). \tag{2}$$

Following Matsumura (1998) and Matsumura and Kanda (2005), the objective function of the public firm can be written as follows:

$$\Omega = (1 - \theta)W + \theta\pi_0 = (1 - \theta)W + \theta(1 - t)\Pi_0. \tag{3}$$

where θ denotes the privatization level of the public firm. It is worth noting that (3) can be explained by stating that an increase in the profit tax rate reduces the weight put on the "gross profit" of the public firm, i.e., Π_0. Specifically, the weighting of the public firm on Π_0 declines from θ to $\theta(1 - t)$ when the profit tax is enforced.

3 | PROFIT TAX NEUTRALITY UNDER THE OPTIMAL PRIVATIZATION

We are now in a position to investigate whether the neutrality of the profit tax holds when the privatization level is endogenously determined. The game in question encompasses two stages. In the first stage of the game, given the profit tax rate, the government determines the optimal privatization level, θ, to maximize social welfare. In the second stage of the game, by taking the profit tax rate and the optimal privatization level as given, the public firm and the private firms decide their optimal outputs. The sub-game perfect Nash equilibrium (SPNE) is derived via backward induction. That is, we shall first solve the second stage of the game followed by the first stage.

By differentiating (1) with respect to x_i and (3) with respect to x_0, we can derive the first-order conditions of the private firms and the public firm, respectively, as follows:

---

[2]According to Amir (1996), the Cournot equilibrium is unique and thus globally stable under the strictly log-concave demand and the convex cost assumptions. The second-order conditions and the stability conditions are, thus, satisfied throughout this paper.

[3]In Section 3 we will prove that the profit tax is neutral to the social welfare, and so this assumption is not going to affect our main results qualitatively.

$$(1 - t)(p'x_i + p - c_i') = 0, i = 1, ..., n,$$ (4)

$$(1 - \theta)(p - c_0') + \theta(1 - t)(p'x_0 + p - c_0') = 0.$$ (5)

To facilitate our analysis, we have rewritten (5) as follows:

$$\varphi p'x_0 + p - c_0' = 0.$$ (6)

where $\varphi \equiv \frac{\theta(1 - t)}{1 - \theta t}$ is defined as the effective degree of privatization with the following properties:

Lemma 1. $\frac{\partial \varphi}{\partial \theta} = \frac{1 - t}{(1 - \theta t)^2} > 0$, and $\frac{\partial \varphi}{\partial t} = -\frac{\theta(1 - \theta)}{(1 - \theta t)^2} < 0$.

By solving (4) and (6) simultaneously, we obtain the equilibrium outputs of individual firms and the market output, denoted by $x_i(\varphi)$, $i = 0,1, ..., n$ and $X(\varphi)$, respectively. The reaction curve of each private firm is negatively sloped as they are producing an identical product. From (4), we can find that, other things being equal, the reaction functions of the private firms are not affected by t and θ. By contrast, by (6), the reaction function of the public firm will be shifted outward (inward) by an increase in $t (\theta)$ as the weighting on the profit of the public firm decreases (increases).[4] Since φ is a function of θ and t, this implies that both t and θ can affect the equilibrium outputs only via changing φ. In other words, $x_i(\varphi)$, $i = 0,1, ..., n$ and $X(\varphi)$ will not change unless φ is varying. Thus, controlling for θ is equivalent to controlling for φ, both of which have the same effect on social welfare. In what follows, we will show how the government chooses the optimal privatization level, θ, and investigate whether the neutrality of the profit tax holds in our model.

In the first stage of the game, the government determines the optimal privatization policy to maximize its welfare. By substituting the equilibrium outputs derived in the second stage of the game, $x_i(\varphi)$ and $X(\varphi)$, into (2), we have:

$$W(\varphi) = \int_0^{X(\varphi)} p(q)dq - \sum_{i=0}^n c_i(x_i(\varphi)),$$ (7)

By routine calculations, we can derive the first-order condition for the welfare maximization of the government as follows:

$$\frac{\partial W}{\partial \theta} = \left(p \frac{\partial X}{\partial \varphi} - \sum_{i=0}^n c_i' \frac{\partial x_i}{\partial \varphi} \right) \frac{\partial \varphi}{\partial \theta} = 0,$$ (8)

The second-order condition is assumed to be satisfied and requires that $\frac{\partial^2 W}{\partial \theta^2} < 0$. Furthermore, because $\frac{\partial \varphi}{\partial \theta} > 0$ from (8), the optimal privatization policy is determined by the following equation:

$$p(X(\varphi)) \frac{\partial X(\varphi)}{\partial \varphi} - \sum_{i=0}^n c_i'(x_i(\varphi)) \frac{\partial x_i(\varphi)}{\partial \varphi} = 0.$$ (9)

It is worth noting that (9) is not directly affected by t. In other words, under the optimal privatization policy, the effective degree of privatization, denoted by φ^*, will be irrespective of t. In fact, φ^* will be the same as the optimal degree of privatization achieved by the traditional literature which ignores profit taxes.

