Rent Seeking for Export Licenses: Application to the Vietnam Rice Market*

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Abstract

The paper develops a model to examine rent seeking in innovation and export licenses, with an application to Vietnam rice exports. Firms can lobby for export restrictions or for free trade. Innovation is introduced as a cost-reducing technology. The analysis focuses on the innovation incentives of the firm lobbying for export restrictions, and the determinants of lobbying incentives. The analysis shows that firms lobbying for export restrictions may have lower incentives to adopt technological innovations under export restrictions than under free trade. The findings can help to identify economic inefficiency when the political elites use export restrictions to seek rents.

Keywords: Trade restrictions, export licenses, innovation, monopoly, rent seeking; free trade, economic development.

JEL: D72, F63, G1, L12, O13, Q55.

1. Introduction

During 2007-2008, the world experienced a food crisis that triggered export restrictions from the largest rice exporting countries, such as India and Vietnam (Slayton, 2009). The governments claimed that trade barriers were erected to protect their domestic consumers against price increases caused by the food crisis (Tsukada, 2011). There are counter-arguments from food experts who have questioned the effectiveness of such drastic policies in insulating domestic markets against the fluctuations in the world market. First, export restrictions introduced in the middle of a price crisis might lead to expectations of further price increases. According to Thinh and Tran (2015), suppliers might postpone their current trading so that they can sell rice at higher prices in the future. On the other hand, consumers and traders might increase their current storage so that they can avoid buying rice at higher prices in the future.

Such speculative behaviour is said to exacerbate the price increases that were observed during the imposition of export restrictions (see Tsukada, 2011, p. 70; Slayton, 2009, p. 10; Baylis, Jolejole-Foreman, and Mallory, 2014, p. 23). Consequently, further price surges allow governments to implement additional trade restrictions, thereby creating a vicious cycle (Fulton and Reynolds, 2015, p. 1216). While questioning the effectiveness of such policies to protect domestic consumers, Fulton and Reynolds (2015) draw attention to other possible motivations underlying trade restrictions. These authors argue that export restrictions are not only the responses of exporting countries that attempt to secure their national food security during food crises, but also a tool that can be used to maximize rents captured by their state-owned enterprises.

In Vietnam, trade restrictions have turned state-owned enterprises effectively into monopolists and monopsonists in the rice export market. On the one hand, export restrictions have prevented small producers and farmers from directly exporting their products to the world market, and increased the bargaining positions of large producers that are mostly state-owned

enterprises (Talbot and Nguyen, 2013, p. 12). On the other hand, exporting firms have to submit their export contracts to the Vietnam Food Administration (VFA), which is effectively a government organization, to request approval (Tsukada, 2011, p. 65). However, many generations of CEOs of Vinafood, a state-owned enterprise (SOE), are also simultaneously chairs of VFA (Slayton, 2009, p. 14). This creates an enormous conflict of interest as the SOEs can manipulate VFA to eliminate strong competitors, while the surviving firms risk disclosing their business information to Vinafood.

In addition, even though farmers are the major stakeholders of the export restrictions, they have no role in the policy making process. Despite being the organization that is in charge of controlling rice exports, VFA only has representatives of state-owned enterprises, without any participation of the Farmers' Union (Tran, Do, and Le, 2013, p. 36). During the export restrictions in 2008, the Vietnamese government still allowed the two largest SOEs to fulfill their commitments regarding government contracts to the Philippines (Slayton, 2009, p. 10). These two SOEs were not obliged to follow export bans, export quotas and minimum export prices (Slayton, 2009, p. 10-11; Baylis et al., 2014, p. 4-5).

On the other hand, being almost the only firms that are permitted to export, these SOEs can use their market power to buy rice from farmers at depressed prices. It has been stated that farmers gained the least during the price peaks in 2008, while state-owned exporters captured all the benefits (Tran et al., 2013, p. 28). The difference between export prices and paddy rice prices reached their peak during the export ban period (Tran et al., 2013, p. 25), which certainly would seem to suggest that exporters used (or possibly abused) their monopsony power to reduce paddy rice prices. In this case, export restrictions were used as a transfer of profits from farmers and small rice companies to exporting firms.

Similarly, Takacs (1994) shows that the government might use export controls on raw materials to support the processing industries that use the raw materials as inputs in their production process. In highly concentrated markets, large firms can exercise their monopsony

power against raw material producers (Takacs, 1994, p. 15). However, in spite of being vested with so many special and preferential treatments from the government, VFA and Vinafood are said to have paid little effort in terms of increasing the sector export quality.

In the recent past, the main strategy of Vietnam rice exports was to focus on increasing export quantity without concern for quality. Rice production in Vietnam is often considered to be of low quality and value (Nguyen and Dinh, 2015; Tran, 2017). Rice that is produced in Vietnam often has a lower value (that is, price) than the same type of rice produced in Thailand (Nguyen and Dinh, 2015). A common practice of exporting firms is to auction for Government-to-Government (G2G) contracts, and to export in large quantities. It is said that these G2G contracts comprise in excess of 70 per cent of total rice exports, and are mainly under the control of SOEs, who have captured around 70 per cent of total exports (Nguyen and Dinh, 2015; Tran et al., 2013; Tran, 2017).

Although the proportion has been decreasing in recent years, G2G contracts still comprise a significant amount of Vietnam rice exports. However, this strategy may contain substantial risks. The G2G contracts concentrate on some traditional markets, such as the Philippines, Indonesia and Malaysia (Nguyen and Dinh, 2015; Tran, 2017). By focusing on only a few import countries, the total export quantity and value can easily be affected when there are fluctuations in demand from these import markets (Nguyen and Dinh, 2015). Moreover, these markets often do not require high quality in rice transactions. Therefore, exporters are often awarded G2G contracts on account of offering the lowest prices.

