Rent-Seeking and Reform: Relationship Revisited

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Abstract

The paper revisits the relationship been reform and corruption. We consider a scenario where less efficient domestic and more efficient foreign firms engaged in Cournot competition bribe the local authorities. The local firm pays for imposing a cost to the foreigners, the foreign firm pays so that the local competitor does not get overwhelming advantage. Local authorities, political or otherwise, decide an optimal level of 'cost' to be inflicted on the foreign firms which maximize their pay-offs from both. We show that in this set up we may have an equilibrium where drastic reform will be consistent with maximizing rent and therefore an aggressively reformist policy maker can turn out to be extremely corrupt. Interestingly this also exhibits the case where consumers' welfare increases with reform, although local producers suffer. In general policy makers decision to choose moderate or drastic reforms depend on the degree of efficiency of the local firm.

1. Introduction

We are all aware of the conventional wisdom which suggests that trade reform or deregulation in general should contain rent-seeking behavior. One can cite the classic work of Krueger (1974) and great many papers which have dealt with this issue. In trade theory, papers by Meyer (1984), Hillman and Ursprung (1988), Grossman and Helpman (1994) and Mitra (1999) have elaborately analyzed endogenous formation of tariffs in settings where lobbies determine tariff rates through political contributions. Justification of an optimal tariff that increases consumers' surplus has been provided by Kabiraj and Marjit (2003) in presence of informational asymmetry between local and foreign firms with a follow-up piece by Mukherjee and Pennings (2006). In this paper we revisit the relation between rent-seeking and reform by construction of a theoretical model with one foreign firm and one domestic firm both trying to influence the choice of tariff/regulation by bribing a corrupt policy maker. The model assumes: (i) the society prefers a duopoly market structure rather than the monopoly either of a foreign firm or a domestic firm as it is expected to fetch a lower price of the product at the current period and creates dynamic efficiency for the future: the policy maker fears a severe punishment on implementation of a monopoly outcome[1]; (ii) the reform-implementing corrupt politician/bureaucrat chooses that rate of tariff/regulation which maximizes her rent; (iii) the firms involved in rent seeking competition are asymmetric: the foreign firm having cost advantage over the domestic firm. The paper tries to answer the following questions: (i) what extent of reform would be chosen at the equilibrium? (ii) does the politician's/bureaucrat's choice conforms to the society's choice (which we assume to be equivalent to consumers' choice on the one hand and to an honest politician's/bureaucrat's choice on the other); and (iii) assuming that the initial domestic monopoly equilibrium is corrupt, does the level of corruption rise or fall with the reform? The results we obtain are unconventional with respect to the existing literature on rent-seeking and therefore interesting. In particular we find that the most drastic trade reform may increase corruption. We find the conditions under which drastic, moderate and incremental trade reforms are implemented by a corrupt authority. We also explain why authority's choice of reform may not always match with the choice of the society. A liberal stance is consistent with greater corruption and *vice-versa*. Difference in fixed cost of operation between the local firm and the foreign firm generally lowers corruption. In particular when the local firm has higher fixed cost of operation than the foreign firm the possibility that an incremental reform is being implemented and marginally lower level of corruption is realized rises.

The results relate both to the rent-seeking and corruption literature on the one hand and to the trade-reform/product market competition and corruption literature on the other. In the rent-seeking models where the size of rent itself changes with rent-seeking it is expected that the higher extent of

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[1] These may be losing the next election for the politician and losing plump positions or the job for the bureaucrat. The cost to the politician/bureaucrat for not executing any form of reform has been assumed to be infinitely large.

reform/product market competition lowers the level of corruption (see Ades and Di Tella (1999)[2], Lambsdorff (2002)). But these models do not endogenize the reform decision of the authority, which we do in the present paper. We show that when the reform decision of the corrupt politician/bureaucrat is endogenized, the expected relation between rent-seeking and corruption no longer holds: moderate/drastic reform raises the level of corruption. However corruption falls marginally in the case of incremental reform. The key assumption explaining this unconventional result is asymmetry of the firms competing for the rent. To be consistent with the vast existing literature on industrial organization of developing countries, we assume here that the foreign firm is more efficient than its domestic competitor having lower operating cost. Several papers have used this idea to derive a rich set of results. The corrupt regulator/politician/bureaucrat, by its power can push both firms to their alternative reservation pay-offs. However, such an action does not exclude the fact that joint pay-offs of these firms need to be maximized for the regulator/politician/bureaucrat to obtain the best deal. Non-monotonicity of the joint profits with respect to the tariff rate/level of regulation holds key to the results we derive. The results are related to such a type of non-monotonicity outcome in Cournot models used in papers by Marjit (1990) and Lahiri and Ono (1999).

