

# International Joint Ventures and Endogenous Protection: A Political-Economy Approach

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## **Abstract**

This paper constructs a model of international joint ventures (JVs) with political-economy considerations as the main motivation. A foreign firm decides whether to undertake full ownership foreign direct investment (FDI), or to form a JV with a home firm, while the home firm lobbies against FDI. It is shown that the level of lobbying is lower in the JV regime than in the FDI regime if the foreign firm transfer sufficiently advanced technology to the home firm through the JV. However, if the foreign firm anticipates future protectionist threats and forms a JV with the home firm beforehand (quid pro quo JV), then the foreign firm's profit increases and the home firm's level of lobbying decreases. (JEL Classification: F21, F12)

## **I. Introduction**

Recently the economics of production joint ventures (JV) has received a great deal of attention. For example, Reynolds and Snapp [1986] demon-

strated that cross ownership of equities by competing firms reduces industry output and increases profits. Shapiro and Willig [1990] analyzed the (anti) competitive effects of JVs. Svejnar and Smith [1984] adopted the Nash bargaining approach to study JV profit sharing in less developed countries. However, when it comes to the motivations for JV formation, the literature dwells largely on risk sharing, technology transfer, the increase of market power and the reduction of transaction costs see Contractor and Lorange, [1988] .

It seems that one important motive for international JV formation has been ignored, that is, political economy. Numerous cases indicate that international JVs involve political-economy considerations. In many less developed countries, foreign firms can do business only if they form JVs with local firms, and if such JVs are formed, foreign firms may benefit from host country government grants, subsidies, tax and export incentives; In some developed countries, international JVs are used to ease 'political tensions' full ownership foreign direct investment (FDI) may cause, and to forestall restrictions against foreign imports.<sup>1</sup> Once a JV is formed, both parties are in a mutually beneficial and mutual hostage position. In the words of Reich and Mankin [1986, p83], "(Japanese-US) Joint ventures and coalitions employ Americans selling Japanese products. If trade barriers limit the flow of products from Japan, American workers will lose their jobs ... and corporations will lose money." It is reported that the GM-Toyota JV formed in the U.S. in 1983 converted GM into an advocate of free trade while Chrysler and Ford lobbied for the renewal of the voluntary export restraint against Japan in 1985 see Bhagwati et al., [1992] .

This paper takes a political-economy approach to the formation of international JVs based on the above observations. We model the interactions between a foreign firm and a home firm competing in the home country

home firm lobbies directly against full ownership FDI.<sup>2</sup> The foreign firm has better production technology than the home firm.<sup>3</sup> It decides whether to undertake full ownership FDI, or to form a JV with the home firm.

We first study the FDI regime, in which the foreign firm chooses to undertake full ownership FDI instead of forming the JV. Firm interactions are modelled as a Cournot-Nash game, in which the home firm's lobbying and output are determined simultaneously. We compare this with the JV regime, in which the formation of the JV is modelled as a Nash bargaining game, and simultaneously the home firm chooses the level of lobbying and output. We call this the quota-jumping JV, since foreign imports are restricted by a quota. We find that the quota-jumping JV is successful in reducing the home firm's lobbying only if the technology transferred to the home firm through the JV is sufficiently advanced. The interesting aspect of the JV is, it will not be formed if the home firm does not lobby. Lobbying thus serves as a facilitating device for the firms to form the JV and cooperate, thereby increase market power and profits.

We then make slight modifications to the basic JV model, to analyze the case in which the JV is formed before other endogenous variables are determined. In this case, the foreign firm may have first-mover advantage versus the home firm's lobbying activities. This type of JV can be classified **quid pro quo**. The idea is similar to that of quid pro quo FDI, as in Bhagwati et al. [1992] and Grossman and Helpman [1994], which the foreign firm undertakes in anticipation of and with the goal of defusing future protectionist threats. This is in contrast to the conventional **tariff-jumping** FDI, which occurs in response to existed trade restrictions. The essence of quid pro quo JV is, the foreign firm by giving up technology and a portion of profits,

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<sup>2</sup> Bhagwati et al. [1992] notes that there have been demands in the U.S. to add Japan

successfully 'bribes' the home firm to reduce lobbying. This can be viewed as a form of foreign (counter)lobbying. However, such JVs are very controversial, particularly in the US. Some believe that the Japanese-US JVs resulted in US workers assembling and selling Japanese products in the US see Reich and Mankin [1986] .

In the present model, we show that under quid pro quo JV, the foreign firm offers to form the JV beforehand. As a result, its output and profit increase, while the home firm's output, profit as well as its level of lobbying decrease.

Section II presents the basic model and compares the FDI and JV equilibria, section III studies quid pro quo JV, and section 4 concludes and discusses extensions.

