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Domestic Lobbying and Foreign Direct Investment
The Role of Policy Instruments

By

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Abstract

Following the Common Agency approach to political equilibrium, we examine how domestic interest groups can influence national policies towards FDI and how the choice of instrument by the government can affect lobbying activities. Domestic firms lobby for lower subsidies when a discriminatory subsidy on FDI is applied. However, when subsidy is applied uniformly to both groups, they may lobby for higher subsidies. The nature of lobbying is also different for proportional and lump-sum profit subsidies when uniformly applied. The qualitative effect of the number of domestic firms or the degree of corruption on the equilibrium depends on the choice of instruments.

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1 Introduction

The total volume of Foreign Direct Investment (FDI) has been increasing rapidly over the last two decades. According to UNCTAD, the ratio of inward plus outward FDI stocks to global GDP is 21 per cent, and foreign affiliate exports now make up about one-third of total world exports. More and more countries are creating attractive conditions for FDI. During 1991-1997, 94 per cent of the regulations regarding FDI were relaxed to promote FDI in both developed and developing countries (see UNCTAD (1998)). At the same time, there are some countries designing national policies with the opposite intent. Clearly, the economic decision making process is intertwined with politics. In this paper, we want to show how internal pressure groups can play a role in shaping national policies towards FDI.

As an important element of global economic activity, FDI has received enormous attention from scholars worldwide. Broadly speaking, the theoretical approaches to the issues of FDI can be divided into two main streams. One approach investigates the rationale behind FDI decision. What is analysed is what makes a firm decide to carry out its operations abroad. For a given market, a foreign firm is generally given the choice of either investing in or exporting to that market. The second approach examines the political competition for FDI through public and trade policies and also analyses the effects of FDI on the welfare of the host country.[1] This includes the issue of increasing competition amongst countries trying to attract FDI. It should be noted that this does not necessarily imply that FDI is always beneficial for the host country. In fact, many studies derive conditions under which the host country governments should encourage or discourage FDI. Bulk of the literature considers the host country government as a social welfare maximising agent.

In reality, governments design their policies not only according to welfare concerns,

[1]Brander and Spencer (1987), Ethier (1986), Helpman (1984), Horstmann and Markusen (1992), Motta (1992), and Smith (1987) are some examples to the first stand, while Grossman (1984), Haufler and Wooton (1999), Itagaki (1979), Janeba (1995), Lahiri and Ono (1998a), Markusen and Venables (1998), and Tsai (1999) are examples to the latter one. Some of the papers mentioned above can be fitted into both categories.

but also in response to the interests of organised lobby groups. There are many examples of the influence of special interest groups on a government's policy determination process. For instance, almost all countries have well-organised local producers (such as the automobile industry) who lobby the government for higher levels of protection against imported goods or against the goods of foreign-owned plants producing in the country. The General Agreement on Tariffs and Trade (GATT) restricts the ability of national governments to introduce domestic policies that could reduce international trade. On the other hand, the Trade Related Investment Measures (TRIM) agreement that is based on the existing GATT principles on trade in goods and regulates foreign investment, does not govern the entry and treatment regulations of FDI, but focuses on the discriminatory treatment of imported and exported products and not services. This suggests that national governments can encourage or discourage foreign investors in a discriminatory manner by choosing the policy tools that do not have a direct effect on international trade. Therefore, the political processes generating economic policy is likely to be affected by pressure groups as far as foreign investment is concerned. Even when discriminatory application of policies are not allowed, there can still be room for domestic pressure groups to lobby the government in order to affect the non-discriminatory levels of the policy instruments.

The formulation of political process in economic modelling has many examples in the international trade literature. These include the tariff-formation function approach of Findlay and Wellisz (1982), the political support function approach of Hillman (1989), the median-voter approach of Mayer (1984), the campaign contributions approach of Magee et al (1989), and the political contributions approach of Grossman and Helpman (1994a).[2]

The use of political competition in the theory of FDI stems back to Bhagwati (1985) and his notion of *quid pro quo* (protection-threat-induced FDI) in which he studies how the protection threats affect FDI entry. Takemori and Tsumagari (1997) focus on whether

[2]The literature has been surveyed in several works, including Magee, Brock and Young (1989), and Rodrik (1995) and Grossman and Helpman (2001).

FDI is helpful in reducing the protectionism, and thus achieving free trade. Hillman and Ursprung (1993) also explore how the presence of FDI affects the emergence of protection. They develop a model where both national and multinational firms lobby for protection in the jurisdictions where they have plants. Unlike the authors above, Ellingsen and Wärneryd (1999) deploy a model where the domestic industry does not want the maximum protection and lobby for less protection. They argue that this is because a high level of protection could induce FDI to jump the trade barriers and even may be more harmful for domestic firms. Konishi et al (1999), using common agency framework, construct political economy model in which the choice of protection (between tariff and voluntary export restraint) is endogenously determined. In Bandyopadhyay et al (2003) cost heterogeniety among domestic firms plays an important role. Grossman and Helpman (1994b) combines quid pro quo FDI with their political contributions approach and develop a model in which trade policy and FDI are endogenously and jointly determined. In all these works, trade policies, such as tariff and quota, are the only policy instruments available to the government.

In this work we develop a partial equilibrium model of an oligopolistic industry in which a number of domestic and foreign firms compete in the market for a homogeneous good in a host country. It is assumed that the number of foreign firms is endogenous and can be affected by government policy in the host country. The host country government uses profit and output taxes on FDI. This distinguishes our model from the works mentioned in the previous paragraph since we allow the government to use different forms of taxes — uniform and discriminatory, and lump-sum and proportional — instead of direct trade policies like tariff and quota. Furthermore, we allow for free entry of foreign firms. Lobbying in our model has the structure of the common agency problem explored by Bernheim and Whinston (1986), which is later used by Grossman and Helpman (1994a) to characterise the political equilibrium under trade protection and finally generalised by Dixit, Grossman and Helpman (1997) for wider economic applications.