This strategy may be profitable in the short run, but it has damaged the image of Vietnam rice exports as a low-quality product. Consequently, this strategy has become a precondition for these markets to continue lowering their bidding prices in future auctions. In addition, dealing rice contracts at low prices also means that exporting firms must buy paddy rice at depressed prices to sustain their profit margins. Therefore, selling rice of low quality may directly harm farmers' incomes in the long run.

On the other hand, improving export quality has even greater significance when there is an increase in competition for G2G contracts from other large rice exporting countries, such as Thailand and India. In addition, large rice importing countries are improving their production capacities to sustain domestic demand (Nguyen and Dinh, 2015). This combination of activities will have a large impact on the incomes of farmers in the Vietnam rice industry if the sector continues to depend on these traditional markets, as has been the case in the past. Consequently, it is imperative that significant changes are made to the quality of rice exports from Vietnam.

The increase in the proportion of high quality rice in total rice exports can help Vietnam penetrate higher value markets, such as Japan and Taiwan, and increase its competitiveness in traditional markets. This will also assist greatly in improving the living standards of farmers in Vietnam. However, the process of adopting new technologies and innovation incentives to improve rice quality has been rather slow, and has only received positive changes in recent years (Tran, 2017). The stagnation can be attributed to the dominance of VFA and state-owned enterprises in the rice export markets.

On the basis of these serious concerns, the primary objective of this paper is to develop a model to explain why trade restrictions may result in a lack of innovation incentives to increase export quality. The lack of incentives arises from the rents that are provided to the SOEs that are not designed to present incentives to exporting firms to increase their adoption of innovations. Moreover, the model also explains why trade restrictions can be inefficient, and remain in place for an extended period.

In the literature regarding the effects of Vietnam export bans, there are only a few that have been concerned about the impacts of such trade policies on the long term development of the rice sector in Vietnam. This paper intends to contribute to the literature by explaining a

mechanism whereby a redistribution from farmers to SOEs that are caused by export restrictions may impede the sector's long term development.

The remainder of the paper is as follows. A literature review is presented in Section 2. The model specification involving the framework, free trade, trade restrictions, comparisons, and incentives for lobbying, are discussed in Section 3. Some concluding remarks are given in Section 4.

2. Literature Review

This paper is closely connected to the literature on the relationship between rent seeking, trade restrictions, monopolies, and economic efficiency. Traditionally, the costs of monopolies and trade restrictions, such as import tariffs to society, are distortions caused by the reduction in the quantity consumed arising from price increases. Such price increases not only transfer the surplus from consumers to producers and the government budget, but also creates deadweight losses for social welfare (Posner, 1975; Krueger, 1974).

Tullock (1967) argues that the social costs of monopolies and trade restrictions may exceed the costs caused by the deadweight loss. The main argument is that, in order to obtain those rights, firms have to invest in lobbying and rent seeking, which costs real resources and are considered wasteful to society. Tullock (1967, pp. 228-231) describes rent seeking as a form of theft. Burglars invest in lock picking technologies in order to steal from their victims, while the victims also invest in technologies that are intended to prevent burglars from stealing. Such activities are considered wasteful to society as the resources that are used in the process could have been used for alternative more productive purposes.

Krueger (1974) highlights an example in which rent seeking does not produce any socially valuable by-products. For example, the government may allocate import licenses based on firms' capacities. In this case, firms are willing to expand their plants even under excess

capacity to obtain import rights. Therefore, the investments have no productive purpose apart from winning the import licenses. This example is closely related to regulations that prevent firms from applying for export licenses in Vietnam. The regulation requires the rice exporting firms to have a "minimum capacity of 5,000 tons" and milling facilities with a "minimum capacity of 10 tons per hour" (Talbot and Nguyen, 2013, p. 12).

Consequently, firms will have incentives to expand their capacity to receive export rights, even though they may not use their full capacity. A traditional strand of rent seeking literature, often inspired by the seminal works of Posner (1975) and Krueger (1974), focuses on estimating the resources wasted in the rent seeking contest, while ignoring the actual impact of the policies resulting from rent seeking on economic development. Addressing this concern, the paper analyzes the impacts of export restrictions on a real economic variable, such as the level of innovation. In particular, the paper presents a rent seeking model in which export restrictions can alter the nature of the economic market structure, and directly affect the innovation incentives of the economic players.

The relationship between rent seeking and economic efficiency has been discussed extensively in the literature. The traditional political economy models often consider rent seeking as a trade-off between the consumer and producer surpluses: incumbent firms and new entrant benefits; trade restrictions and liberalizations (Grossman and Helpman, 1994; Hillman, 1984; Krueger, 1974; Posner, 1975). Such an approach has left an impression that there are unresolved conflicts between rent seeking and economic efficiency, which states that rent seeking often leads to inefficient policy outcomes, such as import tariffs and monopolies, where such policies may not disappear while such interest groups are still in power.

However, Rodrik (2014) offers a different perspective on this matter. Instead of trying to eliminate trade restrictions and protectionism, which are often considered the causes of economic inefficiency, but are heavily protected by powerful interest groups, the analysis argues that governments need to find innovative policies and political innovations that can

bypass such efficiency without jeopardizing the political and economic shares of these groups. In that way, policy changes are more feasible as there would be less resistance from the lobbying groups.