## II. The Basic Model

In the basic model, we characterize two different equilibria. One is the FDI regime, and the other the JV regime.

Consider a home firm and a foreign firm, producing a homogeneous product. Both firms produce and sell only in the home country.<sup>4</sup> Let  $x$  be the output of the foreign firm in the home country under full ownership FDI,  $y$  be the output of the home firm, and  $z$  be the output of the JV in the JV regime. The world output is identical to  $q_1 = x + y$  in the FDI regime and to  $q_2 = x + y + z$  in the JV regime. For simplicity, we assume linear demand and production cost functions throughout the paper. The inverse demand is given by  $p(q_i) = \alpha - q_i$ ,  $i = 1, 2$ , where  $\alpha$  is a positive constant.

To produce output level  $y$ , the home firm incurs a cost of  $cy$ , where  $c > 0$  is a constant. The foreign firm has better production technology (lower marginal and average cost) than the home firm. To produce output level  $x$  in the

$x = x(L)$ , where  $L$  is the level of the home firm's lobbying, with  $x_L < 0$  and  $x_{LL} > 0$ . The lobbying function approach to model endogenous protection was pioneered by Findlay and Wellisz [1981]. The well known advantage is its simplicity, with the shortcoming that it does not model the actual lobbying activities explicitly. The home firm incurs a cost for lobbying,  $e(L)$ , with  $e_L > 0$ , and  $e_{LL} > 0$ .

### A. *The FDI Regime*

In the FDI regime, the foreign firm's profit can be written as

$$\pi_0^* = p(x + y)x(L) - (1 - \theta)cx(L) \quad (1a)$$

There is a one to one ratio between FDI and output by choice of units. The home firm has a higher average cost, with a profit function of

$$\pi_0 = p(x + y)y - cy - e(L) \quad (1b)$$

In the FDI regime, the equilibrium concept is the Cournot-Nash type; that is, the home firm chooses output  $y$  and the level of lobbying  $L$  simultaneously to maximize profits. The foreign firm also chooses output to maximize its own profits if FDI is not restricted. With the quota on FDI, the foreign firm's output choice is taken away. The first order conditions (FOCs) for the home firm are obtained as<sup>5</sup>

$$a - (x + 2y) - c = 0 \quad (2a)$$

$$-yx_L - e_L = 0 \quad (2b)$$

The above FOCs implicitly determine the equilibrium levels of  $y$  and  $L$  in the FDI regime. The quota on FDI,  $x$ , is also determined since it is a function of  $L$ . Combining (2a) and (2b), we obtain

### ***B. The JV Regime***

Since the foreign firm has better production technology, it can also induce the home firm to form a JV in the host country. The incentives for the home partner to form a JV include obtaining better foreign technology through the JV, reducing cost of production, increasing profits and possibly gaining a bigger market share. On the other hand, the foreign firm may wish to transfer technology to the home firm in order to reduce the lobbying of the latter and increase the quota allowed. It may wish to take advantage of the domestic firm's local market knowledge and distributional network, etc.

We assume that when the JV is formed, it uses the foreign firm's better technology. The home firm still uses the inferior technology for its own independent production. The foreign technology can only be transferred gradually in future periods, which reflects the fact that in practice, Japanese automobile makers transferred compact car technology to U.S. automobile makers gradually through JVs. Thus, this type of JV is in essence a 'bribery'.

Assume that the home firm contributes a share,  $s$ , to the JV's production cost and in return gets the same share,  $s$ , of the JV's profit. Share  $(1 - s)$  goes to the foreign firm. The profit functions for the foreign firm and the home firm in the JV regime respectively are

$$\pi^* = p(x + y + z)x - (1 - \theta)cx + (1 - s)\pi^J \quad (4a)$$

$$\pi = p(x + y + z)y - cy - e(L) + s\pi^J \quad (4b)$$

where  $\pi^J = p(x + y + z)z - (1 - \theta)cz$  is the profit of the JV.

There are different ways to model the formation of a JV. Some authors simply assume that the partners maximize joint profits, while others assume that the firm with a bigger equity share controls the JV completely see Yu

the threat point.

If bargaining breaks down, the JV is not formed and the FDI regime is obtained, as in the previous subsection. The threat point corresponds to the Cournot-Nash equilibrium in the FDI regime. Thus the conflict payoffs to the two firms at the threat point can be treated as given, since they are not affected by the JV bargaining game.

With the above bargaining structure, the Nash product can be written as

$$G(z, s) = (\pi - \pi_0)(\pi^* - \pi_0^*) \quad (5)$$

where  $\pi_0$  and  $\pi_0^*$  are the conflict payoffs to the home and the foreign firms at the threat point, given in (1). The expressions  $\pi - \pi_0$ ,  $\pi^* - \pi_0^*$  thus respectively represent the incremental profits the home and foreign firms gain from the formation of the JV. Note that the incremental profits must be positive to both firms for the JV to be formed. Otherwise the threat point is realized and the JV is not formed.