Under the above specification, we examine how policies change by pressure from the interest group. We find that the nature of lobbying activities, and therefore the political equilibrium, are very sensitive to the choice of instrument. In particular, the behaviour of the domestic lobby group depends crucially on whether the subsidy is applied uniformly or discriminatingly or whether it is lump-sum or proportional. The basic structure is given in the next section which also includes some features of the model that are common throughout this paper. In the following sections profit and output subsidies are investigated. In each section we analyse discriminatory and uniform policies. We conclude in the last section.

2 The Basic Framework

We consider an oligopolistic industry with m identical domestic firms and n identical foreign firms. The marginal costs of domestic and foreign firms are c^d and c^f, respectively. Both c^d and c^f are assumed to be constant, and thus they also represent average variable costs. Domestic and foreign firms compete in the domestic market of a homogeneous good. The inverse demand function for this commodity is given by[3]

$$p = \alpha - \beta D, \tag{1}$$

where p is the price, and D is the sum of outputs by domestic and foreign firms, i.e.,

$$D = mx^d + nx^f, \tag{2}$$

where x^d and x^f are the output of a domestic and a foreign firm. Profit of a firm is a function of the subsidy level, and given by

$$\pi^i = \pi^i(x^d, x^f, n; s), \qquad i = d, f \tag{3}$$

[3]The preferences of the consumers are represented by $u(y, D) = y + f(D)$ where y is the consumption of a numeriare good produced under competitive conditions with a price equal to 1. There is also just one factor of production whose price is determined in the competitive sector. We denote the consumption of the non-numeriare good by D, while function f is increasing and strictly concave in D. The inverse demand function is derived from one specific case of the preferences mentioned above, i.e., $u(y, D) = y + \alpha D - \beta D^2/2$.

where s is the vector of subsidies imposed on the firms by the host government.[4]

The number of domestic firms is fixed whereas the number of foreign firms is endogenous.[5] The government can affect the number of foreign firms by changing the values of subsidy level s. It is assumed that the host country is a small one in the market for FDI. Foreign firm moves into (out of) the host country if the profit it makes in the host country, π^f, is larger (smaller) than the reservation profit, $\bar{\pi}$, it can make in the rest of the world. Therefore, the FDI equilibrium provides

$$\pi^f = \bar{\pi}. \tag{4}$$

Domestic and foreign firms behave in a Cournot-Nash fashion. Each firm makes its output decision by taking as given output levels set by other firms, the number of firms, and the subsidy level set by the government. The equilibrium is defined by a three-stage model: first, the government chooses the subsidy level taking everything else as given; in the second stage, the number of foreign firms is determined given the level of subsidy and output levels; finally, output levels are determined.

Having described the FDI equilibrium, we shall now introduce the rest of the model. Domestic firms form a lobby group whose political contribution schedule is defined by $C(s)$.[6] The government's policy variable is a subsidy level, s. Each domestic firm has the following utility,

$$V^d = \pi^d - C, \tag{5}$$

Consumers have identical quasi-linear preferences and are given some exogenous level of income, $\bar{Y}$. With income $\bar{Y}$ each individual consumes D amount of the non-numeriare good

[4]We will examine equation (3) later, in more detail.

[5]Unfortunately, it is not possible to endogenise the numbers of both type of firms as then one group of firms – the ones with higher marginal costs – will be forced out of the market. One way out could be to relax the assumption that the goods produced by the two group of firms are homogeneous as was done in Lahiri and Ono (1998b).

[6]For simplicity, we only consider domestic lobbying and rule out lobbying by foreign firms. This can be justified on the ground that in many countries whereas it is perfectly legal for political parties to accept political contributions from the nationals of that country, foreign contributions to political parties are illegal. In some some countries it is even illegal for domestic firms to bribe abroad.

and $y = \bar{Y} - pD$ amount of the numeraire good. Consumers' indirect utility is then

$$V^c = \text{CS} + \bar{Y}, \tag{6}$$

where CS, which is the consumers' surplus, satisfies

$$d\text{CS} = -Ddp. \tag{7}$$

The government collects the subsidy cost from consumers by lump-sum taxation. We denote the total cost of the subsidy by TR. The government's objective function then can be written as

$$G = \rho mC + (V^d m + V^c - \text{TR}), \tag{8}$$

where $\rho > 1$ is a constant parameter.[7] Following Lahiri and Raimondos-Møller (2000) and Lahiri and Ono (2003, ch. 10), ρ can be interpreted as the degree of corruption. The second term in (8) is total social welfare.

The political equilibrium can be determined as the result of a two-stage game in which the lobby (representing domestic firms) chooses its contribution schedule in the first stage and the government sets policy in the second. Then, the political equilibrium consists of a political contribution schedule $C^*(s)$, that maximises the profits of all domestic firms given the anticipated political optimisation by the government, and a policy level, s^*, that maximises the government's objective given by (8), taking the contribution schedule as given.

As discussed in Dixit et al (1997), the model can have multiple sub-game equilibria, some of which may be inefficient. Dixit et al (1997) develop a refinement that selects truthful equilibria that result in Pareto-efficient outcomes.[8] Stated formally, let $\left(C^0(s^0, V^{d^0}), s^0\right)$ be

[7] Using equations (5) and (6) government's objective function can also be written as $G = \rho mC + (m\pi^d - mC + \text{CS} + \bar{Y} - \text{TR})$. Reorganizing the equation, we get $G = (\rho - 1)mC + (m\pi^d + \bar{Y} + \text{CS} - \text{TR})$. Hence, government attaches a positive weight to contributions provided that $\rho > 1$. In other words, there is no political relationship between the government and domestic firms when $\rho = 1$. Implicitly, we normalise the weight that the government attaches to social welfare to one.

