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Offshoring and outsourcing in a global supply chain: Impact of the arm's length regulation on transfer pricing

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ABSTRACT

We consider the structure of a global supply chain for operational decisions in a multinational firm (MNF) with tax considerations. The MNF consists of two divisions: one for production and the other for retailing. While the retail division of the MNF and the market for its product is located in a domestic country, the production division may be located in either the domestic (high-tax) country or a foreign (low-tax) country. When the two divisions of a MNF are co-located in the domestic country, the firm enjoys the benefit of a centralized operational decision on the order quantity to maximize its total profit although there is no tax saving opportunity. On the other hand, a MNF can enjoy a tax saving benefit when offshoring its production division to a low-tax country although its operational decision on the order quantity is decentralized, which is harmful to the supply chain profit due to double marginalization. The MNF may further pursue the low procurement cost of its retail division by allowing the retail division to search for an outsourcing opportunity from an outside supplier. However, outsourcing can hurt the profit of the MNF from the loss of the production division due to competition with outside suppliers. We analyze the trade-offs in the MNF's optimal choice of supply chain structure. In addition, we incorporate a regulation on the MNF's internal transaction by tax authorities, which is commonly called the arm's length regulation. We study how the MNF's choice of the operational structure of its supply chain changes in consideration of this regulation. Our results suggest that tax considerations deserve attention from managers when designing the supply chain structure.

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1. Introduction

Global supply chains have become increasingly popular among multinational firms (MNFs) due to liberalization in international trades and capital movements and technological development in lowering transportation costs (Sisco, Bhorn, Pruzan-Jorgensen, Prepscius, & Booth, 2010). While labor and material costs, lead time, transportation costs, etc., are well known factors for MNFs to establish global supply chains, the role of tax considerations in managing such global supply chains has not received much attention (Shunko, Hung, & Tsay, 2017). In fact, many MNFs recognize tax as one of the most important factors for the success of the firm. For example, Webber (2011) pointed out that tax payment is one of the largest expenses of the firms. Also, Deloitte (2008) mentioned that MNFs should establish a tax de-

partment that aims to maximize the total after-tax profit of the firm. These results suggest that management of the global supply chain for MNFs should properly incorporate the impact of taxation. Hsu and Zhu (2011) call this "tax-effective supply chain management."

It is well known that globalization and fierce competition drive MNFs to move their production divisions to countries where the cost of labor is cheaper. Thus, offshoring a MNF's production division to a foreign country with a low production cost has been widely observed. Recently, some governments have been reducing the corporation tax rate to attract more firms to their countries and stimulate the local economy, which is called tax competition (Blöchliger & Pinero Campos, 2011). Such tax competition is reflected by an increasing trend in which a MNF shifts its production division to a developing country whose tax rate is relatively low (e.g., China, India, Indonesia, Vietnam, etc.) compared to developed countries. Accordingly, the merit of offshoring MNF's production facility comes not only from a lower production cost, but also from tax reduction. Although numerous papers have discussed the

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pros and cons of offshoring, only a few papers (e.g., Wang, Gao, and Mukhopadhyay, 2016 and Shunko, Debo, & Gavirneni, 2014) consider this problem in consideration of taxation. Thus, while the production cost differential can be a main driving force of a firm to offshore its production facility, to focus on the impact of tax rate differential on a firm's offshoring decision, we do not consider the benefit of low-production cost from offshoring (we will discuss how our results would change if the production cost differential is incorporated in the MNF's offshoring decision in Section 6).

Similar to offshoring, outsourcing is popularly practiced in pursuit of a supplier with low material and/or labor costs (Yang, Zhang, & Zhu, 2017). Outsourcing is another popular option used by MNFs, especially when cost reduction is expected (Kwok & Jianmei, 2006). Under outsourcing, the retail division of the MNF searches for a local supplier outside the MNF whose procurement cost is lower than that of the production division of the MNF. When the MNF further allows the retail division's *outsourcing activity* under offshoring, it brings price competition between the production division in a foreign country and an outside supplier. The MNF can make use of this cost reduction opportunity from the retail division accordingly. For example, the Chinese subsidiary of Hyundai Motors procures its components from a Chinese supplier instead of its factory in Korea for the purpose of cost reduction (Kim, Rhee, & Oh, 2011).