---

[4]It is because that $\frac{\partial \varphi}{\partial \theta} > 0, \frac{\partial \varphi}{\partial \theta} > 0$

Lemma 2. Under the optimal privatization policies, the profit tax rate t will be irrelevant to the effective degree of privatization.

This result suggests that an increase in the profit tax rate has no impact on the effective privatization level under the optimal privatization policies. By Lemma 2, we can obtain a further result, i.e., the profit tax rate t will also be irrelevant to the equilibrium individual outputs, $x_i(\varphi*)$, total outputs $X(\varphi*)$, and the social welfare level, $W(\varphi*)$. Thus, we can construct the following proposition:

Proposition 1. Under the optimal privatization policy, the profit tax is neutral to the outputs of the firms and the level of social welfare.

The economic explanation for Proposition 2 is as follows. By Lemma 1, an increase in t reduces φ, causing the welfare level to deviate from the optimal one. The government can completely remedy the distortion by increasing the privatization level until the effective privatization level is equal to $\varphi*$, and both the market equilibrium and social welfare are restored to the optimal level.

It is also worthwhile noting that Proposition 2 is robust under a general demand function and different cost structures of the private firms. This is because (6) is independent of the private firms' cost functions and the inverse demand function. Specifically, the neutrality of the profit tax will still hold even if the cost is asymmetric between the private firms. The cost structure of the private firms will only affect the firms' output distribution and the resulting optimal welfare level, but will have no effect on the nature of the neutrality of the profit tax.[5]

Note that from Lemma 2, under the optimal privatization policies, the profit tax rate t is irrelevant to the effective degree of privatization. That is to say, by totally differentiating $\varphi*$ with respective to t, we can derive that:

$$\frac{d\varphi*}{dt} = \frac{\partial\varphi*}{\partial\theta}\frac{\partial\theta*}{\partial t} + \frac{\partial\varphi*}{\partial t} = 0. \tag{10}$$

From (10), by using the implicit function theorem, we can further derive that:

$$\frac{\partial\theta*}{\partial t} = -\frac{\frac{\partial\varphi*}{\partial t}}{\frac{\partial\varphi*}{\partial\theta}} = \frac{(1-\varphi*)\varphi*}{(1-t+t\varphi*)^2} > 0. \tag{11}$$

The above result suggests that the optimal privatization level increases with the profit tax rate. The economic explanation is as follows. The outputs of the individual firms and the equilibrium output of the market change as the effective degree of privatization changes. Other things being equal, an increase in the profit tax will lower the effective privatization level, which causes the degree of privatization to deviate from the social optimum. In order to correct this distortion in relation to the effective privatization level, according to Lemma 1, the degree of privatization should rise. Thus, we can construct the following proposition:

Proposition 2. The optimal privatization level is increasing in the profit tax rate.

---

[5]This is in sharp contrast to Lin and Matsumura (2018) who show that the neutralization of privatization will break down if the public and private firms have different cost structures.

4 | DIFFERENTIATED PRODUCTS[6]

In this section, we consider the case under product differentiation. In order to focus on the analysis of profit tax neutrality and to have a clear comparative basis, we borrow the model from Dixit (1979) and Singh and Vives (1984) to examine the neutrality of the profit tax on the firms' output decisions and social welfare in a mixed duopoly.

We first investigate the neutrality of profit taxation under the optimal privatization policy in a mixed duopoly with heterogeneous products, where the two firms compete in Cournot fashion, the two goods can be substitutes or complements to each other, depending on their substitutability. Then, using the duality between quantity competition and price competition in a heterogeneous mixed oligopolistic market (see Claude & Hindriks, 2006), we further analyze the neutrality of the profit tax under Bertrand competition.