[8] As noted in the introduction, Bernheim and Whinston (1986) develop a refinement (see lemma 2 of the mentioned work) in their menu-auction problem. Following this, first Grossman and Helpman (1994) and later Dixit et al (1997) develop a refinement (as in Bernheim and Whinston (1986)) for the political contribution approach, that selects Pareto-efficient actions.

a truthful equilibrium in which V^{d^0} is the equilibrium utility level of each domestic firm. Then, $\left(C^0(s^0, V^{d^0}), s^0, V^{d^0}\right)$ is characterised by

$$C(s, V^{d^0}) = \text{Max}(0, A) \tag{9}$$

$$s^0 = \text{Argmax}_s \left\{\rho C(s, V^{d^0})m + V^{d^0}m + (V^c - \text{TR})(s)\right\} \tag{10}$$

and

$$m\pi^d(s_1) + V^c(s_1) - \text{TR}(s_1) = \rho m C(s^0, V^{d^0}) + mV^{d^0}(s^0) + V^c(s^0) - \text{TR}(s^0) \tag{11}$$

where V^c is defined in (6) and

$$V^{d^0} = \pi^d - A \tag{12}$$

$$s_1 = \text{Argmax}_s \left\{V^d(s)m + V^c(s) - \text{TR}(s)\right\} \tag{13}$$

Equation (9) characterises the truthful contribution schedule chosen by the lobby, where A can be interpreted as the compensation variation. Hence, equation (9) (together with (12)) states that the truthful contribution function $C(s, V^{d^0})$ relative to the *constant* V^{d^0} is set to the level of compensating variations. In other words, under truthful contribution schedules the payment to the government is exactly equal to the change in domestic firms' profits that is caused by a change in policy s (see Dixit et al (1997, p.760)). Equation (10) states that the government sets the subsidy level to maximise its objective, given the contribution schedule offered by domestic firms.

The key aspect of truthfulness in the above specification, defined by equation (11), is that in equilibrium the contribution of the lobby has to provide the government at least the same level of utility that the government could get if it did not accept any contributions. The lobby pays the lowest possible contribution to induce the government to set s^0 defined by (10). Then, the government will be indifferent between implementing the policy (s_1), by accepting no contributions and implementing the equilibrium policy (s^0) and accepting

contributions. In the first case, contribution would be zero and the government would maximise its objective function as if the domestic firms were politically unorganised.

Totally differentiating (8) we get

$$dG = \rho m dC + d\mathrm{CS} - d\mathrm{TR} \tag{14}$$

where, differentiating (9) (and (12))[9]

$$dC = d\pi^d \tag{15}$$

When $\rho = 1$ equation (14) serves for the case in which the government refuses the firms' contributions, and simply maximises the social welfare. That is, when $\rho = 1$ we obtain s_1 defined by (13). Equation (14) helps us to examine the public policy outcome of political relationship between the government and the lobby. In particular, we investigate the use of several subsidy tools in the presence of lobbying and foreign firms. After finding the equilibrium subsidy level, we focus on the effect of the number of lobby members and the degree of corruption on the equilibrium subsidy and contribution levels.

3 Proportionate profit subsidy

Using the above specification, we first consider the case where the government sets a proportionate subsidy on the profits of both domestic and foreign firms.[10] In particular, we examine optimal subsidy levels when the government imposes discriminatory and uniform policies. Profits of a domestic and a foreign firm are respectively given by

$$\pi^d = (p - c^d)x^d(1 + s_d), \tag{16}$$

$$\pi^f = (p - c^f)x^f(1 + s_f), \tag{17}$$

[9] Assuming $A > 0$ we have $A(\cdot) = C(\cdot)$.

[10] The structure of the model is similar to that of Lahiri and Ono (1998a) in which they consider a small country that designs optimal profit taxation and local content rules for foreign firms in the presence of unemployment in the host country.

where s_d and s_f are respectively the proportionate profit subsidies imposed on domestic and foreign firms, with negative values of s_i's representing taxes.[11] The first order profit maximisation conditions are

$$\beta x^d = (p - c^d), \tag{18}$$

$$\beta x^f = (p - c^f), \tag{19}$$

Using (1), (2), (4), (18) and (19), closed-form solutions for some of the key variables are found as

$$x^d = \frac{\alpha - (n+1)c^d + nc^f}{\beta(m+n+1)}, \tag{20}$$

$$x^f = \frac{\alpha - (m+1)c^f + mc^d}{\beta(m+n+1)}, \tag{21}$$

$$n = \frac{\{\alpha - c^f - m(c^f - c^d)\}\sqrt{1+s_f}}{\sqrt{\beta\bar{\pi}}} - (m+1). \tag{22}$$

Totally differentiating (16) and using (20)-(22) we get

$$d\pi^d = \beta(x^d)^2 ds^d - \frac{\beta x^d x^f (1+s^d)}{1+s^f}\, ds^f, \tag{23}$$

and thus

$$d\pi^d\Big|_{s_d=0} = -\frac{\beta x^d x^f}{(1+s_f)} ds_f \tag{24}$$

$$d\pi^d\Big|_{s_d=s_f=s_u} = \beta x^d (x^d - x^f) ds_u \tag{25}$$

where s_u is the uniform subsidy.

It is to be noted that the profit subsidies do not have direct effects on output decisions; the only effect on outputs come through the change in the number of foreign firms. Furthermore, since the number of domestic firms is fixed and domestic profit subsidy s_d does not

[11] When the subsidy is a proportionate profit subsidy, equation (3) takes the form of (16) and (17).

affect the number of foreign firms, s_d has no effect on domestic profits either when the initial level of domestic subsidy is zero. Foreign profit subsidy however increases the number of foreign firms increasing competition in the market and this reduces domestic profits. These two effects are given in (24). From equation (25) together with (18) and (19) it can be found that $d\pi^d/ds_u \gtreqless 0$ if and only if $c^f \gtreqless c^d$. Imposing subsidies uniformly lowers the outputs of both groups of firms by increasing the number of foreign firms. Yet, no matter how many foreign firms are moving in, facing the same price and subsidy, each domestic firm's profit increases (decreases) provided that it produces more (less) output than a foreign firm does. For this to be the case, domestic firms have to be more (less) efficient than foreign firms.

