Does Better Governance Make Privatization Policy Different?

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Abstract. Corporatization and the related governance improving in economic sense is considered within an asymmetric mixed duopoly to divulge firstly that partial privatization is the optimal privatization policy. Secondly, the optimal privatization degree is lowered by better governance. Lastly, when the critical value of the cost-reduction effect is achieved, better governance improves well-being of both the consumers and the public firm, while it is neutral to the private firm, and then consequently enhances social welfare. Additionally, if the public firm is as efficient as the private firm, full nationalization becomes optimal, and better governance is neutral to the production side but benefits the consumers and social welfare.

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1. Introduction

Inefficient management of public firm may overshadow the possible benefits of state ownership, motivating the privatization of public firm and the entry of profit-maximizing private firms to compete against a welfare-maximizing public firm. Correction of public firms' inefficiency has been a concern ever since late 1970s in Western Europe for the flow of the improvement on the performance of nationalized firms.

Corporatization and privatization of public organizations are two often seen methods to improve their governance quality. Both privatization and corporatization are policy tools to raise the autonomy such as personnel and finance of public firms. By raising their autonomy, governments want to ameliorate public firms' governance quality and have their efficiency boosted then eventually enhance the whole social welfare.

Briefly speaking, corporatization is a process of institutional reform that reduces the possibilities of shirking and even re-builds the corporate culture[1]. Due to the rigidity of public organizations, it is usually more difficult to adjust its personnel and financial arrangement, not to mention their management mechanism. The symptoms of this disease are poor service quality, weak profitability and inefficient employees. Corporatization is one cure because corporatized public organizations are more flexible to modify its motivation design so that their managers and employees are willing to do their jobs to what is expected.

It is then paramount to distinguish between "managerial delegation" in industrial organization research[2] and the "general motivation stimulation" in this study. Research on managerial delegation primarily focused on delegation of managers via providing bonus and sharing revenue, while it is a different story for overall efficiency enhancement of employees. The former depicts modalities that induce managers to pursue what firm owners anticipate, whereas the latter demonstrates general upswings of workers in firms. In other words, the manager of a firm is the whole idea of delegation, yet all employees are the key to corporatization. Above all,

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[1] This is supported by the website of the World Bank: Utility restructuring, corporatization, decentralization, performance contracts- World Bank Presentation on Reforming Public Utilities (http://go.worldbank.org/WJ59V3LA10).

[2] Delegation of managers was discussed a lot. Important studies over managerial delegation were made by Vickers (1985), Fershtman and Judd (1987) and Sklivas (1987). These works proposed the explanation for managers' nonprofit-maximizing behavior where the control right and ownership of firms are separated. Ever since these studies, much research followed this path and broadened it to many different fields. For example, Jansen *et al*. (2007) and Ritz (2008) considered market-share as part of managers' delegation. Wang *et al*. (2009) followed them and illustrated further that the optimal trade policy can be influenced by the market-share delegation. Park (2002), Liao (2008, 2010) and Wang and Wang (2010) put vertical market structure into consideration and cultivated a different path in this field.

"managerial delegation" often associated with reduction of production cost that becomes part of a manager's incentive to chase what the owner wants, whereas "institutional reform" is a series of motivation modification that stimulates the employees to work harder. That is, corporatization focuses on how the firm is operated[3]. In brevity, "corporatization" does not add the cost but keeps its employees from shirking and encourages them to boost their capabilities through motivation design so that every task needs fewer workers to complete. This viewpoint is also supported by the World Bank[4]. According to the World Bank, corporatization can be a series of approach that raises workers efficiency. Such approach involves clear definition of responsibilities and processes, clear promotion policies that based on the performances and so on. Building a positive corporate culture is also included.

On the other hand, privatization of public firms is another way to enhance its performance. Completely privatization is an extreme method with at least the disquiet of failing to fulfill the original obligation of nationalized firms. Therefore, commencing from Matsumura[5] (1998), partial privatization has been a consequential trail to access the balance between public firms' efficiency and social welfare. It is followed by Matsumura and Kanda (2005) who pointed out that while partial privatization is the optimal policy in the short-run, the best policy choice in the long-run is full nationalization. The subjects of the following research relating to partial privatization were slightly different from the mentioned works (See Brandão and Castro, 2007 and Fujiwara 2007). However, it is not until Wang and Chen (2010) did the open economy, a free entry market, and efficiency gap[6] among a public firm and private firms be considered in privatization policy decisions. They unveiled that, in the long run, the best policy under open economy with domestic free entry and efficiency gap is always partial privatization.