While deregulations, by cutting through the web of bureaucratic red tapism reduces the incentive for illegal transactions and promises to deliver a more transparent and fair institutional environment, in case of two fastest growing economies India and China the feeling has been somewhat different. For example in various rankings and references related to corruption, India continues to stand out as one of the most corrupt nations in the world. Recent incidents of graft and illegal use of public office have landed a cabinet minister in jail and many are under investigations. Financial scandals, one after the other have rocked the nation for quite some time, especially in the post reform period, i.e., after the 90s. While it is difficult to relate all these anomalies and acts of profligacy to a specific trade related problem, it is potentially interesting to revisit the relationship between trade and levels of political or bureaucratic corruption and contrast the findings with what we usually accept as a reasonable outcome. Domestic barriers wish to fend off foreign competition and therefore distribute favors to the politicians or the powerful. In fact arguments such as these could be used to characterize pre-reform India. On the other hand, foreign firms will be keen to make their presence in the local market and hence will pay for an entry and then should also pay to counter the lobby of the domestic counterpart. To gain an entry or influence the authorities for business benefits foreign firms would also indulge in under-the-table transactions. In fact moderate/drastic liberalization may imply as we show in this paper a win-win-win for foreign firms, politically powerful and consumers. Before our paper Baksi, Bose and Pandey (2009) also arrived at a

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[2] In Ades and Di Tella (1999) corruption may rise later because of relaxed monitoring effort of the administration, not directly because of trade reform.

4

similar result in a different kind of model where the lure of consuming greater variety that comes along with international trade indulges the bureaucrats to be more corrupt[3]. But reform-decision had not been endogenized even in their model as we do it in the present paper. Baksi, Bose and Pandey (2009) and more recently Alexeev and Song (2013) find empirical support in cross country data of the hypothesis that corruption rises with liberalization/product market competition.

The next section lays out the model and derives the main results. Subsection 2.1 extends the model where the firms have fixed costs of operation and develops some new insights. The last section concludes.

2. The Model

We consider a market with a linear demand function $q = a - p$ which can either be served by a domestic monopoly or a foreign monopoly or a Cournot duopoly of the two. We assume constant marginal cost of operation for both the local and the foreign firm. The foreign firm has more efficient technology compared to the local firm. In particular we assume $c > 0$ to be the marginal cost of the local firm when the marginal cost of the foreign firm is zero. For the time being we assume both the foreign firm and the local firm have no fixed cost of operation. In order to separately focus on the role of the fixed costs this assumption will be relaxed only in the next section of the paper.

Since our focus is on rent seeking and reform, we assume initially the market sees a domestic monopoly producing $\bar{q}_d = \frac{a-c}{2} > 0$ with $a > c$ and charging a price $\bar{p} = \frac{a+c}{2}$. The domestic firm's monopoly arises because of existence of a policy barrier which inflates the cost of operation of the foreign firm to a prohibitive level. For convenience we model this barrier as a prohibitive tariff at the rate of $\bar{t} = \frac{a+c}{2}$ on the foreign firm's import. The consumers however are averse to any kind of monopoly equilibrium and prefer a reform to a duopoly market structure as it is expected to fetch a lower price of the product at the current period and creates dynamic efficiency for the future. There exists a politician/bureaucrat possessing power to lower the existing barrier for the foreign firm's operation at the domestic market *i.e.* in our model to choose a tariff rate $t < \bar{t}$ allowing the foreign firm's import. Note since the tariff rate acts as effective marginal cost of operation of the foreign firm, in the duopoly market structure a lower choice of t while raises market share of the foreign firm lowers market share of the domestic firm: market rent gets redistributed from the domestic firm to the foreign firm. This gives rise to rent-seeking behavior among firms. While domestic firm would like to bribe the politician/bureaucrat for

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[3] In Baksi, Bose and Pandey (2009) corruption falls with liberalization later because of strict monitoring of the corrupt bureaucrats, not directly because of liberalization.