The effect on consumer surplus can be found as

$$d\text{CS} = \frac{\beta x^f D}{2(1+s_f)} ds_f. \tag{26}$$

Subsidising foreign firms brings in more foreign firms, making the market more competitive and thus lowering price. Note that, for reasons mentioned above, s_d has no effect on price and thus on consumers' surplus.

Finally, using (16) to (19) the total cost of subsidy is written as

$$\text{TR} = ms_d(p-c^d)x^d + ns_f(p-c^f)x^f = \beta(x^d)^2 s_d m + \beta(x^f)^2 s_f n. \tag{27}$$

Totally differentiating (27) we obtain

$$d\text{TR} = \frac{\beta x^f}{2(1+s_f)} \left[x^f s_f(1+n+m) + 2nx^f - 2x^d m s_d\right] ds_f + \beta(x^d)^2 m ds_d. \tag{28}$$

Subsidising domestic firm increases the subsidy payment unambiguously as it does not affect either m or x^d. Subsidy to foreign firms however, reduces the profits of domestic firms and therefore the tax base there. This is the negative term in (28). It also increases n and decreases x^f and has a direct positive effect on TR. The net effect is however positive.

Having described the framework for proportionate profit subsidy, we shall now examine optimal policies for the cases: (i) discriminatory subsidy, and (ii) uniform subsidy. These will be done in turn in the following two subsections.

3.1 Discriminatory subsidy

We begin our analysis with the case when the government uses a discriminatory policy, namely subsidising foreign firms but not domestic ones. Substituting (24), (26), (28) in (14) we find

$$\frac{2}{\beta x^f}\left.\frac{dG}{ds_f}\right|_{s_f=s_d=0} = -x^d m(2\rho-1) - x^f n. \tag{29}$$

Subsidising foreign firms increases competition and lowers the price by increasing the number of firms firms, and this increases consumers' surplus. However, this lowers the profits of domestic firms which in turn reduces political contributions from them. The negative effects on domestic profits and political contributions outweigh the positive effect on consumers' surplus. Assuming G to be concave in subsidy, it follows from (29) that the optimal subsidy to FDI is always negative.[12] Formally,

Proposition 1 *When the instrument used is proportionate profit tax/subsidy to foreign firms and no tax/subsidy to domestic firms, it is always optimal to tax foreign firms.*

It should be noted that Katrak (1977) also found that when a market is served by only one foreign firm it is always optimal to tax the output of the foreign firm. Here we find that the presence of domestic firms, lobbying by domestic firms and the use of a different

[12] The expression for the second derivative (evaluated at the optimum) is

$$\frac{4(1+s_f)^2}{x^f}\frac{d^2G}{ds_f^2}(2\rho-1)m(x^f+2x^d) - 3x^f(1+m).$$

Substituting the first order condition ((30)) in the expression above and reorganising the result we find that $d^2G/ds_f^2 < 0$ if and only if $(2\rho-1)m(x^f+2x^d) < 3x^f(1+m)$. This condition puts an upper bound on ρ. If ρ is very large, the government essentially does not care about social welfare and thus the optimal level could take a corner value. See also footnote 15.

instrument do not make any difference to his qualitative result. We shall now examine how the presence of domestic firms and lobbying by them affect the magnitude of the tax. In particular, we shall now examine how the number of domestic firms, m, and the degree of corruption, ρ, affect the equilibrium levels of subsidy.

The first order condition for the present case can be written as

$$G^0_{s_f} = -\Big[\beta x^d m(2\rho - 1) + \beta x^f n + s_f \beta x^f (1 + n + m)\Big] = 0, \tag{30}$$

from which we get

$$G_{s^0_f m} = -2\beta x^d(\rho - 1) + s^0_f(c^f - c^d). \tag{31}$$

Since $\rho > 1$ and $s^0_f < 0$, it follows from (31) states that a sufficient condition for $ds^0_f/dm < 0$ is that $c^f > c_d$.[13] An increase in the number of domestic firms increases the level of proportional profit tax for foreign firms if foreign firms are less efficient than domestic ones. This is because the effect of a subsidy to foreign firms on consumers surplus is positively correlated with the efficiency level of foreign firms, and if foreign firms are inefficient (relative to domestic firms), the argument for subsidising them becomes weaker. However, if foreign firms are more efficient than domestic firms, the presence of more domestic firms can actually lower the tax on foreign firms. To see this, note that when $\rho \simeq 1$, (31) becomes

$$G_{s_f m}\Big|_{\rho \simeq 1} = s_f(c^f - c^d). \tag{32}$$

Since $s^0_f < 0$, it follows from (32) that $G_{s_f m} \lesseqgtr 0$ according as $c^f \gtreqless c^d$, and thus $ds^0_f/dm \lesseqgtr 0$ according as $c^f \gtreqless c^d$. In view of (18) and (19), we know that $c^f \gtreqless c^d$ if and only if $x^d \gtreqless x^f$ or $mx^d/(mx^d + nx^f) \gtreqless m/(m+n)$, i.e., domestic firms' market share is more than $m/(m+n)$. In other words, if foreign firms' market share is more than $n/(m+n)$ and politics pay no part ($\rho = 1$), an increase in the number of domestic firms will reduce tax on foreign firms.[14]

[13] To determine the effects on the equilibrium subsidy level, setting dG/ds equal to zero in (14) and using implicit function rule give $ds^0/d\theta = -G^0_{s\theta}/G^0_{ss}$, where $\theta = \{m, \rho\}$. The above algebra will be used for comparative static analysis throughout the paper.