Regarding the economic efficiency of rent seeking, Khan and Jomo (2000, pp. 40-53) argue that, even though the rent seeking process may waste real resources as rent seekers compete for rent, its net effect may still be positive to society if the resulting policy outcomes create value for society. Such value may arise from Schumpeterian rents or rents for learning that create incentives for firms to adopt and invent new technologies. On the other hand, rent seeking may be even more detrimental to social welfare if it reduces innovation incentives, which is harmful to growth and development.

These concerns justify the need to analyze the potential inefficiency of providing rents to exporting firms in the form of trade restrictions. Whether one believes such policy options may exist or not, it is important to locate the sources of inefficiency that are caused by the policies arising from rent seeking. Moreover, the findings can help to justify the need to eliminate trade restrictions and protectionism. Such findings might also be able to contribute to the creation of more innovative solutions that can coordinate economic efficiency and interest groups.

The literature on the relationship between market structure and innovation may shed light on the impact of rent seeking on innovation incentives. According to Brou and Ruta (2013), firms lobbying for subsidies and tax cuts can alter the market structure by influencing the equilibrium number of firms in the economic market and, therefore, the level of innovation. As an alternative, Arrow (1962) argues that the innovation incentives under monopoly are lower than under competition.

Demsetz (1969) notes that the analysis in Arrow (1962) makes an implicit assumption that the monopolist restricts quantity compared with the total quantity under competition. Intuitively,

the greater the output a firm produces, the more it can use the newly adopted marginal cost reducing or quality improving technologies. Such an outcome would justify the lower innovation incentives under monopoly as compared with under competition.

However, Holmes, Levine, and Schmitz (2012, p. 12) argue that a reduction in monopoly power does not always increase the level of production. The increase in competition caused by tariff reductions may eliminate some domestic firms and replace them with foreign firms, which reduces domestic output and, consequently, the innovation incentives. This paper contributes another channel whereby trade restrictions can lower the monopolist's production and, therefore, their innovation incentives. The reduction in production is caused by the replacement effect, in which the monopolist purchases rice from other producers and then re-sells the rice to the world market rather than producing and exporting rice themselves.

With regard to the causal relationship between innovation and rent seeking, Lenway, Morck, and Yeung (1996) argue that firms are more likely to lobby for trade restrictions when they are less efficient and have a lower return on investment. These lobbying firms are less likely to spend on research and development, which suggests that less innovative firms are more badly affected by free trade and have greater incentives to lobby for trade barriers (Lenway et al., 1996, pp. 412-415).

Alternatively, the correlation can mean that firms in a more protected industry may have less incentive to be innovative. From the analysis in the next section, it is shown that a causal relationship between innovation and rent seeking can be interpreted in different ways. A less efficient firm may find it beneficial to lobby for trade restrictions, while a highly protected firm might find it optimal to reduce innovations under trade restrictions.

3. Model Specification

a. Framework

Consider an economy where *N* firms in the domestic market produce rice and export to the world market. The export volume of the domestic country is large enough to influence the world price. As the world's second largest rice exporters in quantity, this assumption is entirely appropriate for Vietnam. Therefore, the demand function can be simply represented as $P = 1 - Q$

The quality of rice is assumed to be homogeneous. All firms have convex cost functions. Firm 1 can reduce its marginal cost by investing in cost reducing technologies. Alternatively, firms can compete in a market with differentiated goods, and adoption of innovations can lead to an increase in the quality of rice, which increases mark-ups and profits. For simplicity, this model focuses on homogeneous products and cost reducing innovations.

Suppose that firm 1 is different from other firms in terms of production costs and lobbying costs, while firms 2, 3, ..., *N* are identical. In the case of Vietnam, firm 1 represents a group of state-owned enterprises that are given exclusive rights to export rice. On the other hand, firms 2, 3, ..., *N* represent smaller firms and farmers with small market power and low capacity to invest in technological improvements. This explains why their innovation incentives are constant in the model.

Moreover, firm 1 can be different from firms 2, 3, ..., , *N* in terms of their lobbying capacity. The assumption that firms can have different "lobbying technologies" reflects the reality that some firms, being state-owned enterprises, are closely connected to the government, and are thereby more effective in the lobbying process. On the other hand, firms 2, 3, ..., *N* are small rice producers and farmers without strong connections to the state, and thereby do not have any material effect on export policies. Firm 1 lobbies for trade restrictions to become the only firm allowed to export, while the other firms lobby for free trade so that they can export freely to the world market.

The model focuses on analyzing firm 1's innovation and lobbying incentives. First, the model analyzes the direct effects of trade restriction on firm 1's innovation incentives, given that the innovation levels of all other firms remain constant. Second, the paper investigates the firms' lobbying incentives. In particular, the analysis focuses on explaining how firm 1's winning probability in the lobbying contest depends on its production efficiency relative to the other firms.

In this model, firms compete in two markets, namely the political and economic markets. In the political market, firms invest in lobbying activities to decide whether trade restriction are implemented. In the economic market, firms decide the optimal level of quantities, and firm 1 decides its innovation level under the market structure that is decided in th political market.

The order of the game is as follows:

Stage 1: Firm 1 lobbies for trade restrictions, while firm 2, ..., *N* lobbies for free trade. At the end of the rent seeking process, the trade regime is decided, and its outcome is observed by all firms.

Stage 2: Firm 1 decides how much to invest in cost reducing technologies. After the decision is made, all firms observe the cost structures of their competitors.