5

choosing a t close to $\bar{t}$, the foreign firm would like to do the same for a sufficiently low value of t that could minimize the domestic firm's competition at the market. The politician/bureaucrat being corrupt demands $x \in (0, 1)$ proportion of the expected profit of either of the firms for bestowing the favor. While choosing t she maximizes her own payoff with the constraint that no monopoly is created in the market out of her choice as that hurts her future career[4]. The question that interests us is: what are the conditions under which she implements (1) a value of t close to $\bar{t}$ (*incremental reform*); (2) a value of $t > 0$ away from $\bar{t}$ (*moderate reform*); (3) a value of $t = 0$ (*drastic reform*)? We will also like to compare the politician's/bureaucrat's choice of reform with the society's choice (which we assume to be equivalent to consumers' choice) and the corruption level associated with them.

If duopoly is maintained at the market at a tariff rate $t < \bar{t}$, the foreign firm and the domestic firm would produce respectively $\tilde{q}_f = \frac{a - 2t + c}{3}$ and $\tilde{q}_d = \frac{a - 2c + t}{3}$ levels of output at a market price $\tilde{p} = \frac{a + c + t}{3}$. At such an equilibrium the profit levels of the foreign firm and the domestic firm will be given by:

$$\pi_f = (1 - x)\frac{(a - 2t + c)^2}{9} \tag{1}$$

and

$$\pi_d = (1 - x)\frac{(a - 2c + t)^2}{9} \tag{2}$$

respectively. The value of $t < \bar{t}$ will be decided by the politician/bureaucrat from maximization of her payoff

$$\pi(t) = x[\frac{(a - 2t + c)^2}{9} + \frac{(a - 2c + t)^2}{9}] \tag{3}$$

such that $\pi_f > 0$ and $\pi_d > 0$.

We will now focus on the politician's/bureaucrat's problem. Note using equations (1) and (2) $\pi(t)$ can also be written as:

$$\pi(t) = \frac{x}{1-x}[\pi_f + \pi_d].$$

Let us first characterize the domain of $\pi(t)$ that satisfies the constraints. Observe from (1): π_f is a continuous and monotonically decreasing function of t in $[0, \bar{t})$ with $\pi_f \to 0$ as $t \to \bar{t}$. Therefore at all values of $t < \bar{t}$, $\pi_f > 0$ and lower is the choice of t, higher is π_f. In contrast, from (2) $\pi_d > 0$ is a continuous and monotonically increasing function of t. It takes positive values if and only if $t > \tilde{t}$ where $\tilde{t} = -(a - 2c)$. Note $\tilde{t} > 0$ if and only if $c > \frac{a}{2}$. As we rule out the scope of import subsidy in this paper, if $c \leq \frac{a}{2}$, $\tilde{t} = 0$. So if $c > \frac{a}{2}$ the politician/bureaucrat can choose a suitable value of t only from

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[4] See footnote 1.

($\tilde{t}$, $\bar{t}$). But if $c \leq \frac{a}{2}$, the choice set of the politician/bureaucrat expands to $(0,\bar{t})$. Observe greater is the size of the market (higher is the value of a) and more efficient is the domestic firm (lower is the value of c), greater is the freedom to the politician/bureaucrat in her choice of t.

Let us now look at the behavior of $\pi(t)$ over the domain characterized above. Notice $\pi(t)$ as given in (3) has an unconstrained minimum at $t^* = \frac{a+4c}{5} \in (0,\bar{t})$.

Case 1: $ > c > \frac{a}{2}$.