[14] This result has some similarity with a result in Ono (1990) who showed that additional foreign penetration is welfare improving if foreign firms have more than 50% of the market share. Here we examine the interaction between domestic and foreign penetration.

In general if $c^d \gg c^f$, an increase in the number of firms reduces the optimal tax on foreign firms.

Turning now to the degree of corruption, from (30), we get

$$G_{s_f\rho} = -2\beta x^d m. \tag{33}$$

Equation (33) reveals that $ds_f^0/d\rho < 0$, i.e., an increase in the degree of corruption leads to a lower level of subsidisation (or a higher level of taxation) for FDI when the subsidy is discriminatory. An increase in the degree of corruption means that the government puts more value on the political contributions and the profits of domestic firms. Since domestic firms lobby for lower subsidies (or a higher tax) to FDI, foreign firms will be asked to pay higher taxes and the government will receive more contributions from domestic firms.

The above results are formally stated in the following proposition.

Proposition 2 *When the government applies discriminatory proportionate profit tax to FDI, the following properties hold:*
(i) an increase in the number of domestic firms raises the level of equilibrium tax if $c^f > c^d$. *When* $\rho \simeq 1$, *an increase in the number of firms decreases the tax if and only if* $c^f < c^d$.
(ii) an increase in the degree of corruption unambiguously increases the level of equilibrium tax.

3.2 Uniform subsidies

In the last subsection, we analysed the case where the government is able to discriminate between domestic and foreign firms. However, in some situations, it may not be possible for the government to discriminate between firms in the application of policy instruments. In this subsection we shall analyse the case when the government subsidies (or taxes) uniformly.

Substituting (25), (26), (28) in (14) we get

$$2 \left.\frac{dG}{ds_u}\right|_{s_f=s_d=s_u=0} = 2x^d m(c^f - c^d)(\rho - 1) - \beta x^f (x^f n + x^d m) \tag{34}$$

Applying the subsidies uniformly lowers outputs of both group of firms, and therefore the positive effect on consumers' surplus is lower in the case of uniform policies than in the case of discriminatory policy. Subsidy payments, and therefore lump-sum taxes on the representative consumer, will be higher in the present case as domestic firms are paid subsidies as well. As for lobbying, domestic firms in the present case will need to be more careful in lobbying for a higher taxes for foreign firms as such taxes are levied on them as well. However, as we have noted before (see (25)), a uniform subsidy increases profits of domestic firms if and only if they are more efficient than than foreign firms. In other words, uniform taxes increases profits of domestic firms if they are less efficient than foreign firms. Therefore, if domestic firms are less efficient than foreign firms, the former will lobby the government for a higher uniform taxes and pay a higher political contribution. This can be seen from (34) above: if $c^d > c^f$, optimal subsidy is negative, i.e. it is optimal for the government to apply a tax on all — domestic and foreign — firms. In contrast to the case of discriminatory tax, here we find that the optimal subsidy can be positive if either $c^f \gg c^d$ or $\rho \gg 1$. However, if politics is not very important ($\rho \simeq 1$), it is always optimal to tax the firms.

Proposition 3 *When the instrument used is proportionate uniform profit tax/subsidy to domestic and foreign firms, a sufficient condition for it to be optimal to tax the firms is that domestic firms are less efficient than foreign firms. In the absence of lobbying, it is always optimal to tax the firms.*

Having characterised the equilibrium uniform profit tax, we shall now examine how this equilibrium tax change with the number of domestic firms and the corruption parameter.

The first order condition for the present case is found as

$$\begin{aligned} G^0_{s_u} &= 2x^d m(c^f - c^d)(1+s_u)(\rho-1) - \beta(x^f)^2(1+s_u)n \\ &- \beta(x^f)^2 s_u(1+m) - \beta x^f x^d m = 0, \end{aligned} \tag{35}$$

from which we get

$$G_{s_u m} = \left[2x^d(\rho-1)(1+s^0_u) + x^f s^0_u\right](c^f - c^d). \tag{36}$$

From (36) it is clear that in the absence of lobbying, i.e., when $\rho = 1$, $ds^0_u/dm > 0$ if and only if $c^d > c^f$ since $s^0_u < 0$ in this case. That is, in the absence of lobbying, if domestic firms are less efficient than foreign firms and there are more of them, then the government should provide more help for all firms (increase subsidy/reduce tax). The results arises primarily via effects of consumers' surplus. In the presence of lobbying ($\rho > 1$), if $c^f \gg c^d$, we know from discussions above that $s^0_u > 0$ and in this case $ds^0_u/dm > 0$. That is, when foreign firms are significantly more efficient than domestic firms, an increase in the number of domestic firms will increase the subsidy rate. Note that when $c^f > c^d$, domestic firms lobby for a higher uniform subsidy (see (25)).

Turning now to the degree of corruption, from (35), we find

$$G_{s_u \rho} = 2\beta x^d m(1+s_u)(c^f - c^d) \tag{37}$$

Equation (37) reveals that $ds^0_u/d\rho \gtreqless 0$ according as $c^f \gtreqless c^d$. That is, an increase in the degree of corruption increases (decreases) uniform optimal subsidy if and only if domestic firms are more (less) efficient than foreign firms. This is because we know from our discussions before that when $c^f > c^d$, domestic firms lobby for more subsidy to all firms.

Proposition 4 *When the government applies uniform proportionate profit subsidies, the following properties hold:*

(i) an increase in the number of domestic firms raises the equilibrium subsidy level if foreign

firms are significantly more efficient than domestic ones and domestic firms are active in lobbying. If domestic firms do not lobby, then an increase in the number of domestic firms will decrease the equilibrium tax level if and only if domestic firms are less efficient than foreign ones.

(ii) an increase in the degree of corruption reduces the equilibrium tax level if and only if foreign firms are more efficient than domestic ones.