Motivated by this, we study the impact of the supply chain structure of a MNF in consideration of the tax effect. We develop a stylized model of a global supply chain of a vertically integrated MNF with a production division and a retailing division. While the retail division and the market for its product are located in a domestic country, the production division may be located in either a domestic (high-tax) country or a foreign (low-tax) country. When the two divisions of a MNF are co-located in the same country, the production and pricing decisions can be centrally managed to maximize the total profit of the MNF (i.e., *centralized integration*). However, no tax saving opportunity exists in this structure since all divisions are subject to the same tax rate. Alternatively, we investigate the *decentralized* structure of a vertically integrated MNF where the production division can be located in the foreign country (i.e., *offshoring*). If offshored, the production division is located to a low-tax country and a tax saving benefit is achieved by the profit realized for the production division at a low tax rate. The retail division remains in the domestic country along with the market for the final product. Since the two divisions are located in different countries, the coordination of operational decisions is difficult, as expected. In fact, to recognize the local divisions' profits properly to tax authorities, it is essential for an MNF to delegate its operational decisions to its divisions. In our model, this implies that the retail division independently decides its order quantity from the production division for the purpose of maximizing the retail division's profit. Otherwise, if the MNF determines all operational decisions of divisions in a centralized manner, it is hard to justify a MNF applying a different tax rate to the profit in each country.

In addition, we consider another decentralized supply chain structure where the product can be procured from an outside supplier to the retail division, instead of from the production division of the MNF (i.e., *outsourcing*). If the retail division is allowed to seek for an outsourcing opportunity, the production division of the MNF competes with outside suppliers to procure product for the retail division of the MNF. While this may increase the retail divisions profit by lowering its procurement cost, it may decrease the production division's profit and eventually hurt the total profit of the MNF. We study the optimal structure of the supply chain to maximize the total after-tax profit of the MNF and derive insights regarding a MNF's choice of supply chain structure.

Since offshoring is involved with international transactions of products from the production division to the retail division of the MNF, the price at which the product is procured internally to the MNF (i.e., transfer price) is a key factor that divides the profit of the MNF between both divisions under tax rate differentials among countries. The transfer price is defined as an intra-price that is used between two divisions within the same MNF. Therefore, a MNF can allocate its profit to each division by adjusting the transfer price between them. For instance, by increasing the transfer price between a production division in a low-tax country and a sales division in a high-tax country, the MNF can shift its profit to a low-tax country. Ernst & Young (2010) report that this is the most important issue in tax departments. However, governments widely regulate the transfer pricing of MNFs to prevent tax evasion behavior. For example, the Organization for Economic Cooperation and Development (OECD) issued "Discussion Draft for Public Comment on Transfer Pricing Guidelines for Business Restructuring" to regulate tax evasion by MNFs (OECD, 2008). According to these guidelines, the transfer price should be determined at a price where two parties engage in a transaction as if they are independent. This regulation is commonly called the *arm's length regulation*, and it is used in many countries.

The regulation on transfer pricing potentially can alter a MNF's decision on its supply chain structure significantly. However, few papers have investigated the impact of the arm's length regulation on transfer price on a MNF's operational decisions in a global supply chain. Among these, Autrey and Bova (2012) consider a MNF's transfer pricing decision in the presence of a gray market. They show that its pricing decision and consequent firm profit and social welfare can be highly dependent on the arm's length regulation. Also, Arya, Mittendorf, and Yoon (2008b) show that the optimal organizational structure of a MNF (centralization or decentralization) can change if the arm's length regulation is implemented on the MNF's transfer pricing, when the MNF with its own retail division also supplies the product to an outside rival retailer. In this paper, we investigate how the choice of a MNF's supply chain structure for operation (centralized integration, decentralized offshoring, and decentralized outsourcing under offshoring) changes if the arm's length regulation on the MNF's internal transactions between divisions across different countries is implemented.

To summarize, we consider the global supply chain of a MNF. The MNF can locate its production division in a low-tax country to enjoy the tax benefit from offshoring. However, in this situation, the MNF should delegate its operational decision on order quantity, and as such, its retail division makes the order quantity decision to maximize its own profit. This may hurt the total profit of the MNF due to double marginalization. As an alternative to offshoring, outsourcing of the product can be allowed for the retail division of the MNF. Under outsourcing, the retail division can benefit from a cheaper procurement option. However, outsourcing decreases the production division's profit, which can be also harmful to the MNF's total after-tax profit. We investigate how such trade-offs affect the MNF's choice of a supply chain structure. In choosing an operational structure, we also investigate the impact of the arm's length regulations on the MNF's internal transactions.

The rest of this paper is organized as follows. In Section 2, we review the literature. Section 3 presents the model of each organizational structure. We derive the optimal decision for each structure in Section 4 and compare the results in Section 5. Section 6 provides managerial implications from the analysis. We conclude the paper in Section 7.

2. Literature review

This paper considers the design and management of a global supply chain in consideration of the taxation effect, which is a

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