Since the initial market condition is such that $a > c$, $\tilde{t} > 0$ and the politician/bureaucrat's domain of choice is ($\tilde{t}$, $\bar{t}$). So now the politician/bureaucrat is never going to choose drastic reform. Also, $t^* \in (\tilde{t},\bar{t})$. Therefore she would choose between moderate reform and incremental reform whichever maximizes her payoff. If $t \to \bar{t}$, $\pi(t) \to x\left[\frac{(a-c)^2}{4}\right] = \tilde{\pi}_i$ and if $t \to \tilde{t}$, $\pi(t) \to x(a-c)^2 = \tilde{\pi}_m$. Note also since $-c > \frac{a-c}{2}$, $\tilde{\pi}_m > \tilde{\pi}_i$. The $\pi(t)$ function has been described in the figure below.
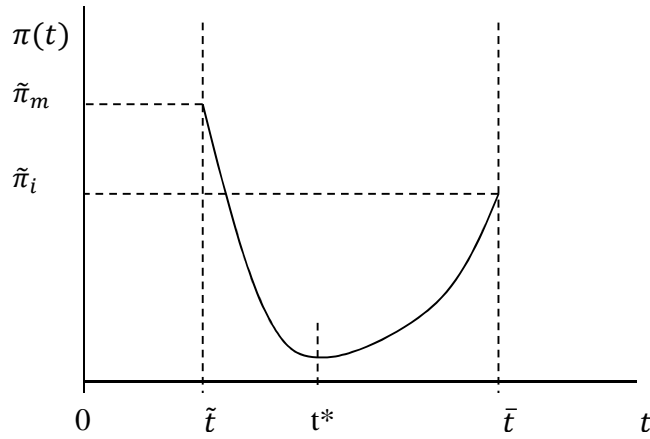

Figure 1

Since $\tilde{\pi}_m > \tilde{\pi}_i$ the politician/bureaucrat chooses moderate reform over incremental reform.

Case 2: $\leq \frac{a}{2}$.

Now the politician/bureaucrat's domain of choice expands to (0 , $\bar{t}$) in comparison of case 1 discussed above. Since $\pi(t)$ has its minimum at t^* in (0 , $\bar{t}$), now the politician/bureaucrat would choose either drastic reform or incremental reform whichever maximizes her payoff. If $t \to 0$, $\pi(t) \to x\left[\frac{(a+c)^2}{9} + \frac{(a-2c)^2}{9}\right] = \tilde{\pi}_d$ and if $t \to \bar{t}$, $\pi(t) \to \tilde{\pi}_i$. It turns out that $\tilde{\pi}_i >=< \tilde{\pi}_d$ if and only if $c <=> \frac{a}{11}$. The $\pi(t)$ function in this case has been described in the figure below.
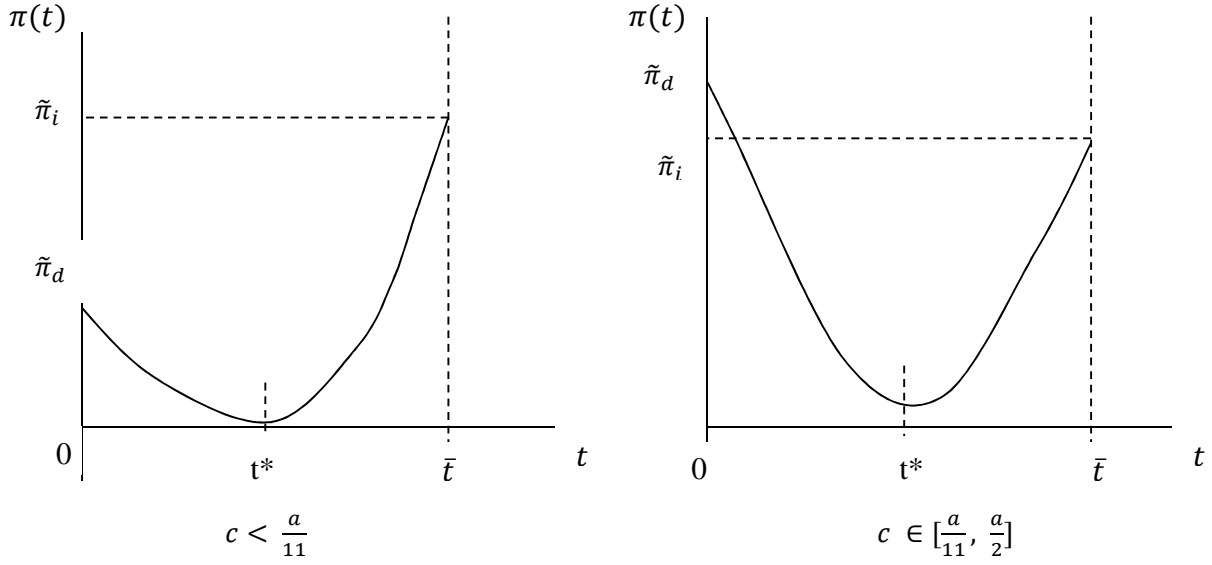
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Figure 2

The politician/bureaucrat chooses incremental reform over drastic reform if $c < \frac{a}{11}$. However if $c \in [\frac{a}{11}, \frac{a}{2}]$ she chooses drastic reform over incremental reform.