4 Lump-sum profit subsidy

In this section, we consider a different instrument for the government, viz., lump sum subsidies. Profits of a domestic and a foreign firm in this case are respectively given by

$$\pi^d = (p - c^d)x^d + S_d \tag{38}$$

$$\pi^f = (p - c^f)x^f + S_f \tag{39}$$

where S_d and S_f are respectively the lump sum profit subsidies imposed on domestic and foreign firms. Lump-sum subsidies and proportional profit subsidies have one property in common, viz., that both are non-distortionary. Because of this, many of the results derived in the previous section also goes through in the present case. Therefore, for the sake of brevity, we do not present those results but focus on the results that are different. In particular, politics works in quite different ways in the present case than in the case of proportional profit taxes.

The solution for x^d and x^f is the same as in (20) and (21) respectively. However, the solution for n changes to

$$n = \frac{\alpha - c^f - m(c^f - c^d)}{\sqrt{\beta(\bar{\pi} - S_f)}} - (m + 1), \tag{40}$$

and the total derivative of π^d for the case of uniform lump-sum subsidies is given by

$$d\pi^d = -\frac{x^d}{x^f} dS_f + dS_d. \tag{41}$$

Thus, we get

$$x^f \, d\pi^d\Big|_{S^d=S^f=S} = (x^f - x^d)dS, \tag{42}$$

where S is the uniform lump-sum subsidy.

Comparing (42) with (25), we note that whereas in the case of uniform proportional taxes domestic firms lobbies for increased taxes if and only if they were *less* efficient than foreign firms, in the present case they lobby for increased taxes if they are *more* efficient. In other words, lobbying works just the opposite ways in the two cases. Because of this property, as we shall note below, the effect of more corruption on optimal policy also works differently in the two cases. However, before moving to the comparative static exercises, let us make an attempt to explain why the nature of lobbying depends so crucially on the choice of instruments.

Profit subsidies — either lump-sum or proportional — have two effects on domestic producers. First, for a given level of domestic output, it raises their profits. Second, for a given level of the subsidy, it reduces profits by reducing domestic outputs by increasing the number of foreign firms. These effects are shown in the following two equations for the two instruments respectively:

$$d\pi^d = \beta(x^d)^2 ds_u + 2(1+s_u)\beta x^d dx^d, \tag{43}$$

$$d\pi^d = 2\beta x^d dx^d + dS, \tag{44}$$

where

$$(m+n+1)dx^d = -x^f dn, \tag{45}$$

and dn for the two instruments are given by

$$dn = \frac{m+n+1}{2(1+s_u)} ds_u, \tag{46}$$

$$dn = \frac{m+n+1}{2\beta(x^f)^2} dS. \tag{47}$$

The net effect of the subsidies on domestic profits therefore depends on relative magnitudes of the two opposite effects, and on relative magnitude of the effects of the two subsidies on the number of foreign firms. As for the latter, since the two instruments have different units of measurement, we need to compare the effects for 'equivalence' changes in the two instruments. One natural candidate for defining equivalence changes is changes in the two instruments that will have the same effect on subsidy payments when evaluated at the initial equilibrium, i.e. dS and ds_u satisfying $(m+n)dS = \beta\{m(x^d)^2 + n(x^f)^2\}ds_u$. The left hand side is the total lump-sum payments and the right hand side is total subsidy payments under proportional subsidies. From (46) and (47) and the above definition of equivalence, it can be shown that lump-sum subsidies will have a bigger effect on n than an 'equivalent' proportional subsidies if and only if $s_u\{m(x^d)^2 + n(x^f)^2\} + m\{(x^d)^2 - (x^f)^2\} > 0$. That is, when the domestic firms are more efficient than the foreign ones, lump-sum subsidies have bigger effects on the number of foreign firms than equivalent proportional subsidies. This to some extent explains why domestic producers lobby for more lump-sum taxes, but less proportional taxes, when they are more efficient than the foreign ones.

We now examine the effect of an increase in the degree of corruption ρ on the equilibrium level of uniform lump-sum subsidy. The first order condition for the government's maximisation problem in this case is

$$G_S^0 = -2x^f m(c^f - c^d)(\rho - 1) - S - [\beta(x^f)^2 + S](n+m) = 0 \tag{48}$$

from which we obtain

$$G_{S\rho} = -2x^f m(c^f - c^d), \tag{49}$$

from which it follows that $dS^0/d\rho \gtreqless 0$ if $c^d \gtreqless c^f$. An increase in the degree of corruption increases the level of subsidy if and only if domestic firms are less efficient than foreign ones. The reason for this result has already been discussed above. Formally,

Proposition 5 *When the government applies uniform lump sum profit subsidies, an increase in the degree of corruption decreases optimal subsidy if and only if domestic firms are more efficient than foreign ones.*

5 Output subsidy

In the final part of this paper we investigate the political outcome when the government uses output subsidy as a policy tool. This policy tool, which is distortionary by nature, is qualitatively very different from the previous two which were non-distortionary.

Profits of a domestic firm and a foreign firm are respectively given by

$$\pi^d = (p - c^d + z_d)x^d \tag{50}$$

$$\pi^f = (p - c^f + z_f)x^f \tag{51}$$

where z_d and z_f are the output subsidies imposed on domestic and foreign firms.

The first order profit maximisation conditions are

$$\beta x^d = (p - c^d + z_d) \tag{52}$$

$$\beta x^f = (p - c^f + z_f) \tag{53}$$

Turning to the components of welfare, first, totally differentiating domestic profits in (50) we get

$$d\pi^d = -2x^d dz_f + 2x^d dz_d, \tag{54}$$

Next, the effect on consumer surplus can be found as

$$d\text{CS} = D dz_f \tag{55}$$

Note that subsidies to domestic firms in this case do not affect consumers surplus. This is because substituting (53) into (51) and then using the free entry condition (4), we

find

$$\beta(x^f)^2 = \bar{\pi},$$

from which it follows that x^f does not depend on any of the two subsidy rates. It then follows from (53) that p only depends on z_f and not on z_d.