Stage 3: The firms decide their quantities, given the trade regime and each other's cost functions.

There are two possible market structures, namely free trade and trade restrictions. The game is solved via backward induction. The model starts to solve the equilibrium profits under the two scenarios, then the analysis compares the innovation incentives under both free trade and

trade restrictions. Subsequently, the lobbying efforts of the firms are analyzed in the lobbying contests, given their profits under both free trade and trade restrictions.

b. Free trade

Under free trade, every firm is allowed to export to the world market without any restrictions. Firms engage in Cournot competition, with the inverse demand function, $P = 1 - Q$. The firms' profit functions are:

$$\pi_1^{FT} = (1 - Q)q_1 - (1 - a)kq_1^2 - \frac{\alpha}{2}a^2 \quad (1)$$

$$\pi_i^{FT} = (1 - Q)q_i - \frac{1}{2}q_i^2, \qquad \text{with } i = 2, 3, \ldots, N. \quad (2)$$

Each firm's revenue equals price times quantity. Each firm has a convex cost function, where *k* is firm 1's production efficiency parameter, and firm *i*'s parameter is 0.5. A larger *k* implies that firm 1 is more inefficient in production than other firms. Firm 1 can invest in cost reducing technologies, *a*, to reduce the marginal production costs: *a* must lie between 0 and 1, so that the marginal production costs remain positive. Innovation incurs a cost of $\frac{\alpha}{2}a^2$.

The first-order condition (FOC) is used to determine the optimal quantities under free trade, that is, q_1^{FT} and q_i^{FT}:

$$q_1 = \frac{2}{2(1-a)k(N+1)+N+3} \quad (3)$$

$$q_i = \frac{2(1-a)k+1}{2(1-a)k(N+1)+N+3}, \qquad \text{with } i = 2, 3, \ldots, N. \quad (4)$$

Taking into account that q_1 and q_i are to be chosen optimally, it is possible to determine the marginal effect of a change in the innovation term, *a,* on firm 1's equilibrium profit under free trade (see Appendix A.1):

$$\frac{d\pi_1^{FT}}{da} = \frac{4k\left[2\left(1-a^{FT}\right)k(N+1)+3N+1\right]}{[2(1-a^{FT})k(N+1)+N+3]^3} - \alpha a^{FT} \tag{5}$$

c. Trade Restrictions

Under trade restrictions, only firm 1 is allowed to export, while the other firms cannot export directly to the world market. In order to export, firms 2, ..., *N* have to become firm 1's suppliers. Suppose that the number of firms *N* is large such that, using its bargaining power, firm 1 can make a take-it-or-leave-it offer to the other firms. Firms 2, ..., *N* can either accept or reject the offer, but they cannot bargain to change the design of the offer are there are many unco-ordinated firms. The offer can have a form of a pair q_j and t_j : q_j is the quantity that firm 1 demands and t_j is the transfer payment to firm *j*. As firm 1 has the power to set the offer, they have no incentive to give firms 2, ..., *N* more favourable terms. However, the offer must be designed so that firms 2, ..., *N* would be willing to accept the offer if their profits are positive.

Assuming that firm 1 has full information about the cost structures of firms 2, ..., *N*, the transfers from firm 1 to the other firms will be sufficient to cover their costs and to incentivize acceptance of the offer. Consequently, the profit functions of firm 1 and firm *i* under trade restrictions are:

$$\pi_1^{TR} = (1-Q)q_1 - (1-a)kq_1^2 - \frac{\alpha}{2}a_1^2 + (1-Q)\sum_{i=2}^{N} q_i - \frac{1}{2}\sum_{i=2}^{N} q_i^2 \tag{6}$$

$$\pi_i^{TR} = 0. \tag{7}$$

As the other firms have convex cost functions, the more firm 1 buys from one particular firm, the more costly does it become. In addition, the other firms are identical so that, in order to minimize the buying prices, the best strategy for firm 1 is to buy the same quantities from every firm *i*.

Firm 1's profit function becomes:

$$\pi_1^{TR} = (1-Q)q_1 - (1-a)kq_1^2 - \frac{\alpha}{2}a^2 + (1-Q)(N-1)q_i - \frac{1}{2(N-1)q_i^2}. \quad (8)$$

The first-order condition to determine the optimal q_1 and q_i are:

$$q_1 = \frac{1}{2}\frac{1}{1+(1-a)k(2N-1)} \quad (9)$$

$$q_i = \frac{(1-a)k}{1+(1-a)k(2N-1)} \quad (10)$$

Taking into account that q_1 and q_i are chosen optimally, it is possible to determine the marginal effect of a change in *a* on firm 1's equilibrium profits under trade restrictions (see Appendix A.2):

$$\frac{d\pi_1^{TR}}{da} = \frac{\frac{1}{4}k}{[1+(1-a)k(2N-1)]^2} - \alpha a \quad (11)$$

d. Comparison

When *k* is sufficiently large, firm 1's production under trade restrictions is lower than under free trade. This section will illustrate the changes in firm 1's behaviour under trade restrictions

as compared with under free trade. The changes will affect firm 1's innovation incentives under trade restrictions. Under free trade, there is a strategic effect, where firm 1 can reduce the quantities of the other firms by reducing its marginal costs through investing in technology and innovation:

$$q_i = \frac{2(1-a)k+1}{2(1-a)k(N+1)+N+3}$$

Consequently, the prices increase and firm 1 has an incentive to expand is production due to having lower marginal costs. Therefore, firm 1 has strong incentives to invest in technologies to reduce marginal costs. However, such strategic effect disappears under trade restrictions as firm 1 effectivelybecomes a monopoly in the export market. The strategic effect is replaced by the monopoly effect and the replacement effect. On the one hand, being a monopoly makes firm 1 restrict the total export quantity.