This leads us to the first proposition of the model as:

Proposition 1: *When the firms do not have any fixed cost of operation, in presence of rent-seeking a corrupt politician/bureaucrat*

(i)   *if $c < \frac{a}{11}$, chooses incremental reform;*

(ii)   *if $c \in [\frac{a}{11}, \frac{a}{2}]$, chooses drastic reform;*

(iii)   *if $c \in (\frac{a}{2}, a)$, chooses moderate reform*

in a market.

Proof: The statement of proposition follows from case 1 and 2 discussed above.

From proposition 1 it is clear that the corrupt politician/bureaucrat would like to implement an incremental reform only in an extreme situation: when the domestic firm is very efficient. Surprisingly when the domestic firm is very inefficient moderate reform is implemented. This happens as the implementation of drastic reform in such a situation would create a monopoly of the foreign firm which the politician/bureaucrat would like to avoid. The drastic reform would be the choice of the politician/bureaucrat if the level of inefficiency of the domestic firm is moderate because in such a

situation even a drastic reform would keep both the firms at the market and therefore would be politically correct.

Proposition 1 describes the political equilibrium arrived at under the condition of rent seeking. However this may not coincide with the first best optimum at the market which would have been implemented by an honest politician/bureaucrat. Note we have already assumed the society would like to have a duopoly equilibrium in place of a monopoly. But that particular duopoly equilibrium will be implemented by the honest politician/bureaucrat that maximizes the surplus generated at the market. We call it *socially optimum* reform.

Proposition 2: *When the firms do not have any fixed cost of operation,*

(i) if $c \leq \frac{a}{2}$ the drastic reform is the social optimum;

(ii) if $c > \frac{a}{2}$ the moderate reform is the social optimum.

Proof: In our model the market surplus is maximized when the consumer surplus is maximized. The lower is the price of the product at the market the higher is the consumer surplus. So the society would like to adopt that particular type of reform which implements lowest price of the product at the market but avoids a monopoly outcome.

Under duopoly the price of the product at the market is given by $\tilde{p} = \frac{a+c+t}{3}$ which is a monotonically decreasing function of t. Therefore if $c > \frac{a}{2}$ since the duopoly will exist in the tariff range $(\tilde{t}, \bar{t})$ the social optimum will be achieved at $\tilde{t}$. The society would prefer a moderate reform.

If $c \leq \frac{a}{2}$ the duopoly will exist in the tariff range $(0, \bar{t})$ and therefore the social optimum will be achieved at $t = 0$. The society would prefer a drastic reform.

The statement of the proposition follows.

It is interesting to note from proposition 2 that an incremental reform can never be a social optimum. Surprisingly if the domestic firm is inefficient, moderate reform becomes the social preference. This happens because the society realizes that a drastic reform though could generate more surplus, would also create monopoly of the foreign firm, which it does not prefer. If the domestic firm is sufficiently efficient the society prefers drastic reform because now even implementation of such a reform would not create monopoly of the foreign firm at the market. Notice proposition 2 also represents the choice of an honest, non rent-seeking politician/bureaucrat.

9

Now we juxtapose the preference of the corrupt politician/bureaucrat with that of the society/honest politician/honest bureaucrat to check if any conflict arises at the rent-seeking equilibrium.

Proposition 3: *When the firms do not have any fixed cost of operation, in presence of rent-seeking a corrupt politician/bureaucrat*

> *(i) if $c < \frac{a}{11}$ while the society prefers drastic reform, the corrupt politician/bureaucrat implements incremental reform;*
>
> *(ii) if $c \in [\frac{a}{11}, \frac{a}{2}]$ while the society prefers drastic reform, the corrupt politician/bureaucrat also implements drastic reform;*
>
> *(iii) if $c \in (\frac{a}{2}, a)$ while the society prefers moderate reform, the corrupt politician/bureaucrat also implements moderate reform.*

Proof: The statement of the proposition follows from statements of propositions 1 and 2 above.