Although Matsumura's research focused on the policy of privatization, his model actually implies more than what he stated. Recall that in Matsumura's model the objective of a privatized firm is comprised of social welfare and profits, whereas a fully public-owned firm pursues the maximization of social welfare only. It is vital to deliberate again the meaning of privatized firm's objective and the mechanism within the transition from a purely social welfare maximizing firm to a firm that somewhat

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[3] In finance literature, the corporate governance concerns primarily the monitoring scheme in asymmetric information framework (see Tirole, 2005), which is not the key point here.
[4] See footnote 1.
[5] Matsumura's proposition (1998) is empirically verified by Gupta (2005), which reported that even only minority shares of a public firm are available on stock markets, performances of the public firm in India are "highly statistically significant" improved.
[6] Efficiency gap between public firms and private firms was particularly pointed out by Matsumura. He concerned that his neglect of it might underestimate the benefits brought by privatization.

emphasizes the profits. There is no doubt that when a firm wants to make profits, it is going to face the pressure of competition coming from the market. In other words, if the firm is fully public-owned, it is merely dealing with the issue of welfare maximizing, meaning that there is no need, more important, no incentive to pay attention to the market. On the contrary, when the firm wants to make some profits, there will be a strong incentive for it to grasp the fluctuation of the market. Furthermore, making-profit itself brings out the mentioned autonomy-raising required by the firm. Moreover, the process of transition reflects the internal structure change of a public firm, which is exactly the result of corporatization. Therefore, what is veiled in Matsumura's model is that the success of privatization is hinged on the complement of privatization and corporatization. Actually, just one year after Matsumura's work, the aforementioned enriching inferences of his model were echoed and empirically verified. According to empirical research, Shirley[7] (1999) proposed that:

*"…countries which **improved state-owned enterprise performance the most** followed a comprehensive strategy of reforms, **including combination of privatization and corporatization.**"*

Recall that this study considers that corporatization is a process of internal structure change. This is probably a missing point in Matsumura's inference because the mechanism in the transition of public firms' objective was not provided. The rational for transformation from a social welfare maximizing public firm to a profit emphasizing firm relies on the corporatization. The most fundamental change between these two types of operating goal is the emphasis of profits, which has already been introduced. The viewpoint that this transition is not related to the cost incurring or further investment is also implied by Matsumura's model because there were no such concerns in his model either. This sober interpretation is not beyond the realms of possibility. The empirical evidence for it is provided by Aivazian *et al.* (2005). To be more precise, quoting from Aivazian *et al.* (2005):

*"Our results also showed that **corporatization had no impact on SOE investment levels**; that the **potential source of the efficiency** delivered by corporatization could be **from the change in the internal governance system** of these enterprises."*

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[7] This study was based on the policy research report of the World Bank, "Bureaucrats in business: the economics and politics of government ownership", 1995. Mary M. Shirley was the research manager on competition policy, regulation, finance, public sector management and private sector development of the World Bank from 1990 to 2001. She had been working for the Work Bank from 1980 to 2001.

Therefore, the importance of the issue discussed within this study generates from the efforts of directly governance improving or corporatization and the concurrently non-stop wave of privatization. On one hand, governments privatized some of their public firms to make them more efficient, whereas some other public firms were kept nationalized. On the other hand, governments worked on the governance strengthening through corporatization of public organizations or governance enhancement policy toward corporatized public firms.

There are many cases showing that this situation exists. Albeit the trend of privatization, the Development Bank of Japan and Public House Loan Corporation in Japan, the CPC (oil) corporation and Taiwan Railways Administration in Taiwan are still nationalized. In fact, according to OECD's report (2008), the market value of public firms in the industries of gasoline, public utilities and telecommunication is still more than 40%. The importance of the public firms even surged right after the subprime crisis burst out. In the meantime, the pressure on governance enhancing has never eased. It seems that people understand that under many circumstances, public firms are still necessary and the necessity for it is even stronger when national need appears.

