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Endogenous choice of strategic incentives in a mixed duopoly with a new managerial delegation contract for the public firm☆

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ABSTRACT

This paper revisits the endogenous choice problem of the strategic contracts in a mixed duopoly of one public firm and one managerial private firm, with differentiated goods. This paper considers the situation wherein the separation between ownership and management exists in both the public firm and the private firm. In particular, we focus on a new type of managerial delegation contract in the public firm that is a weighted sum of social welfare and the difference between consumer surplus and producer surplus (sum of each firm's absolute profit). On the other hand, in this paper, the classical sales delegation contract is employed in the private firm. In the above setting, we show that similar to the case wherein both the public firm and the private firm simultaneously use their sales delegation contracts, there does not exist any equilibrium market structure under the class of pure strategies of both the firms. Thus, even if the government as the owner of the public firm provides to her/his manager a strategic delegation contract such that it is easier to manipulate social welfare, we find that it is likely that the indeterminacy in the equilibrium market structure(s) under the class of pure strategies cannot be resolved. Therefore, in this paper, we conclude that the government must devise another style of managerial delegation contract of the public firm in order to assure the equilibrium market structure under the pure strategy class.

1. Introduction

This paper considers the endogenous choice game of each firm's strategic variable in a mixed duopoly with differentiated goods, which is composed of one managerial social welfare-maximizing public firm and one managerial absolute profit-maximizing firm with separation between ownership and management.[1] Then, following the approach of Matsumura and Ogawa (2012) and Chirco

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[1] In the real world economy, many public firms still exist, and many of them compete with private firms in private goods markets in not only developing and former communist countries but also developed countries, and thus, many industries including the indutries of airline, rail, telecommunications, natural gas, electricity, steel, and overnight-delivery as well as services including banking, home loans, health care, life insurance, hospitals, broadcasting, and education correspond to mixed oligopoly regardless of the modern big wave of privatization all over the world.

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and Scrimitore (2013), we revisit the three-stage game theoretic model where both the public firm and the private firm simultaneously choose their quantity or price levels before they simultaneously choose the contents of their strategic managerial delegation contracts.[2]

Furthermore, in this paper, we focus a mixed oligopoly with separation between ownership and management.[3] In particular, we focus on the situation wherein the public firm adopts a new managerial delegation contract, equal to the weighted sum of social welfare and the difference between consumer surplus and producer surplus, whereas the private firm uses a sales delegation contract in the fashion of Fershtman and Judd (1987), Sklivas (1987), and Vickers (1985).[4] This style of managerial delegation of the public firm is justified as follows. Recently, Goering (2007) and Kopel and Brand (2012) considered the influence of the presence of a managerial consumer-friendly or a managerial socially responsible firm with separation between ownership and management on the equilibrium market outcomes.[5] More recently, although corporate social responsibility (henceforth CSR) has become a mainstream topic, theoretical research on optimal market strategies (or governance) of consumer-friendly or socially responsible firms that engage in CSR activities has ignored what these firms' preferred goals are and how their presence affects their market outcomes and performance in an oligopolistic market.[6] Then, in order to tackle the above problem, Goering (2007) and Kopel and Brand (2012) paid attention to the organizational governance of these consumer-friendly and socially responsible firms, that is, how their organizational structure and incentive systems differ from those of firms with other objectives. They then defined as the objective function of the owner of either firm as the weighted sum of absolute profit and consumer surplus, and subsequently, the managerial delegation contract as the weighted sum of the objective function of the owner and the difference between consumer surplus and absolute profit with respect to the delegation parameters. Thus, the delegation parameter employed by such consumer-friendly or socially responsible firms can be regarded as the importance of consumer surplus relative to absolute profits for the owners, as in Goering (2007) and Kopel and Brand (2012). In this paper, since the public firm is supposed as the competitor of the private firm, it would be natural for the owner of the consumer-friendly public firm to design a managerial contract using the consumer surplus and the producer surplus on the basis of the approach of Goering (2007) and Kopel and Brand (2012).[7] Therefore, the delegation parameter of the public firm in this paper can be regarded as the importance of consumer surplus relative to producer surplus, which are components of social welfare for the owner of the public firm.[8] The main purpose of this paper is to disclose the equilibrium consequences on the basis of endogenous determination of strategic contracts by the owners of both the managerial public firm and the managerial private firm, when the owner of the public firm uses a weighted sum of social welfare and the difference between consumer surplus and producer surplus as the incentive delegation contract of her/his manager, which is newly introduced in this paper, and the owner of the private firm adopts a sales delegation contract in the fashion of Fershtman and Judd (1987), Sklivas (1987), and Vickers (1985).[9]