The two firms choose  $z$  and  $s$  to maximize  $G(\cdot)$ . The FOCs are obtained as

$$(\pi^* - \pi_0^*)\pi_z + (\pi - \pi_0)\pi_z^* = 0 \quad (6a)$$

$$(\pi^* - \pi_0^*) + (\pi - \pi_0) = 0 \quad (6b)$$

where  $\pi_z^J = \partial\pi^J/\partial z$ ,  $\pi_z = -y + s\pi_z^J$ ,  $\pi_z^* = -x + (1-s)\pi_z^J$ . Combining the above and simplifying to give

$$p(x + y + z) - (x + y + z) - (1 - \theta)c = 0 \quad (7a)$$

Eq. (7a) is the condition for joint profit maximization of the two firms through the JV. While condition (6b) states that the equity shares should be allocated such that the two firms have equal incremental profits from the formation of the JV, eq. (7a) implies that they must choose  $z$  to maximize

$$\alpha - [x + 2y + (1 + s)z] - c = 0 \quad (7b)$$

$$- (y + sz)x_L - e_L = 0 \quad (7c)$$

Eqs. (7a), (7b) and (7c) jointly determine  $z$ ,  $y$ , and  $L$ . The variable  $s$  must be chosen such that condition (6b) is satisfied. Combining (7a)-(7c), we also obtain

$$- \frac{1}{2}(a - c - c)x_L - e_L = 0 \quad (8)$$

which determines the equilibrium level of lobbying in the JV regime.

Denote the equilibrium levels of the variables in the FDI regime with a subscript  $_{fdi}$ , and the counterpart in the JV regime with a subscript  $_{jv}$ , then we have

**Proposition 1:**  $L_{jv}$  is equal to, or greater than, or smaller than  $L_{fdi}$  according to if  $\theta c$  is equal to, or smaller than, or greater than  $x_{fdi}$ .

**Proof:** We compare conditions (3) and (8). In both conditions, the first term on the LHS denotes the marginal benefit of lobbying, while the second term denotes marginal cost. If  $\theta c = x_{fdi}$ , then conditions (3) and (8) are identical, which implies  $L_{jv} = L_{fdi}$ ; if  $\theta c < x_{fdi}$ , then the marginal benefit of lobbying is higher in (8) than in (3), which implies  $L_{jv} > L_{fdi}$ ; if  $\theta c > x_{fdi}$ , then the marginal benefit of lobbying is lower in (8) than in (3), which implies  $L_{jv} < L_{fdi}$ .

Q.E.D.

Intuitively,  $\theta c$  is the cost advantage the foreign firm enjoys over the home firm. Since the JV uses the foreign firm's better technology, the home firm gains cost efficiency through the JV. However, forming a JV also reduces the home firm's own output due to the intra-marginal effect, since the products are perfect substitutes. If this gained cost efficiency is small such that

### III. Quid Pro Quo JV

This section builds on the insight of *quid pro quo* FDI see, for example, Bhagwati et al. [1992]. In the present paper, *quid pro quo* JV arises when the foreign firm foresees future protection threats in the home country. Hoping to defuse or reduce such threats, it offers to form a JV with the home firm. This can be interpreted as a form of foreign counter-lobbying.<sup>6</sup> In order for *quid pro quo* JV to occur, the foreign firm must be able to move *before* the home firm. It does not wait until *after* the imposition of trade restrictions. Thus, we assume that this game has two stages. In the first stage, the two firms form a JV. The profit shares and the level of the JV output are again determined through a Nash bargaining process. In the second stage, the home firm makes its choices of output and lobbying. To ensure consistency, the game is solved backwards. We compare the equilibrium of this game structure with that in the quota-jumping JV model in section II. B.<sup>7</sup>

Under *quid pro quo* JV, the second stage equilibrium is characterized by conditions (7b) and (7c) in the previous section, which determine  $y$  and  $L$ , given  $s$  and  $z$  in the first stage. Totally differentiating these two conditions to give

$$-2dy + \pi_{yL}dL = (1+s)dz + zdz \quad (9a)$$

$$\pi_{Ly}dy + \pi_{LL}dL = sx_Ldz + zx_Lds \quad (9b)$$

where  $\pi_{yL} = \pi_{Ly} = -x_L > 0$ , and  $\pi_{LL} = -[(y+sz)x_{LL} + e_{LL}] < 0$ . For existence and uniqueness of equilibrium, we need the determinant to be positive, i.e.