We consider a differentiated products duopoly with constant marginal cost normalized to zero $c = 0$. Following Dixit (1979) and Singh and Vives (1984), the representative consumer's utility function is specified as follows:

$$u(x_0, x_1) = \alpha(x_0 + x_1) - \frac{\beta}{2}(x_0^2 + x_1^2) - \delta x_0 x_1. \tag{12}$$

By routine calculations, we derive the following inverse demand functions:

$$p_i = \alpha - \beta x_i - \delta x_j, i = 0, 1 \quad and \quad i \neq j, \tag{13}$$

where $\alpha, \beta > 0$ and $\beta > \delta$, implying that the own-price effect dominates the cross-price effect and the utility function is strictly concave. Let $\gamma = \frac{\delta}{\beta} \in [-1,1]$ denote the degree of product differentiation. The two products are independent (substitutes, complements) if $\gamma = (>,<)0$.

Under Cournot competition, the two firms determine their optimal outputs, whereas in a Bertrand game, they choose optimal prices. In both cases, the timing of the game is as follows: In the first stage, the social planner decides the degree of privatization θ to maximize the social welfare. In the second stage, the two firms make their output/price decisions. We look for the sub-game perfect Nash equilibrium (SPNE) of the proposed game via backward induction.

The private firm's profit under Cournot competition is given by

$$\pi_i(x_i, x_j) = (1 - t)(\alpha - \beta x_i - \delta x_j)x_i, \forall i, j \in \{0, 1\} \tag{15}$$

The social welfare can be written in the following form:

$$W(x_0, x_1) = \alpha(x_0 + x_1) - \frac{\beta}{2}(x_0^2 + x_1^2) - \delta x_0 x_1. \tag{16}$$

Therefore, objective function of the partially privatized firm under Cournot competition can be expressed as follows:

$$\Omega(x_0, x_1) = (1 - \theta)W(x_0, x_1) + \theta\pi_0(x_0, x_1). \tag{17}$$

We now proceed to solve for the Cournot game. In the second stage, the private firm takes x_0 as given and chooses x_1 so as to maximize $\pi_1(x_0, x_1)$ whereas the public firm takes x_1 as given

---

and chooses x_0 so as to maximize $\Omega(x_0, x_1)$. By routine calculations, we yield the reaction functions for the two firms as follows:

$$x_0 = r_0(x_1) = \frac{\alpha - \delta x_1}{(2 - \varphi)\beta}, \tag{18}$$

$$x_1 = r_1(x_0) = \frac{\alpha - \delta x_0}{2\beta}. \tag{19}$$

Similarly, the reaction function of the public firm will be shifted outward (inward) by an increase in $t(\varphi)$ and both t and θ can affect the equilibrium outputs only via changing φ. In other words, an increase in profit tax will lead to a steeper reaction function for the public firm $\left(\frac{\delta}{(2 - \varphi)\beta} \text{ increase}\right)$, but will not change the reaction function for the private firm.

By solving (18) and (19), we can obtain the equilibrium quantities as follows:

$$x_0(\varphi) = \frac{\alpha(2\beta - \delta)}{\Delta}, x_1(\varphi) = \frac{\alpha((2 - \varphi)\beta - \delta)}{\Delta}, \tag{20}$$

where $\Delta = 2(2 - \varphi)\beta^2 - \delta^2 > 0$. The equilibrium quantity difference is:

$$x_0(\varphi) - x_1(\varphi) = \frac{\alpha\beta\varphi}{\Delta} > 0, \tag{21}$$

We are now in a position of the first-stage game, solving for the optimal degree of privatization. By substituting (20) into (16), and then differentiating (16) with respect to θ, we the optimal degree of privatization is derived as follows:

$$\theta^*(t) = 1 - \frac{(1 - t)\delta(\beta - \delta)}{\beta(4\beta - 3\gamma) - t\delta(\beta - \delta)}. \tag{22}$$

From (22), we find that partial privatization is optimal (i.e., $\theta^*(t) < 1$) only if goods are substitutes $\delta > 0$. Otherwise, no privatization is optimal for the social planner. Moreover, by substituting θ^* into $\varphi(\theta)$, we can derive that $\varphi^* = 1 - \frac{\delta(\beta - \delta)}{\beta(4\beta - 3\gamma) - \delta(\beta - \delta)}$. This result is parallel to Lemma 2, i.e. under the optimal privatization policies, the profit tax rate t is irrelevant to the effective degree of privatization. By substituting $\grave{}$ into (20) and making use of (16), we have

$$x_0 \equiv x_0(\varphi^*) = \frac{\alpha(4\beta - 3\gamma)(2\beta - \delta)}{(2\beta^2 - \delta^2)(4\beta - 3\gamma) + 2\delta\beta(\beta - \delta)}, \tag{23}$$

$$x_1 \equiv x_1(\varphi^*) = \frac{\alpha(\beta - \delta)(4\beta - 3\gamma + \delta)}{(2\beta^2 - \delta^2)(4\beta - 3\gamma) + 2\delta\beta(\beta - \delta)}, \tag{24}$$