As the result, the monopoly effect reduces the total export quantiity, so that $Q^{TR} < Q^{FT}$ (see Appendix A.3). Under a restricted total export quantity, firm 1 has to choose the most efficient combination between self-production and purchasing from other firms, which can lead to a lower or higher q_1 under trade restrictions than under free trade. It is useful to consider the optimal quantities q_1^{TR} and q_i^{TR} from equations (9) and (10), respectively, without the innovation term:

$$q_1 = \frac{1}{2}\frac{1}{1+k(2N-1)}$$

$$q_i = \frac{k}{1+k(2N-1)}$$

so that $\frac{\partial q_1}{\partial k} < 0$ and $\frac{\partial q_i}{\partial k} > 0$. This means that if firm 1 is efficient, it may prefer producing itself to buying from other firms under trade restriction. On the other hand, if firm 1 is inefficient, it will reduce its own production and increase the quantities bought from other firms. The replacement effect happens when firm 1 becomes sufficiently inefficient, so that $q_1^{TR} < q_1^{FT}$ (see Appendix A.4).

When $q_1^{TR} < q_1^{FT}$, firm 1's innovation incentives under trade restrictions is lower than under free trade. Intuitively, innovation becomes more valuable when it can be applied to a larger quantity. This effect can be shown by comparing the total costs of firm 1 with and without the innovation term, *a*:

$$\text{Total costs (with } a) = (1-a)kq^2 \text{ ;}$$

$$\text{Total costs (without } a) = kq^2 \text{ ;}$$

$$\Delta\text{Total costs} = akq^2.$$

The total costs saved is dependent on the total quantity. Therefore, a lower quantity may weaken firm 1's innovation incentives under trade restrictions. It might be conjectured that when $q_1^{TR} < q_1^{FT}$, it is likely that the innovation level under trade restrictions is lower than under free trade.

In order to confirm this intuition, consider again the marginal effect of a change in the innovation term, *a*, on firm 1's equilibrium profits under free trade and under trade restrictions, taking into account that q_1 and q_i are chosen optimally under each scenario:

$$\frac{d\pi_1^{FT}}{da} = \frac{4k[2(1-a^{FT})k(N+1)+3N+1]}{[2(1-a^{FT})k(N+1)+N+3]^3} - \alpha a^{FT}$$

$$\frac{d\pi_1^{TR}}{da} = \frac{k}{4\,[1+(1-a)k(2N-1)]^2} - \alpha a$$

Simplifying the above functions using the optimal quantities q_1^{FT} and q_1^{TR} from equations (3) and (9) leads to:

$$\frac{d\pi_1^{FT}}{da} = k[2(1-a)k(N+1)+3N+1](q_1^{FT})^2 - \alpha a \qquad (12)$$

$$\frac{d\pi_1^{TR}}{da} = k(q_1^{TR})^2 - \alpha a. \qquad (13)$$

Therefore, the innovation incentive under free trade is higher than under trade restrictions when firm 1's optimal quantity under free trade is greater than under trade restrictions. On the other hand, firm 1 may have a greater incentive to innovate under trade restrictions than under free trade when its optimal quantity under trade restrictions is, in fact, greater than under free trade.

e. Rent Seeking Model

This is the state in which firms lobby for their favourable market structure based on their expected payoff and lobbying cost functions. The analysis assumes that the probability that firm 1 wins the rent seeking contest equals the proportion of firm 1's lobbying effort in the total rent seeking efforts, called P_1. This is also the probability that export restrictions are realized. On the other hand, other firms can lobby against trade restrictions by increasing the total rent seeking efforts to dilute firm 1's probability of winning.

The probability that free trade is realized, therefore, equals $1 - P_1$. Their lobbying costs increase with their rent seeking efforts. Firms may have different lobbying cost functions, and it is assumed that firm 1 is the only firm that can lobby for trade restrictions:

$$V_1 = \frac{x_1}{x_1+\sum_{i=2}^{N} x_i}\pi_1^{TR} + \left(1 - \frac{x_1}{x_1+\sum_{i=2}^{N} x_i}\right)\pi_1^{FT} - k_l x_1 \quad (14)$$

$$V_2 = \left(1 - \frac{x_1}{x_1+\sum_{i=2}^{N} x_i}\right)\pi_i^{FT} - m_l x_i \quad (15)$$

$$P_1 = \frac{x_1}{x_1+\sum_{i=2}^{N} x_i} \quad (16)$$

Firm 1 may be more well connected to the government than are the other firms, which makes it more efficient in the lobbying contest for export restrictions, where k_l and m_l denote firm 1's and firm *i*'s lobbying efficiency parameters, respectively. Firm 1's payoff function, V_1 equals the sum of its expected profit under trade restrictions and its expected profit under free trade, minus its lobbying costs. Similarly, firm *i*'s payoff function, V_2, equals its expected profit under free trade minus its lobbying costs.