[2] More recently, mixed oligopolistic markets which are composed of a public firm and private firm have been extensively analyzed. As other research areas in the context of mixed oligopoly than the endogenous choices of the strategic contracts of both the public firm and the private firm, Mukherjee and Sinha (2014) found that the discussion such that cost asymmetries between the public and the private firm create a rationale for privatizing the public firms is restrictive. In addition, Wang, Lee, and Hsu (2014) examined privatization policy and entry regulation in a mixed oligopoly market with foreign competitors and free entry of domestic private firms. Furthermore, Nakamura (2014) studied a capacity choice problem in a duopoly with substitutable goods that is composed of one consumer-friendly firm and one standard absolute profit-maximizing firm in the contexts of both quantity competition and price competition with substitutable goods on the basis of the approach of Nishimori and Ogawa (2004), Ogawa (2006), and Bárcena-Ruiz and Garzón (2007).

[3] Although we conduct the analyses of a mixed duopoly with separation between ownership and management, which is composed of one managerial public firm and one managerial private firm in this paper, such a mixed duopoly corresponds to mixed duopolistic industries comprising a public firm and a private firm in restrictive regional areas. See Tomaru and Nakamura (2012) and Matsumura and Sunada (2013) for real world examples in the hospital and airline markets, respectively.

[4] Barros (1995) first considered the influence of separation between ownership and management within both the public firm and the private firm in a mixed oligopolistic market, on the equilibrium market outcomes. In particular, Barros (1995) explored the use of the incentive contracts as strategic variables in the context of asymmetry of information between both firms' owners and managers in a mixed duopoly. Subsequently, White (2001) investigated the strategic benefits of the delegation aspects of managerial incentive contracts within the public firm and the private firm in situations of complete information. Barros (1995) and White (2001) commonly investigated the case wherein the owners of both the public and private firms provide to their managers, strategic managerial delegation contracts equal to the weighted sum of their absolute profits and sales, which were presented in Fershtman and Judd (1987), Sklivas (1987), and Vickers (1985).

[5] More precisely, although Goering (2007) and Goering (2008) referred to consumer-friendly or socially responsible firms as non-profit organizations (NPOs), the more recent works including Wang, Wang, and Zhao (2012) and Nakamura (2013) are called similar firms, consumer-friendly or socially responsible firms. Note that in Goering (2008), such firms are called socially concerned firms.

[6] Note that Matsumura and Ogawa (2014) regarded the social welfare-maximizing public firm as a (consumer-friendly) firm that engages in the activity on the basis of corporate social responsibility (CSR) similar to Goering (2007) and Kopel and Brand (2012).

[7] The examples of industries in the real world economy to which the research of this paper specifically corresponds are the airline industry in the EU where the public "flag-carriers" compete against private airlines, and the electricity industry in Japan where many private enterprises facing financial problems have been nationalized, either fully or partially. As indicated in Matsumura and Sunada (2013), since in the above industries, the problem of ownership structure within the (partially) public firm is being studied and each firm with separation between ownership and management is supposed to actively engage in consumer-friendly activities, it is appropriate to consider that this paper's model provides an analysis of such industries. In addition, a mixed duopoly composed of one managerial public firm and one managerial private firm considered in this paper, corresponds to a hospital market with competition between the local public hospital and the private hospital over patients as described in Tomaru and Nakamura (2012).

[8] As explained in Section 4, we find that the equilibrium consumer surplus is higher than the equilibrium producer surplus among all four games, p–p game, q–q game, p–q game, and q–p game (p: price competition, q: quantity contract), which are classified on the basis of the strategic contracts selected by both firms' owners. Thus, we realize that as the delegation parameter of the public firm becomes higher, the owner of the public firm gives more emphasis to consumer surplus than to producer surplus in all the four games.

[9] As described below in detail, in the case wherein the owners of both the public and private firms provide to their managers the sales delegation contracts, Chirco et al. (2014) showed that there does not exist any equilibrium market structure under the class of pure strategies on the strategic contracts of the public and private firms. Further, in this paper, we show that in the endogenous selection of the strategic contracts of the public firm and the private firm, there exists no equilibrium market structure in the new delegation system where the public firm adopts the delegation contract on the basis of social welfare and the difference between consumer surplus and producer surplus whereas the private firm adopts the sales delegation contract, since the combination of the strategic contracts of the public and private firms does not coincide with each other, given the strategic contract of their respective rival firm. However, provided the strategic contractor the rival for both firms, it is noteworthy that their optimal strategic contracts are different from the new delegation system in this paper and the sales delegation case in Chirco et al. (2014).