$$W^* = \frac{\begin{array}{c}\alpha^2(112\beta^5 + 18\gamma^2\delta^3 - 8\beta^4(21\gamma + 5\delta) + \beta^3(63\gamma^2 + 102\gamma\delta - 125\delta^2) \\ + 3\beta\delta^2(-6\gamma^2 - 26\gamma\delta + \delta^2) + 6\beta^2\delta(-9\gamma^2 + 20\gamma\delta + 11\delta^2))\end{array}}{2(8\beta^3 - 6\beta\delta^2 + 3\gamma\delta^2 + \beta^2(-6\gamma + 2\delta))^2}. \tag{25}$$

All of the above Equations (23)-(25) is unrelated to the profit tax rate t. These results suggest that the profit tax neutrality is sustainable under product differentiation. The intuition and economic explanations in Proposition 2 applies here.

In sum, we establish the following proposition:

Proposition 3. In a differentiated mixed oligopolistic market with quantity competition, the neutrality of profit taxation holds if the optimal privatization level is endogenously determined.

We now move to discuss the Bertrand case. We will take advantage of the formal duality that relates Cournot's and Bertrand's models of duopoly. The duality is first proposed by Singh and Vives (1984) in a differentiated products market. They observe that Cournot (Bertrand) competition with substitutes ($\delta > 0$) was shown to be the dual of Bertrand (Cournot) competition with complements ($\delta < 0$). This observation was subsequently extended to differentiated products mixed oligopolistic markets by Claude and Hindriks (2006). By the duality, it is trivial to show that the neutrality of profit taxation is robust to the competition modes. Thus, we can construct the proposition as follows:

Proposition 4. In a differentiated mixed oligopolistic market with price competition, the neutrality of profit taxation holds if the optimal privatization level is endogenously determined.

The above findings are in sharp contrast to the results in Matsumura and Tomaru (2013, 2015) and deserves some policy implications. In the mixed oligopoly literature, it is generally believed that a tax policy changes firms' objective functions and thereby deteriorates social welfare owing to output distortion. In this paper, we show that profit taxation is neutral under the mixed economy. If the government is able to determine the optimal privatization level of the public firm, the imposition of a profit tax can be identical to a lump-sum tax which allows revenue to be raised, and redistribution to be achieved with no efficiency cost. Furthermore, our result is robust under a general demand and a general cost function, and with product differentiation under both Cournot and Bertrand competition.

5 | CONCLUDING REMARKS

We construct a mixed oligopoly model with a general demand function and cost function to reconsider the neutrality of a profit tax. We find that the key point is the extent to which the privatization is exogenous or endogenous. When the extent of the privatization is exogenous, as Wu and Yang (2011) show, the neutrality of the profit tax will not hold. However, when the extent of the privatization is endogenously determined, the neutrality of the profit tax will hold, regardless of the cost structure (symmetric or not), the demand function, product heterogeneity, and the competition modes.

In this paper, we take the profit tax rate as given. If the tax rate is endogenously determined but the privatization level (δ) is exogenously given, when $\delta = 1$, the model will degenerate into a purely oligopolistic market, so that the levying of a profit tax will be neutral to the output decision and the social welfare. When $\delta = 0$, the public sector's objective is to maximize social welfare. From (5), we can see that the public sector's pricing strategy is marginal cost pricing. The equilibrium price as well as the equilibrium quantity of the market will be independent of the profit tax rate. Thus, levying a profit tax will be neutral to the output decision and the social welfare. This result is similar to the comparison of the ad valorem and specific tax systems in

the mixed oligopoly market discussed in Mujumdar and Pal (1998). They show that both the equilibrium price and quantity are constant, irrespective of whether the taxation involves a specific or ad valorem tax. When $\delta \in (0,1)$, from (6), we know that the profit tax rate t will affect the output levels of the public and private firms by affecting the effective degree of privatization φ, which in turn affects the equilibrium quantity and price and the social welfare level. This implies that the levying of the profit tax will be non-neutral to the output decision and the welfare level.

In our model, the profit tax policy can fully serve as a substitute for the privatization policy. With the rapid growth of social enterprises and the concept of corporate social responsibility (CSR), the literature has also taken a new direction in setting the objective of (public) firms. As a result, the literature has become increasingly diverse in its views of the mixed oligopoly market. The conclusion that the degree of privatization is exogenous can be used to infer that firms in a mixed economy are social enterprises as described above. The extent to which such social enterprises value social welfare is not a control variable of the government and should therefore be exogenous rather than endogenous. Thus, in this case the profit taxation will be non-neutral to the output decision and the welfare level.