The FOCs of the expected payoffs with respect to x_1 and x_i are:

$$\frac{(\pi_1^{TR}-\pi_1^{FT})\sum_{i=2}^{N} x_i}{(x_1+\sum_{i=2}^{N} x_i)^2} - k_l = 0 \quad (17)$$

$$\frac{\pi_i^{FT} x_1}{(x_1+\sum_{i=2}^{N} x_i)^2} - m_l = 0 \quad (18)$$

From the above functions, it can be shown that a firms' willingness to increase their lobbying efforts is proportional to their gains from lobbying. For firm 1, its gain from lobbying is the difference between its profit under trade restrictions and under free trade. For firm *i*, their gains from lobbying are their profits under free trade. Moreover, if firm 1 is more efficient in lobbying, which means that *k* is small, then it is more willing to invest in the lobbying contest:

$$\frac{x_1}{\sum_{i=2}^{N} x_i} = \frac{m}{k}\left(\frac{\pi_1^{TR} - \pi_1^{FT}}{\pi_i^{FT}}\right) \quad (19)$$

Firm 1's probability of winning the rent seeking contest can be determined using the above equation:

$$P = \frac{x_1}{x_1 + \sum_{i=2}^{N} x_i} = \frac{m_l(\pi_1^{TR} - \pi_1^{FT})}{k_l \pi_i^{FT} + m_l(\pi_1^{TR} - \pi_1^{FT})} \quad (20)$$

f. Incentives for Lobbying

This section demonstrates how firm 1's relative efficiency in production as compared with the other firms can change their gains from lobbying, as well as their incentives to lobby. Consider the following more simplified profit functions under free trade and trade restrictions:

$$\pi_1^{FT} = (1 - Q)q_1 - q_1^2 \quad (21)$$

$$\pi_i^{FT} = (1 - Q)q_i - m_p q_i^2 \quad (22)$$

$$\pi\_1\text{^}TR = (1 - Q)\ q\_1 - q\_1\text{^}2 + (1 - Q)(N - 1)\ q\_i - m\_p\ (N - 1)\ q\_i\text{^}2 \quad (23)$$

In order to simplify the analysis, the innovation term is considered fixed and firm 1's production efficiency parameter is normalized to 1, while m_p is treated as the relative efficiency of other firms as compared with firm 1.

The purpose of the analysis is to understand what would happen to firm 1's probability of winning when the other firms become more efficient as compared with firm 1.

After solving for the optimal outputs q_1 and q_i in each case (see Appendix A.5), the equilibrium profit functions become:

$$\pi_1^{FT} = 2\left(\frac{2m_p+1}{3N+8m_p+1}\right)^2 \tag{24}$$

$$\pi_i^{FT} = (m_p+1)\left(\frac{3}{3N+8m_p+1}\right)^2 \tag{25}$$

$$\pi_1^{TR} = \frac{m_p+N-1}{4(2m_p+N-1)} \tag{26}$$

If $N > \frac{8m_p+15}{3}$, the probability that firm 1 wins the lobbying contest decreases with m_p. From equation (20), it is possible to determine the marginal effect of a change in m_p on firm 1's winning probability:

$$\frac{\partial P}{\partial m_p} = z\left[\pi_i^{FT}\frac{\partial(\pi_1^{TR}-\pi_1^{FT})}{\partial m_p} - (\pi_1^{TR}-\pi_1^{FT})\frac{\partial \pi_i^{FT}}{\partial m_p}\right] \tag{27}$$

$$z = \frac{m_l k_l}{\left[k_l\pi_i^{FT}+m_l(\pi_1^{TR}-\pi_1^{FT})\right]^2} \tag{28}$$

It can be seen that the marginal effect of a change in firm 1's relative efficiency on the probability of winning depends on two terms: $\frac{\delta(\pi_1^{TR}-\pi_1^{FT})}{\delta m_p}$ and $\frac{\delta \pi_i^{FT}}{\delta m_p}$. The first term is the marginal effect of a change in m_p on firm 1's gains from lobbying. Firm 1's gains from lobbying are the difference between its profits under trade restrictions and free trade. Under free trade, firm 1 has to compete with firms 2, ..., *N* in Cournot competition.

The more efficient is firm *i*, the more competitive does the market become, which has a negative effect on firm 1's profits. Therefore, firm 1's free trade profit is negatively affected

by a decrease of m_p. This can be shown by considering the marginal effect of a change in m_p on firm 1's profit under free trade:

$$\frac{\partial \pi_1^{FT}}{\partial m_p} = 4\left(\frac{2m+1}{3N+8m_p+1}\right)\frac{6(N-1)}{(3N+8m_p+1)^3} > 0$$

However, under trade restrictions, the more efficient firm *i* can supply firm 1 with cheaper inputs. Therefore, the profit of firm 1 under trade restrictions is positively affected by a decrease in m_p. This can be shown by considering the marginal effect of a change in m_p on firm 1's profit under trade restrictions:

$$\frac{\partial \pi_1^{TR}}{\partial m_p} = \frac{-(N-1)}{4(2m_p+N-1} < 0.$$

Therefore, firm 1's gains from lobbying will increase when other firms become relatively more efficient, which makes the first term negative:

$$\frac{\partial(\pi_1^{TR}-\pi_1^{FT})}{\partial m_p} < 0. \tag{29}$$

Consider the marginal effect of a change in m_p on firm *i*'s free trade profits:

$$\frac{\partial \pi_i^{FT}}{\partial m_p} = \frac{9(3N-8m_p-15)}{(3N+8m_p+1)^3}$$

If $N > \frac{8m_p+15}{3}$, then $\frac{\partial \pi_i^{FT}}{\partial m_p} > 0$. This means that, when there are too many firms in the export market, reducing m_p may lead to an increase in competition, which decreases firm *i*'s equilibrium profits. Therefore, when *N* is sufficiently large, the following inequality holds:

$$\pi_i^{FT} \frac{\partial(\pi_1^{TR} - \pi_1^{FT})}{\partial m_p} - (\pi_1^{TR} - \pi_1^{FT}) \frac{\partial \pi_i^{FT}}{\partial m_p} > 0$$

The analysis demonstrates the fact that firm 1 may feel threatened by the entry of relatively more efficient firms. Consequently, the threat forces firm 1 to try to influence the government. By participating in the rent seeking contest, firm 1 can lobby for trade restrictions in order to neutralize the harmful effects of the entering firms on its profits.