Reform of public organizations is sometimes a dilemma, since it has to alleviate their inefficiency but at the same time keep their original objectives achieved. Many cases showing that corporatization can be the typical solution. Classic success of corporatization is the institutional reform of public hospitals enforced in New Zealand during 1980s (Duncan and Bollard, 1992). The strongest contrast among a public organization and a corporatized public firm is between Taiwan Railways Administration and Taiwan High Speed Rail Corporation as well as Taipei Metro Corporation. Taiwan Railways Administration, which is still a public organization, is responsible for both management and operation for decades. Unfortunately, its poor service-quality has been constantly criticized and train delay has become a daily routine. On the contrary, service quality of Taiwan High Speed Rail Corporation and Taipei Metro Corporation is much better. As matter of fact, these two public owned companies are under efficient operation and on many aspects better than Taiwan Railways Administration. Corporatization thus actually does work to make the governing quality better under many circumstances, which is often seen from airports, railways and hospitals, whereas the efforts of privatization policies are

sometimes to no avail[8]. It is not difficult to realize that if the privatization were a panacea, debate over it would not be that overwhelming.

Fundamentally, both privatization and corporatization are modalities to raise autonomy of a nationalized firm, which aims at the target of discarding the rigidity generated by hierarchical bureaucracies and then have the ultimate goal, ameliorating public firms' efficiency, accomplished. Consequently, concurrent application of governance enhancing and privatization policy is an interesting issue to investigate. In the following analysis, the policy of governance improving will accordingly be considered when a public firm is privatized. However, it will be conducted sequentially from the relatively less efficient public firm formally, to the equally efficient one in a remark.

The remainder of this paper is arranged as follows. Section 2 describes the model, derives the results and proceeds to the analyses. Section 3 explains what it would be if the public firm is as efficient as the private firm in brevity. Section 4 concludes.

2. The model and the results

2.1 Model Setting

There are two firms in the market, one public firm, denoted by firm 0, and one private firm, denoted as firm 1, engaging the Cournot competition with homogenous goods. The inverse demand function is defined as $P = a - Q$, where P is price and the total output quantity is $Q = \sum q_i$, $i = 0,1$.

The profit functions of the firms are

$$\pi_i = Pq_i - C_i, \qquad i = 0,1.$$

The consumer surplus (CS) and the social welfare (SW) are defined as, respectively $CS = (1/2)(Q)^2$ and $SW = CS + \pi_0 + \pi_1$.

Following Matsumura (1998), the objective function of the private firm is its profit function, while the objective function of the public firm is

$$V = \theta\pi_0 + (1 - \theta)SW,$$

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[8] Before 1990s, the railway connecting York, Reid and Edinburgh was run by the government. Due to the miserable corporation governing, British government decided to privatize it. However, the misery remained and became even more complicated. Because those private companies who took over the railway company found that it was not that profitable as they expected, they often just absconded away. For example, Connex abandoned its contract in 2003, GNER did the same thing in 2005, and the National Express also gave up its 10-year running rights in 2009 for the loss caused by the subprime crisis. Similar cases are not rare. More evidence showing that the policy of privatization could sometimes turn out to be disasters is also provided by the mentioned work (Shirley, 1999). The reasons for the failure are various but many of those misfiring privatization cases ended up in returning previously sold public firms to governments in a worse shape than when they were sold.

where θ indicates the degree of privatization. Higher θ means higher degree of privatization because more shares of the public firm are owned by private sectors and thus makes this firm weigh its profits higher, while lower θ represents lower degree of privatization for less share that the private sector owns making this firm show more interest to social welfare. Therefore, if this firm is completely owned by the government, indicating that $\theta = 0$, then it will focus entirely on social welfare. On the contrary, if the firm is fully privatized, meaning that $\theta = 1$, then its profits are the solely target this firm is pursuing.

2.1.1 Cost-reduction effect

To be more precise, Mukherjee-Maiti's[9] proposition that relates to costs and better governance needs to be introduced in advance. Firstly, to catch the spirit of better governance that reduces cost, the cost function is further broken down to three parts. It is actually supposing that the costs of firms are formed by wages paid to the sales representatives and the time they need to promote sales. This kind of business model is, for example, often seen in a tertiary industry because the principal "goods" provided and sold by firms in a tertiary industry are usually services that generally require salesperson to promote. It is mathematically to say that given η_i to describe the unit of sales persons that i firm needs to sell one unit of the product, h to be the number of hours a sales person needs to sell one unit of product, and w to be the per-hour wage for the sales representatives. Consequently, the cost function can be expressed as

$$C_i = c_i q_i = (\eta_i h w) q_i, \quad i = 0,1.$$

Owing to the lower efficiency of the public firm, it is assumed that $\eta_0 > \eta_1$. This simply represents that on account of the public firm's lower efficiency, it needs more salespersons.