Finally, differentiating the total cost of output subsidy TR$(= z_d x^d m + z_f x^f n)$, we obtain

$$\beta \, d\text{TR} = m\left[\beta x^d + z_d - z_f\right] dz_d + \left[\beta x^f n + z_f(1+m) - z_d m\right] dz_f \tag{56}$$

We now, as before, consider the cases of discriminatory and uniform subsidies in turn in the following two subsections.

5.1 Discriminatory Subsidy

As before here we assume that $z_d = 0$ and the political process determines only z_f. The effect of this discriminatory subsidy on G can be found as

$$\beta \left.\frac{dG}{dz_f}\right|_{z_f=z_d=0} = -\beta x^d m(2\rho - 1) < 0 \tag{57}$$

Subsidising the outputs of foreign firms will attract new FDI, and the arrival of foreign firms will reduce the price by increasing competition. Thus, consumers' surplus will increase. However, this lowering of price will reduce the profits of domestic firms and therefore lower the contribution that the government will receive from the lobby. The subsidy will increase total output of foreign firms and thus total subsidy payments. The net effect is negative as is shown by (57).[15] Thus, taxing foreign firms is the optimal policy for the government. Formally,

[15] In the output subsidy case, we check the concavity conditions directly from the second order derivatives. The concavity of the government's objective in subsidy requires $(2m+1)/2m > \rho$, which we assume to hold and thus, $G_{z_d z_d} < 0$. Note that the second-order condition puts an upper bound on both ρ and m. For the justification of an upper bound on ρ, see footnote 12. As for m, a very large value of it means that the domestic market is essentially perfectly competitive and thus, in our framework, there is no need for any FDI. Therefore, the optimal value would take a corner value.

Proposition 6 *When the policy instrument available to the government is an output tax (or subsidy) on foreign firms and tax on domestic firms, in the political equilibrium the government taxes foreign firms.*

Having determined the sign of the equilibrium subsidy, we shall now see this equilibrium tax is affected by the number of domestic firms and the corruption parameter.

The first order condition for the government's maximisation problem in this case is

$$G^0_{z_f} = -\beta x^d m(2\rho - 1) - z_f(1 + m) = 0 \tag{58}$$

from which we get

$$G_{z_f m} = -[\beta x^d(2\rho - 1)]/(1 + m) < 0 \tag{59}$$

From (59), we find that $dz^0_f/dm < 0$, i.e., an increase in the number of domestic firms unambiguously raises the tax for FDI.

Turning to the degree of corruption, from (58), we get

$$G_{z_f \rho} = -2\beta x^d m \tag{60}$$

Equation (60), reveals that $dz^0_f/d\rho < 0$, i.e., an increase in the degree of corruption increases the equilibrium value of output tax to foreign firms. These results are formally stated below.

Proposition 7 *When the government applies a discriminatory output tax to foreign firms and no tax on domestic outputs, an increase in either the number of domestic firms or the degree of corruption increases the equilibrium tax.*

5.2 Uniform Subsidies

It follows from (54) that

$$d\pi^d\Big|_{z_d = z_f = z} = 0 \tag{61}$$

where z is the uniform subsidy. That is, when the government imposes uniform output subsidies, profits of domestic firms do not change.Therefore, in this case domestic firms will have no reason to lobby the government. It can also shown that in this case neither x^d nor x^f change. Therefore, uniform output taxes are effectively non-distortionary.

As for the optimal level of uniform output subsidy, we find

$$\beta \left. \frac{dG}{dz} \right|_{z_f=z_d=z} = -z \tag{62}$$

From (62), it follows that the government will not apply any subsidy, i.e., optimal uniform subsidy is zero. The reason for this is that domestic profits, as mentioned before, is not affected by uniform subsidy and the sum of consumers' surplus and tax to finance subsidy payments are maximised at $z = 0$. Formally,

Proposition 8 *When the output subsidies are applied uniformly there is no lobbying and the optimal policy is a zero subsidy.*

It should be noted that since there is no lobbying, the degree of corruption will have no effect on the level of optimal subsidy. From (62) it should also be clear that the number of domestic firms will also have no effect on optimal policy.

6 Conclusion

We develop a partial equilibrium model of FDI in which foreign firms locate themselves in a host country that is small in the international market for FDI. Foreign firms compete with a fixed number of domestic firms under oligopolistic conditions. The government designs subsidies (taxes) towards both groups of firms while facing political pressure from a lobby representing domestic firms. Lobbying in our model is a special case of the generalised common agency problem of Dixit, Grossman and Helpman (1997). Under this structure, the

government maximises a weighted sum of the total political contributions from lobbyists and aggregate social welfare.

Using the above framework, we determine optimal policies in the presence and absence of lobbying. We found that in the case of discriminatory subsidy for foreign firms, the optimal policy is to tax FDI when the government receives political contributions from domestic firms. On the other hand, we found that when the subsidies are applied uniformly, the lobbying behaviour of domestic firms depends on the type of subsidy, i.e whether it is proportional or lump-sum profit subsidy. Moreover, in the case of uniform output subsidies, we found that the domestic firms do not lobby at all.

In the absence of lobbying, the government is only concerned with maximising the aggregate social welfare. There are three main effects of subsidising FDI on the welfare of the host country. These are a reduction in price through the increasing competition caused by the entry of foreign firms, a reduction in domestic profits due to FDI, and the cost of subsidy. We show that the sign of optimal subsidy also depends on the nature of subsidy. in the case where a discrminatory profit subsidy — proportional or lump-sum — is applied to foreign firms, optimal subsidy is negative, i.e. foreign firms are taxed. However, when the subsidies are uniform optimal subsidy can be positive.