$$\Delta = -\{2\pi_{LL} + (\pi_{Ly})^2\} > 0 \quad (10)$$

Applying Cramer's rule, we obtain

$$v = dv/dz = \{(1+s)\pi_{Ly} + s(\pi_{Ly})^2\}/\Delta < 0 \text{ given } s < 1 \quad (11a)$$

$$L_s = dL/ds = z\pi_{yL}/\Delta > 0 \quad (11c)$$

$$y_s = dy/ds = z\{(\pi_{yL})^2 + \pi_{LL}\}/\Delta \quad (11d)$$

The interpretations of conditions (11a)-(11c) are relatively straightforward. (11a) implies that an increase in  $z$  reduces  $y$ , since they are substitutes to each other; (11b) implies that an increase in the JV output reduces the home firm's lobbying, since the marginal benefit of lobbying is reduced due to the substitution of  $y$  by  $z$ ; (11c) implies that an increase in the home firm's share of the JV profit raises its lobbying, since the marginal benefit of lobbying increases.

The sign of condition (11d) depends on two effects: (i). The expression  $\pi_{yL} > 0$  implies that  $y$  and  $L$  are strategic complements to the home firm, in the sense of Bulow et al. [1985], (ii). The expression  $\pi_{LL} < 0$  implies that the home firm's marginal profit of lobbying is declining. These two effects work in opposite directions. If the first effect is strong, then the sign of (11d) can be non-negative. In the rest of the paper, we assume this is the case.

Now we turn to the first stage, in which the two firms again form the JV through a Nash bargaining process for  $s$  and  $Z$ , taking into consideration that  $s$  and  $Z$  also affect  $L$  and  $y$  in the second stage. Invoking conditions (11a)-(11d), the FOCs for this Nash bargaining game can be written as

$$(\pi^* - \pi_0)\pi_z + (\pi - \pi_0)\pi_z^* + (\pi - \pi_0)\{\pi_L^*L_z + \pi_y^*y_z\} = 0 \quad (12a)$$

$$[(\pi^* - \pi_0) - (\pi - \pi_0)]\pi^J + (\pi - \pi_0)(\pi_y^*y_s + \pi_L^*L_s) = 0 \quad (12b)$$

where  $\pi_L^* = \pi_x^*X_L < 0$  given the quota, i.e.  $\pi_x^* > 0$  and  $\pi_y^* = -x - (1-s)z < 0$ , obtained by differentiating expression (4b).

Comparing conditions (6b) and (12b), it is immediately clear that the latter has one extra term  $(\pi_y^*y_s + \pi_L^*L_s)$  which is negative if  $y_s > 0$  in (11d). This

jumping JV model in section II. B, condition (6b) states that the two firms have equal profit differentials.

Now, what are the effects of quid pro quo JV on  $z$  and  $y$ ? Comparing condition (6a) and (12a), one sees that the latter has an extra positive term,  $(\pi - \pi_0)\{\pi_L^* L_z + \pi_y^* y_z\}$ . Thus  $z$  is bigger under quid pro quo JV, compared with that under quota-jumping JV. And since  $y_z < 0$ , then  $y$  is in turn smaller under quid pro quo JV.

What can we say about the level of lobbying under quid pro quo JV? Since  $L_z < 0$ ,  $L_s > 0$  and the fact that  $s$  is smaller and  $z$  is bigger under quid pro quo JV, then  $L$  must be smaller. As a consequence, the quota allowed,  $x$ , is higher.

Summarizing this section, we establish

**Proposition 2:** Under Quid pro quo JV, the JV output, the foreign firm's share of the JV and its profit are higher than the counterpart under quota-jumping JV. The home firm's levels of output and lobbying are lower and the resulting quota on FDI is higher.

Intuitively, the foreign firm foresees protectionist threats and offers to form a JV beforehand. This conveys Stackelberg first-mover advantage to the foreign firm in the sense that it internalizes the effects which the home firm's lobbying and output choice may cause, and thus obtains a bigger share of the JV and a higher profit incremental.

#### IV. Conclusions

JVs are particularly relevant in sectors with strong labor unions and fierce foreign competition, such as the automobile industry. Through the JV, the foreign firm can penetrate the protected home country market, while the home country workers keep their jobs and the corporations keep their profits.

The present paper can be extended in several directions. For instance, one could introduce a home country labor union and investigate whether the union is indifferent between JV and full ownership FDI or not.

Another possible extension is to introduce a home government that actively carries out commercial policies. In such a scenario, the government maximizes a weighted welfare function, choosing the levels of FDI and import restrictions. The home firm's (union's) lobbying affects the weights on the arguments (profits, consumer surplus, etc.) in the welfare function. Then the impact of quid pro quo JV on the government's activities can be studied.

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