Under trade restrictions, firm 1 can avoid direct competition with other firms, and turn them into its suppliers. Thus, firm 1 will have greater incentives to lobby for trade restrictions when there are more firms with greater efficiency that enter the export market. Consequently, firm 1 will have a higher probability of winning the rent seeking contest, and trade restrictions are more likely to be realized.

4. Concluding Remarks

The market structure under trade restrictions has changed exporter behaviour in a unique way. Based on the findings of the paper, if exporters are very efficient, they are more likely to expand their production under trade restriction as compared with that under free trade. The increased production will increase the innovation incentives of exporters under trade restrictions. On the other hand, trade restrictions have increased exporter bargaining power, so that there is a reduction in the input prices that exporters pay to other producers.

Therefore, an inefficient exporter would choose to buy rice from other firms and re-sell on the world market instead of producing rice themselves. Consequently, a low production level will reduce innovation incentives because the value of innovation is dependent on the level of production. On the other hand, inefficient exporters are more likely to be hurt by competition with efficient firms under free trade. Moreover, being able to buy inputs of rice at cheap prices

is more valuable to these firms as compared with more efficient firms. Consequently, these inefficient firms are more likely to lobby for trade restrictions.

For a long time, Vinafood companies have held a dominant role in the rice export market, with around 40-50 per cent of the total export quantity. On the other hand, their profits are heavily dependent on G2G contracts, which are often exported in large quantities. It is said that around 50 per cent of Vinafoods exports are from G2G contracts (Tran et al., 2013). However, these firms do not grow their own rice to fulfill their contracts. Instead, they depend on the rice supply collected from farmers and other producers. The nature of their business model, which is based on trading rice in the export market rather than producing rice, explains why these exporters are reluctant to invest in technologies and innovations to increase export quality. On the other hand, the SOEs often win the auctions for these contracts by offering the lowest prices.

Moreover, the same SOEs often collect rice from merchants and intermediaries immediately after winning the auction, without preparing their own supply sources in advance. Thus, the only choice for them is to buy rice as inputs at spot prices. From the rent seeking perspective, these firms are likely to lobby for export restriction from the time the auctions start until the designated delivery date. The first reason is to reduce potential competitors who might undercut them in the auctions; second, the exporters can collect rice from the spot market at lower prices.

Even though the export restrictions may have caused some inefficiencies, a complete liberalization of the rice export market is unlikely to occur immediately, especially in view of the rents received by the political elite. On the other hand, the government still has to face the pressure of increasing export quality. There are possible ways that the government can make export restrictions a better policy to foster the adoption of innovations. If the objective of export restrictions is to retain the leading roles of SOEs in the export market, the policy should

be adjusted so that these SOEs have incentives to increase the competitiveness of rice exports from Vietnam.

If government policy were designed appropriately, the adoption of innovations should be an essential condition to provide and maintain food company export rights in the export market. In particular, monopoly rights should be withdrawn when the SOEs are not able to commit themselves to specified innovation objectives. From the analysis presented in the paper, fostering exporter self-production might be suggestive to increase their innovation incentives under export restrictions. This condition could prevent firm 1 from only buying from other firms and neglecting innovation activities. In general, more innovative policies and political innovations would seem to be required in order to manage the practice of providing rents effectively.

Appendix

A.1 Free Trade Equilibrium

Given:

$$\pi_1^{FT} = (1-Q)q_1 - (1-a)kq_1^2 - \frac{\alpha}{2}a^2$$
$$\pi_i^{FT} = (1-Q)q_i - \frac{1}{2}q_i^2,$$

with $i = 2, 3, ..., N$,

the first-order conditions (FOC) of π_1^{FT} and π_i^{FT} with respect to q_1 and q_i, are:

$$-q_1 + 1 - q_1 - \sum_{i=2}^{N} q_i - 2(1-a)kq_1 = 0$$
$$-q_i + 1 - q_1 - \sum_{i=2}^{N} q_i - q_i = 0$$

The equilibria q_1^{FT} and q_i^{FT} are:

$$q_1 = \frac{2}{2(1-a)k(N+1) + N + 3}$$
$$q_i = \frac{2(1-a)k + 1}{2(1-a)k(N+1) + N + 3}, \quad \text{with } i = 2, 3, ..., N.$$

The total quantity and price level are:

$$Q = \frac{(1-a)k(N-1)+N+1}{2(1-a)k(N+1)+N+3}$$
$$P = \frac{4(1-a)k+2}{2(1-a)k(N+1)+N+3}$$

The free trade profit function of firm 1 is:

$$\pi_1 = \frac{4(1-a)k+2}{2(1-a)k(N+1)+N+3}\frac{2}{2(1-a)k(N+1)+N+3} - (1-a)k\frac{4}{\left[2(1-a)k(N+1)+N+3\right]^2} - \frac{\alpha}{2}a^2$$