Secondly, resulting from that better governance lowers firms' costs and with the adoption of Mukherjee-Maiti's definition, the cost-reduction effect can be further extracted from the cost function. The amount of the reduced cost is defined as

$$g_a = ehw.$$

This g_a is what was described in the Introduction meaning that if the governance quality is enhanced, firms can be benefit from higher efficiency, better operating environment or shorter time required to finish a deal. When governance is improved,

[9] Mukherjee and Maiti, 2010, 'Governance, foreign direct investment and welfare', Research Paper of Leverhulme center, Nottingham University, United Kingdom. They introduced the method of defining and model setting of the governance in economic sense.

the cost would be reduced[10], then the cost function can be re-written as $C_i = (\eta_i hw - ehw)q_i$. Due to $C_i = [(\eta_i - e)hw]q_i$, the parameter e is therefore defined as cost-reduction effect. It is worth of mentioning here that e means the cost lessened by better governance on the grounds that $c_i = \eta_i hw$ and $g_a = ehw$ making $C_i = [(\eta_i - e)hw]q_i$. Note that if there is no governance or the governance is so weak that it can be ignored, then the cost function here will reduce to ordinary one. Therefore, following equations summarize the relation among c_i, g_a, and e

$$C_i = (c_i - g_a)q_i = [\eta_i hw - ehw]q_i = [(\eta_i - e)hw]q_i, \qquad i = 0,1. \qquad (1)$$

2.1.2 Producers and the governance

Inheriting from last subsection, the cost function of the two firms are defined as

$$C_i = (c_i q_i - g_a q_i), \qquad i = 0,1$$

Recall that the parameter g_a in the cost function indicates the governance performed and the parameter c_0 is assumed to be larger than the parameter c_1 for lower efficiency of the public firm.

Finally, the backward induction is used to solve the Subgame-Perfect Nash Equilibrium (SPNE).

2.2 Results

The results with the unsolved optimal degree of privatization will be introduced first.

The equilibrium outputs of the public firm and the private firm are, respectively

$$q_0 = \frac{a + g_a - 2c_0 + c_1}{1 + 2\theta},$$

$$q_1 = \frac{(a + g_a)\theta + c_0 - (1 + \theta)c_1}{1 + 2\theta}.$$

From the equilibrium outputs of both firms and $g_a = ehw$, the boundaries for e can be pointed out here. That is, for the public firm:

$$e \geq \frac{a - 2c_0 + c_1}{-hw} \equiv e_{q0},$$

and for the private firm

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[10] letting $(\eta_i - e)hw = c_i g_i$, then the proportion of the cost cut down can be written as $g_i = \frac{\eta_i - e}{\eta_i}$.

It is actually assuming that the proportion of the cost reduced are different between the public firm and the private firm. Mukherjee and Maiti (2010) also pointed out that the proportion of the costs reduced can be the same between the firms considered.

$$e \geq \frac{a\theta + c_0 - (1 + \theta)c_1}{-hw\theta} \equiv e_{q1}.$$

Then the total market output and the market price are derived as

$$Q = \frac{(a + g_a)(1 + \theta) - c_0 - \theta c_1}{1 + 2\theta},$$

$$P = \frac{a\theta - g_a(1 + \theta) + c_0 + \theta c_1}{1 + 2\theta}.$$

The profit of the public firm is

$$\pi_0 = \frac{\theta(a + g_a - 2c_0 + c_1)^2}{(1 + 2\theta)^2}.$$

The profit of the private firm is

$$\pi_1 = \frac{[(a + g_a)\theta + c_0 - (1 + \theta)c_1]^2}{(1 + 2\theta)^2}.$$

The consumer surplus and the social welfare are

$$CS = \frac{[-(a + g_a)(1 + \theta) + c_0 + \theta c_1]^2}{2(1 + 2\theta)^2},$$

$$SW = \frac{2\theta(a - 2c_0 + c_1 + g_a)^2 + [(\theta + 1)(-(a + g_a)) + c_1\theta + c_0]^2 + 2[\theta(a + g_a) - c_1(\theta + 1) + c_0]^2}{2(2\theta + 1)^2}.$$

The first derivative of the SW with respective to θ shows

$$\partial SW/\partial\theta = -\frac{1}{(1 + 2\theta)^3}(a + g_a - 2c_0 + c_1)[(a + g_a)\theta - (1 + 4\theta)c_0 + (1 + 3\theta)c_1]. \quad (2)$$