UNCITED REFERENCES

(Cato and Matsumura (2013); Fujiwara (2007); Kato and Tomaru (2007); Merrill and Schneider (1966); Myles (2002); Poyago-Theotoky (2001)).

DATA AVAILABILITY STATEMENT

n/a

ORCID

Cheng-Hau Peng 🄳 http://orcid.org/0000-0002-7522-7002

REFERENCES

Amir, R. (1996). Cournot Oligopoly and the Theory of Supermodular Games. *Games and economic behavior*, *15*, 132–148.

Atkinson, A. B., & Stiglitz, J. E. (1980). *Lectures on Public Economics*. New York: McGraw Hill.

Baldini, M., & Lambertini, L. (2011). Profit Taxation and Capital Accumulation in a Dynamic Oligopoly Model. *Japan and the World Economy*, *23*, 13–18.

Claude, D., & Hindriks, J. (2006). Strategic Privatization and Regulation Policy in Mixed Market. *The IUP Journal of Managerial Economics*, *4*, 7–26.

Dixit, A. K. (1979). A Model of Duopoly Suggesting a Theory of Entry Barriers. *Bell Journal of Economics*, *10*, 20–32.

Escrihuela-Villar, M., Gutiérrez-Hita, C., & Vicente-Pérez, J. (2020). Supply Function Competition in a Mixed Electric Power Market. *Journal of Public Economic Theory*, *22*, 1151–1175.

Goerke, L., & Runkel, M. (2006). Profit Tax Evasion under Oligopoly with Endogenous Market Structure. *National Tax Journal*, *59*, 851–857.

Klumpp, T., & Su, X. (2019). Price–quality Competition in a Mixed Duopoly. *Journal of Public Economic Theory*, *21*, 400–432.

Lee, K. (1998). Tax Evasion, Monopoly, and Non-neutral Profit axes. *National Tax Journal*, *51*, 333–338.

Lin, M. H., & Matsumura, T. (2018). Optimal Privatization and Uniform Subsidy Policies: A Note. *Journal of Public Economic Theory*, *20*(3), 416–423.

Matsumura, T. (1998). Partial Privatization in Mixed Duopoly. *Journal of Public Economics*, *70*, 473–483.

Matsumura, T., & Kanda, O. (2005). Mixed Oligopoly at Free Entry Markets. *Journal of Economics*, *84*, 27–48.

Matsumura, T., & Tomaru, Y. (2013). Mixed Duopoly, Privatization, and Subsidization with Excess Burden of Taxation. *Canadian Journal of Economics*, *46*, 526–5540.

Matsumura, T., & Tomaru, Y. (2015). Mixed Duopoly, Location choice, and Shadow Cost of Public Funds. *Southern economic journal*, *82*, 416–429.

Mujumdar, S., & Pal, D. (1998). Effects of Indirect Taxation in a Mixed Oligopoly. *Economics Letters*, *58*, 199–204.

Musgrave, R. A., & Musgrave, P. B. (1980). *Public Finance in Theory and Practice*. New York: McGraw-Hill Book Company.

Parai, A. K. (1999). Profit Tax and Tariff under International Oligopoly. *International Review of Economics and Finance*, *8*, 317–326.

Singh, N., & Vives, X. (1984). Price and Quantity Competition in a Differentiated Duopoly. *Rand Journal of Economics*, *15*, 546–554.

Ueng, K. L. G., & Wu, C. J. (2009). A Note on the Neutrality of Profit Taxes and Tax Compliance with Uncertain Detection. *Economics Bulletin*, *29*, 312–319.

Wang, L. F. S., & Conant, J. L. (1988). Corporate Tax Evasion and Output Decisions of the Uncertain Monopolist. *National Tax Journal*, *41*, 579–581.

Wang, L. F. S., Mukherjee, A., & Zeng, C. (2020). Does Technology Licensing Matter for Privatization? *Journal of Public Economic Theory*, *22*, 1462–1480.

Wu, T. C. M. (2016). Profit Tax Evasion under Wage Bargaining Structure. *The B.E. Journal of Theoretical Economics*, *16*(2), 817–834.

Wu, T. C. M., & Yang, C. C. (2011). Monopolists' Profit Tax Evasion Revisited: When Firms Have Objectives Other than Maximizing Profit. *Public Finance Review*, *39*, 831–840.

Yaniv, G. (1996). Tax Evasion and Monopoly Output Decisions: Note. *Public finance quarterly*, *24*, 501–505.