Simplifying the equation:

$$\pi_1 = \frac{4(1-a)k+4}{\left[2(1-a)k(N+1)+N+3\right]^2} - \frac{\alpha}{2}a^2$$

the first-order condition with respect to a is:

$$\frac{4k\left[2(1-a^{FT})k(N+1)+3N+1\right]}{\left[2(1-a^{FT})k(N+1)+N+3\right]^3} - \alpha a^{FT}$$

A.2 Trade Restrictions Equilibrium

Given:

$$\pi_1^{TR} = (1-Q)q_1 - (1-a)kq_1^2 - \frac{\alpha}{2}a^2 + (1-Q)\sum_{i=2}^{N} q_i - \frac{1}{2}\sum_{i=2}^{N} q_i^2$$
$$= (1-Q)q_1 - (1-a)kq_1^2 - \frac{\alpha}{2}a^2 + (1-Q)(N-1)q_i - \frac{1}{2}(N-1)q_i^2$$
$$\pi_i^{TR} = 0$$

The FOC of π_1^{TR} and π_i^{TR} with respect to q_1 and q_i are:

$$-q_1 + 1 - q_1 - (N-1)q_i - 2(1-a)kq_1 - (N-1)q_i = 0$$

$$-(N-1)q_1 - (N-1)^2 q_i + [1 - q_1 - (N-1)q_1](N-1) - (N-1)q_i = 0$$

The equilibria for q_1 and q_i are:

$$q_1 = \frac{1}{2}\frac{1}{1+(1-a)k(2N-1)}$$
$$q_i = \frac{(1-a)k}{1+(1-a)k(2N-1)}$$

The total quantity and the price level are:

$$Q = \frac{\frac{1}{2} + (N-1)(1-a)k}{1+(1-a)k(2N-1)}$$
$$P = \frac{\frac{1}{2} + (1-a)kN}{1+(1-a)k(2N-1)}$$

The trade restriction profit function of firm 1 is:

$$\pi_1 = \frac{\frac{1}{2} + (1-a)kN}{\left[1 + (1-a)k(2N-1)\right]^2}\frac{1}{2} - (1-a)k\frac{\frac{1}{4}}{\left[1 + (1-a)k(2N-1)\right]^2} - \frac{\alpha}{2}a^2$$
$$+ \frac{\left[\frac{1}{2} + (1-a)kN\right](N-1)(1-a)k}{\left[1 + (1-a)k(2N-1)\right]^2} - \frac{1}{2}(N-1)\frac{(1-a)^2k^2}{\left[1 + (1-a)k(2N-1)\right]^2}$$

Simplifying the equation:

$$\pi_1^{TR} = \frac{\frac{1}{2}(N-1)(1-a)k + \frac{1}{4}}{1 + (1-a)k(2N-1)} - \frac{\alpha}{2}a^2$$

the FOC with respect to a is:

$$\frac{\frac{1}{4}k}{\left[1 + (1-a^{TR})k(2N-1)\right]^2} - \alpha a^{TR} = 0$$

A.3 Monopoly Effect Equilibrium

$$Q^{TR} < Q^{FT}$$

$$Q^{FT} > Q^{TR}$$
$$\Leftrightarrow \frac{2(1-a^{FT})k(N-1) + N + 1}{2(1-a^{FT})k(N+1) + N + 3} > \frac{1 + 2(1-a^{TR})k(N-1)}{2 + 2(1-a^{TR})k(2N-1)}$$
$$\Leftrightarrow \frac{2(1-a^{FT})k(2N-2) + 2N + 2}{2(1-a^{FT})k(N+1) + N + 3} > \frac{1 + (1-a^{TR})k(2N-2)}{1 + (1-a^{TR})k(2N-1)}$$

we have:

$$\frac{2(1-a^{FT})k(2N-2)+2N+2}{2(1-a^{FT})k(N+1)+N+3} > 1$$

when $N \geq 3$, and:

$$\frac{1+(1-a^{TR})k(2N-2)}{1+(1-a^{TR})k(2N-1)} < 1.$$

Therefore, the original inequality holds when $N \geq 3$.

A.4 Condition that $q_1^{FT} > q_1^{TR}$ holds (when there is no innovation)

$$\begin{aligned} & q_1^{FT} > q_1^{TR} \\ \Leftrightarrow & \frac{2}{2k(N+1)+N+3} > \frac{1}{2}\frac{1}{1+k(2N-1)} \\ \Leftrightarrow & [4(2N-1)-2(N+1)]\,k > N-1 \\ \Leftrightarrow & k > \frac{1}{6} \end{aligned}$$

A.5 Equilibrium profits without innovation

$$\pi 1^{FT} = (1-Q)q1 - q12 \; \pi i^{FT} =$$

$$(1-Q)qi - mpqi2$$

$$\pi_1{}^{TR} = (1-Q)q_1 - q_1{}^2 + (1-Q)(N-1)q_i - m_p(N-1)q_i{}^2$$

Optimal quantities:

$$q_1^{FT} = \frac{2m_p + 1}{8m_p + 3N + 1}$$
$$q_i^{FT} = \frac{3}{8m_p + 3N + 1}$$
$$q_1^{TR} = \frac{m_p}{4m_p + 2(N-1)}$$
$$q_i^{TR} = \frac{1}{4m_p + 2(N-1)}$$

Equilibrium profits:

$$\pi_1^{FT} = 2\left(\frac{2m_p + 1}{3N + 8m_p + 1}\right)^2$$
$$\pi_i^{FT} = (m_p + 1)\left(\frac{3}{3N + 8m_p + 1}\right)^2$$
$$\pi_1^{TR} = \frac{m_p + N - 1}{4(2m_p + N - 1)}$$

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