Setting it to be zero and solve it will give the optimal degree of privatization[11]:

$$\theta^* = \frac{c_0 - c_1}{a + g_a - 4c_0 + 3c_1}. \quad (3)$$

Substitution of the derived θ^* back to the profit functions and equilibrium output functions gives the following lemma:

Lemma 1: *In the asymmetric mixed duopoly market, if better governance reduces the firms' costs and the public firm is less efficient than the private firm, then the optimal equilibrium of quantities, price, profits, consumer surplus, social welfare, and optimal degree of privatization is, respectively,*

$$q_0 = a - 4c_0 + 3c_1 + g_a, \qquad q_1 = 2(c_0 - c_1), \qquad Q = a - 2c_0 + c_1 + g_a,$$
$$P = 2c_0 - c_1 - g_a, \quad \pi_0 = (c_0 - c_1)(a + g_a - 4c_0 + 3c_1), \quad \pi_1 = 4(c_0 - c_1)^2,$$

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[11] Substitution of θ^* into the second order derivative shows that $\partial^2 SW/\partial\theta^2 \big|_{\theta=\theta^*} = -\frac{(a+g-4c_0+3c_1)^4}{(a+g-2c_0+c_1)^2}$ indicating that the second order condition is satisfied. Besides, to make the optimal degree of privatization non-negative, the inequality $a + g_a - 4c_0 + 3c_1 > 0$ needs to hold. Therefore, the criterion for g_a is $g_a > -a + 4c_0 - 3c_1$.

$$CS = \frac{1}{2}(a + g_a - 2c_0 + c_1)^2,$$

$$SW = \frac{1}{2}[(a + g_a)^2 + 4c_0^2 + 3c_1^2 - 2c_0(a + g_a + 3c_1)],$$

$$\theta^* = \frac{c_0 - c_1}{a + g_a - 4c_0 + 3c_1}.$$

2.3 Analysis

2.3.1 The degree of privatization and better governance

Recall that the main purpose of this paper is to figure out if and how better governance affects the degree of privatization. Firstly, the optimal degree of privatization is displayed in Lemma 1. Owing to the relatively less efficient public firm, it can be realized that the best policy for the public firm is partial privatization for $c_0 > c_1$. Then, the following equation, together with Lemma 1, points out the first Proposition. The intuition behind this Proposition will be discussed with Proposition 2.

$$(\partial\theta^*/\partial g_a) = \frac{-(c_0 - c_1)}{(a + g_a - 4c_0 + 3c_1)^2} \tag{4}$$

Proposition 1: *In the asymmetric mixed duopoly market, if better governance reduces the firms' costs and the public firm is less efficient than the private firm, then partial privatization is the best policy for the public firm and better governance lowers the optimal degree of privatization.*

2.3.2 Production side and better governance

On the production side, it is important to understand how better governance affects firms' profits. Substitution of $g_a = ehw$ into the following two equations reveals the boundaries of e that makes better governance exhibit positive effect on the firm's profits

$$\partial\pi_0^*/\partial g_a = \frac{2\theta(a + g_a - 2c_0 + c_1)}{(1 + 2\theta)^2} \tag{5}$$

$$\partial\pi_1^*/\partial g_a = \frac{2\theta[\theta(a + g_a) - c_1(\theta + 1) + c_0]}{(2\theta + 1)^2} \tag{6}$$

Therefore, the boundary for e of the public firm is:

$$e \geq \frac{a - 2c_0 + c_1}{-hw} \equiv e_{\pi_0},$$

and for the private firm is:

$$e \geq \frac{a\theta + c_0 - (1 + \theta)c_1}{-hw\theta} \equiv e_{\pi_1}.$$

It is just repeated from the limitation of e on the output of the firms. Therefore, $e_{\pi_0} = e_{q0}$ and $e_{\pi_1} = e_{q1}$. The size of e needed by both firms to make higher profit with better governance is different. Therefore,

Lemma 2: *In the asymmetric mixed duopoly market without implementation of optimal privatization policy, if better governance reduces firms' costs and the public firm is less efficient than the private firm, then the public firm requires higher cost-reduction effect to be benefit from better governance than the private firm does.*

Lemma 2 can be easily derived owing to

$$e_{\pi_0} - e_{\pi_1} = e_{q0} - e_{q1} = \frac{(1 + 2\theta)(c_0 - c_1)}{hw\theta} > 0. \tag{7}$$