We also analyse how the number of domestic firms and the degree of corruption change the equilibrium levels of subsidies.Our results show that, in the presence of lobbying, an increase in the number of domestic firms or an increase in the degree of corruption decreases the discriminatory subsidy towards FDI. When the subsidies are applied uniformly, we find that the policy choice is important. If the government uses uniform proportionate profit subsidies, both an increase in the number of domestic firms and the degree of corruption increases the subsidy when foreign firms are less efficient than domestic firms, while the opposite conditions hold under lump sum uniform subsidies in the case of the effect of the degree of corruption. Finally, we find that there is no lobbying under uniform output

subsidies.

Our analysis shows that the nature of lobbying can depend on the type of instrument that the government considers. It therefore would be interesting to examine in the future how a political equilibrium can be achieved in the present framework when the interest groups could lobby for a specific public policy as well as its level.

References

Bandyopadhyay, S., E-S. Park and H. Wall, 2003, Endogenous export subsidies and welfare under domestic cost heterogeneity, forthcoming in *Economics and Politics*.

Bernheim, B. and M. Whinston, 1986, Menu auctions, resource allocation, and economic influence, *Quarterly Journal of Economics* 101, 1-31.

Bhagwati, J.N., 1985, Investing abroad, Esmee Fairbain Lecture, University of Lancaster.

Brander, J.A. and B.J. Spencer, 1987, Foreign direct investment with unemployment and endogenous taxes and tariffs, *Journal of International Economics* 22, 257-279.

Dixit, A., G.M. Grossman, and E. Helpman, 1997, Common Agency and Coordination: General Theory and Application to Government Policy Making, *Journal of Political Economy* 105, 752-769.

Ellingsen T., and K. Wärneryd, 1999, Foreign direct investment and the political economy of protection, *International Economic Review* 40, No:2, 357-379.

Ethier, W.J., 1986, The multinational firm, *Quarterly Journal of Economics* 101, 805-833.

Findlay, R. and S. Wellisz, 1982, Endogenous tariffs, the political economy of trade restrictions, and welfare, in: J.N. Bhagwati, ed., *Import competition and response*, University of Chicago Press, Chicago.

Grossman, G.M., 1984, International trade, foreign investment, and the formation of the entrepreneurial class, *American Economic Review* 74, No:4, 605-614.

Grossman, G. and E. Helpman, 1994a, Protection for sale, *American Economic Review* 84, 833-850.

Grossman, G. and E. Helpman, 1994b, Foreign investment with endogenous protection, *National Bureau of Economic Research* Working Papers 4876.

Grossman, G. and E. Helpman, 2001, *Special interest politics*, MIT Press, Cambridge, USA.

Haufler, A., and I. Wooton, 1999, Country size and tax competition for foreign direct investment, *Journal of Public Economics* 71, 121-139.

Helpman, E., 1984, A simple theory of trade with multinational corporations, *Journal of Political Economy* 92, 451-471.

Hillman, A., 1989, *The political economy of protection*, Harwood Academic Publishers, Chur.

Hillman, A. and Ursprung, H., 1993, Multinational firms, political competition, and international trade policy, *International Economic Review* 34, 347-363.

Hortsman, I. and J. Markusen, 1992, Endogenous market structures in international trade (natura facit saltum), *Journal of International Economics* 32, 109-129.

Itagaki, T., 1979, Theory of the multinational firm: An analysis of effects of government policies, *International Economic Review* 20, No:2, 437-448.

Janeba, E., 1995, Corporate income tax competition, double taxation, and foreign direct investment, *Journal of Public Economics* 56, 311-325.

Katrak, Homi, 1977, Multinational monopolies and commercial policy, *Oxford Economic Papers*, 29, 283-291.

Konishi, H., K. Saggi and S. Weber, 1999, Endogenous trade policy under FDI. *Journal of International Economics* 49, 289-308.

Lahiri S. and P. Raimondos-Møller, 2000, Lobbying by ethnic groups and aid allocation, *Economic Journal*, 110, 62-79.

Lahiri, S. and Y. Ono, 1998a, Foreign direct investment, local content requirement, and profit taxation, *Economic Journal* 108, 444-457.

Lahiri, S. and Y. Ono, 1998b, Tax policy on foreign direct investment in the presence of cross-hauling, *Weltwirtschaftliches Archiv* 134, 263-279.

Lahiri, S. and Y. Ono, 2003, *Trade and industrial policy under international oligopoly*, forthcoming, Cambridge University Press, Cambridge, England.

Magee, S.P., W.A. Brock, and L.Young, 1989, *Black hole tariffs and endogenous policy theory*, Cambridge University Press, Cambridge and New York.

Markusen, J.R., and A.J. Venables, 1998, Multinational firms and the new trade theory, *Journal of International Economics.* 46, 183-203.

Mayer, W., 1984, Endogenous tariff formation, *American Economic Rewiev* 74, 970-985.

Motta, M., 1992, Multinational firms and the tariff jumping argument: a game theoretic analysis with some unconventional conclusions, *European Economic Review* 36, 1557-1571.

Ono, Y., 1990, Foreign penetration and national welfare under oligopoly, *Japan and the World Economy*, 2, 141-154.

Rodrik, D., 1995, Political economy of trade policy, in: G. Grossman and K. Rogoff, eds., *Handbook of International Economics* 3, North-Holland Publishing House, Amsterdam.

Smith, A., 1987, Strategic investment, multinational corporations and trade policy, *European Economic Review* 31, 89-96.

Takemori, S. and M. Tsumagari, 1997, A political economy theory of foreign investment: an alternative approach, *Japan and the World Economy* 9, 515-531.

Tsai, P-L., 1999, Regional integration, foreign investment, and optimal trade and investment policies, *International Economic Journal* 13, 1-18.

UNCTAD, 1998, *World investment report 1998: trends and determinants*, United Nations.