This Lemma illustrates a simple fact. When the optimal degree of privatization is not implemented, as long as the public firm is beneficial from better governance, better governance is advantageous to the private firm, too. On the other hand, if the optimal degree of privatization is fulfilled, the profits of the private firm simply will not be affected by the changes of governance level. It can be understood form the following two equations

$$\pi_1^* \mid_{\theta=\theta^*} = 4(c_0 - c_1)^2, \tag{8}$$

$$\partial \pi_1^* \mid_{\theta=\theta^*} / \partial g_a = 0. \tag{9}$$

Whereas it is not the case for the public firm because

$$\pi_0^* \mid_{\theta=\theta^*} = (c_0 - c_1)(a + g_a - 4c_0 + 3c_1), \tag{10}$$

$$\partial \pi_0^* \mid_{\theta=\theta^*} / \partial g_a = c_0 - c_1 > 0 \tag{11}$$

From the discussion above, it is clearer that even if the optimal degree of privatization is adopted, better governance can still improve on the profits of the public firm. The intuition behind this is that despite the cure for inefficiency is dispensed by privatization policy, the relative inefficient public firm is merely partly cured.

Why is it only cured partly? From the standpoint of a government, it has to consider the welfare of an economy as a whole. Neither can it neglect the well-being of consumers, nor can the government abandon the interest of firms. Therefore, the ultimate goal of the privatization policy is enhancing the welfare of the entire society. Since the dose is for the entire social welfare but not specifically for the inefficiency of the public firm, it is not surprising that direct improvement of governance quality of the public firm is able to further make it even more profitable. Hence, privatization is an indirect tool to strengthen the efficiency, while policy of governance improvement is the direct one. Then it can be realized that the remedy for maximizing social welfare via privatization is not necessarily the best treatment to the nationalized firm's inefficiency.

As a result, the following proposition catches the spirit of the relation between better governance and profits of firms.

Proposition 2: *In the asymmetric mixed duopoly market under the implementation of optimal privatization policy, if better governance reduces the firms' costs and the public firm is less efficient than the private firm, then when e is above the critical levels, better governance brings higher profits to the public firm but does no harm to the private firm.*

When the public firm is partially privatized, its profit may be negative is being recognized in literature. From Proposition 1, together with Proposition 2, reveals an important finding that better governance can not only reduce the degree of the privatization but also raise the profits of the public firm without causing damage to the private firm. It manifests that the effect of better governance is noteworthy because it brings higher welfare to the production side of the market.

2.3.3 Consumers' well-being and social welfare

Turning to the consumer side, the consumer surplus under optimal degree of privatization is

$$CS \mid_{\theta=\theta^*} = \frac{1}{2}(a + g_a - 2c_0 + c_1)^2.$$

Furthermore, realizing how better governance affects the consumer surplus is also important when the policy is about to be implemented. Hence,

$$\frac{\partial CS \mid_{\theta=\theta^*}}{\partial g_a} = a + g_a - 2c_0 + c_1. \tag{12}$$

Then it can be understood the required cost-reduction effect which guarantees positive impact of better governance on consumer surplus is

$$e \geq \frac{a - 2c_0 + c_1}{-hw} \equiv e_{CS}. \tag{13}$$

However, to keep the optimal degree of privatization, $\theta^* = \frac{c_0 - c_1}{a + g_a - 4c_0 + 3c_1}$, non-negative, its denominator, $a + g_a - 4c_0 + 3c_1$, needs to be positive because of the positive numerator, $c_0 - c_1$. Therefore, when the optimal privatization policy is executed, there is a lower bound that has to be imposed on the cost-reduction effect. That is, due to $a + g_a - 4c_0 + 3c_1 > 0$, the lower bound of the cost-reduction effect is

$$e \geq \frac{a - 4c_0 + 3c_1}{-hw} \equiv \underline{e}. \tag{14}$$

Hence when e_{CS} and $\underline{e}$ are both satisfied, better governance is beneficial to the consumers. The comparison of e_{CS} and $\underline{e}$ shows that

$$\underline{e} - e_{CS} = \frac{2(c_0 - c_1)}{hw} > 0. \tag{15}$$

The equation above indicates when the lower bound of the cost-reduction effect is satisfied, the required cost-reduction effect that guarantees positive impact of better governance on consumer surplus is met. Then, how better governance affects the consumers under the optimal degree of privatization is thereon captured by the following Proposition.

Proposition 3: *In the asymmetric mixed duopoly market, if better governance reduces the firms' costs and the public firm is less efficient than the private firm, then better governance will improve consumer surplus when optimal degree of privatization is enforced and the threshold $\underline{e}$ is satisfied.*

Last but not least is how better governance affects social welfare when the optimal degree of privatization is employed. The social welfare under optimal degree of privatization is

$$SW \mid_{\theta = \theta^*} = \frac{1}{2}[(a + g_a)^2 + 4c_0^2 + 3c_1^2 - 2c_0(a + g_a + 3c_1)].$$

Then $\partial SW \mid_{\theta = \theta^*} / \partial g_a$ shows how better governance affects the social welfare under optimized privatization.

$$\frac{\partial SW \mid_{\theta=\theta^*}}{\partial g_a} = a + g_a - c_0. \tag{16}$$

It indicates that only when the following condition is satisfied can the social welfare be enhanced by better governance

$$e \geq \frac{a - c_0}{-hw} \equiv e_{SW}. \tag{17}$$

Comparing the threshold e_{SW} here and the threshold e_{CS} for consumer surplus under the optimal privatization degree, it can be understood that when governance is improved, as long as consumer surplus is improved, social welfare will also be improved but not vice versa; it means that the required governance quality that makes the consumers better off is higher than the required governance quality that enhances social welfare. Mathematically, it means $e_{CS} > e_{SW}$ because

$$e_{CS} - e_{SW} = \frac{c_0 - c_1}{hw} > 0. \tag{18}$$

Recall that the relationship between $\underline{e}$ and e_{CS} is $\underline{e} > e_{CS}$ and from the equation above, it can be derived that $\underline{e} > e_{CS} > e_{SW}$. Thereupon,

Proposition 4: *In the asymmetric mixed duopoly market, if better governance reduces the firms' costs and the public firm is less efficient than the private firm, then as long as better governance improves consumer surplus, social welfare will be enhanced when optimal degree of privatization is enforced and the threshold $\underline{e}$ is satisfied.*

It is immediate from Proposition 1 and Proposition 4 that better governance can lower the optimal degree of privatization and simultaneously increase social welfare.

Consequently, inheriting from Proposition 2 and Proposition 4, Corollary 1 states

Corollary 1: *In the asymmetric mixed duopoly market under the adoption of optimal privatization policy, if better governance lowers firms' costs and the public firm is less efficient than the private firm, then when the lower bound of cost-reduction effect, $\underline{e}$, is satisfied, better governance is advantageous to the public firm and the consumers, whereas it is neutral to the private firm*

Corollary 1 briefly summarizes that, with implementation of optimized privatization policy, better governance not only enhances overall social welfare but

also benefits the consumers and the public firm, whereas the private firm in the market is neither damaged by nor benefited from the policy. In other words, while the other two participants in the market are advantageous from the policy, the private firm is not harmed by it. Then, this is to say that this policy triggers a *Pareto* improvement.

As matter of fact, Proposition 2, together with Proposition 4, states that as long as the cost-reduction effect is larger than e_{SW}, this *Pareto* improvement is achievable. Nevertheless, the requirement of non-negative privatization degree, θ^*, and the comparison of $\underline{e}$, e_{CS} and e_{SW} show that $\underline{e}$ is binding. Consequently, technically speaking, the cost-reduction effect has to be larger than $\underline{e}$. Despite this restriction, e_{CS} can still be a benchmark showing that as long as corporatization enhances consumer surplus, the private firm will not be hurt, while the public firm is benefited from the policy, and eventually social welfare is made better off.

What is really important for Corollary 1 is that during the process of transition, both the production side and the consumers are well taken care of. This does count for many previous studies emphasized primarily the policy effects on the entire social welfare but failed to notice the individual consequence on different sectors (public vs. private) of a transitional economy. For example, De Fraja and Delbono (1989) considered consumer surplus into the social welfare when they analyzed the effects of complete privatization and complete nationalization. Their whole analysis focused on the welfare ranking that generated from different market structures and noticed that the profits of firms within the markets are different. Nonetheless, very few analyses were conducted to depict how consumers' well-beings are affected. Matsumura (1998) and Matsumura and Kanda (2005) illustrated the effects of privatization policy in duopoly market and oligopoly market with free entry, respectively. Both papers put consumer surplus into consideration when the social welfare was defined. However, information about consumers' welfare under implementation of privatization policy was not revealed either. On the contrary, different from the former research, Wang *et al.* (2010) specifically analyzed how consumer surplus changes when tariff policy is being constructed. They showed that there can be a policy that brings "win-win-win" results to the consumers, the firms, and the government, which not only depicted the changes of overall social welfare but also analyzed the policy impact on every player in the market.

3. A remark: If the public firm is not presumed inefficient

Since the validity of the assumption that public firms are less efficient is kept being questioned, the very next step is naturally the relaxation of that assumption.

However, to avoid complexity, this section emphasizes primarily on the crucial findings of the last section.

Both privatization and corporatization are policy instruments to ameliorate a public organization's relatively lower efficiency by means of raising its autonomy and rectifying its bureaucratic rigidity, especially those red tapes in hierarchical structures. Generally, it is believed that performances of any institution, public or private, reflect its inner operation quality. Therefore, the real problems of public organizations are not structure itself, but the obstinacy the bureaucracy brings, though they are almost inseparable. Consequently, the need of reforming public firms and organizations, which are equally efficient as private ones, still merits further deliberation, let alone those with higher efficiency because higher efficiency just represents that its operating structure does work well.

As matter of fact, if the public firm and the private firm are equally efficient, then there is no need to privatize the public firm at all. The rationale is quite obvious. As what was described in the Introduction, drawbacks of privatization are sometimes conspicuous, while the roles of public firms are sometimes irreplaceable. When the public firm is as efficient as the private one, there is no need to privatize it owing to the reason why a public firm is needed to be privatized is resulting from its low efficiency, and since there is no such symptom, the pharmaceuticals is needless to be prescribed. Besides, public firms usually shoulder vital responsibilities that ordinary private firms simply won't bear. Therefore, keeping the efficient public firm fully nationalized might be a better policy choice. In addition, this finding somewhat enriches Matsumura (1998) who pointed out that in a mixed duopoly market, the optimal privatization policy should not be full privatization if the cost structures between the public firm and the private firm are the same, whereas this study shows that under this circumstance, the best policy is full nationalization. Moreover, on grounds that the equally efficient public firm is better to be fully nationalized, the degree of privatization shall not be affected by the governance enhancement policy.

Turning to the production side, the governance improvement policy should no longer enhance the public firm's profit, but it shouldn't damage the public firm either. As for the private firm, such policy is still irrelevant to its profits, just like what it is in the earlier discussion.

Comprehending the effects of such policy on the production side is truly helpful to grasp its impact on the social welfare because the consumer surplus is the only component left to affect the social welfare. Then after simple calculation and the comparison of the cost-reduction effect boundaries, it can be seen that this policy can enhance consumer surplus and raise social welfare in turn.

All in all, corporatization policy in the case of identical efficiency neither does harm to nor initiates benefits for the production side, while it lifts consumer surplus and ultimately makes social welfare higher.

4. Concluding Remarks

This paper utilizes governance model setting and focuses on the effects of better governance upon the privatization policy. The better governance can be brought by the policy of corporatization or governance enhancement policy toward corporatized public firms. Such policy deals with the shirking inhibition and the stimulation of employee's motivation to work harder. In an asymmetric mixed duopoly market under the consideration of better governance, partial privatization turns out to be the optimal privatization policy. Moreover, better governance lowers the optimal degree of privatization and simultaneously increases social welfare. It also benefits the consumers and the public firm, while it is neither harmful nor advantageous to the private firm. Consequently, governance enhancement brought by the policies triggers a *Pareto* improvement to the economy.

In the same mixed duopoly model but the public firm is equally efficient as the private one, it is more reasonable that full nationalization becomes the optimal policy. It is because there is no such need since the public firm works just well. This result somewhat enriches Matsumura (1998) who proposed that full privatization is not optimal if the cost structures of both firms are the same. In addition, governance improvement of the public firm makes the consumers better off, whereas it is neutral to the production side and eventually raises social welfare.

This model setting is restricted and it can be extended in the future research. For example, instead of a duopoly market, an oligopoly market, free entry and international competition may enrich findings within this study. Moreover, the control right of a partially privatized public firm is a very serious issue needed to be explored. Ishikawa *et al*. (2009) provided a thought-provoking study reporting that only when the control right is owned by a multinational company that forms joint ventures with domestic firms, can the desired spillover effects be realized. An analogy can be drawn here because privatization does not necessarily mean that the public firm is going to be privately controlled. Then the question becomes how the performances of the public firm are improved when privatized? Is it the privatization itself or the change of the control right that enhances the performances?

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