Rent-seeking is considered harmful to the society because: (i) it creates Dead Weight Loss (DWL) due to inefficient choice of the politician/bureaucrat; (ii) it leads to unproductive expenditure equal to the amount of dissipated rent. Proposition 3 clearly shows that except the situation where the domestic firm is very efficient (having $c < \frac{a}{11}$) the type of reform chosen through the process of rent-seeking is not in conflict with the social optimum. If $c < \frac{a}{11}$ the society would prefer drastic reform but the rent-seeking, corrupt politician/bureaucrat would implement incremental reform. So Dead Weight Loss (DWL) is created in addition to the amount generated in corruption. In all other situations rent-seeking would not have any DWL implication: the choice of the corrupt politician/bureaucrat would match the social optimum, but the unproductive expenditures are incurred equal to the amount generated in corruption would still be there.

From the model itself we are able to calculate the amount of corruption associated with each type of reform. We compare them with the no reform situation in proposition 4 below.

Proposition 4: *Given that the initial monopoly of the domestic firm is also a rent-seeking equilibrium, neither the domestic nor the foreign firm have any fixed cost of operation and the reform-implementing politician/bureaucrat is corrupt, a reform*

> *(i) if $c < \frac{a}{11}$, would marginally lower the level of corruption;*
>
> *(ii) if $c \in [\frac{a}{11}, a)$, would raise the level of corruption.*

Proof: At the initial equilibrium the level of corruption is given by $\tilde{\pi}_i$. If $c < \frac{a}{11}$ and the incremental reform is implemented, the level of corruption $\pi(t) \to \tilde{\pi}_i$ but it would be marginally lower than $\tilde{\pi}_i$. If $c \in [\frac{a}{11}, \frac{a}{2}]$ drastic reform is implemented and the level of corruption $\pi(t) \to \tilde{\pi}_d > \tilde{\pi}_i$. If $c \in (\frac{a}{2}, a)$ the moderate reform is implemented and the level of corruption $\pi(t) \to \tilde{\pi}_m > \tilde{\pi}_i$. Therefore the statement of the proposition follows.

Proposition 4 shows that the level of corruption may rise or fall with reform. It is expected to fall with incremental reform. But it increases compared to the corruption level of initial monopoly equilibrium both in the moderate reform and drastic reform. So the proposition qualifies the existing ideas in the rent seeking literature. It shows that in a model where both the reform decision and the size of the rent is endogenously determined and the competing firms are heterogeneous, the size of corruption may either rise or fall depending on the efficiency of the domestic firm compared to that of the foreign firm: if the domestic firm is sufficiently efficient, incremental reform is implemented and the level of corruption marginally falls, but if the domestic firm is inefficient moderate or domestic reform is implemented and the level of corruption rises.

Observation 1: *Given that the initial monopoly of the domestic firm is also a rent-seeking equilibrium, neither the domestic nor the foreign firm have any fixed cost of operation and the reform-implementing politician/bureaucrat is corrupt,*

> *(i) if $c < \frac{a}{11}$, the incremental reform would be implemented in deviation from the socially optimum reform but the level of corruption would fall marginally;*

> *(ii) if $c \in [\frac{a}{11}, a)$, either moderate or drastic reform would be implemented in accordance with socially optimum reform but the level of corruption would rise.*

Proof: Follows from proposition 3 and 4 above.

Observation 1 underlines the trade-off that is involved with the reform decision made by a corrupt politician/bureaucrat in a rent-seeking economy. In presence of a sufficiently efficient domestic firm the extent of reform chosen by the corrupt politician/bureaucrat would not be socially efficient (would create DWL at the market) but the level of corruption would fall marginally. In all other situations the socially optimum reform would be implemented (no DWL would be there) but the level of corruption would rise.

11

2.1 Extension: firms having fixed cost of operation

Now we introduce fixed cost of operation for the firms in the basic model. We assume two firms differ in their fixed cost of operation: either of the firm can have higher fixed cost of operation than the other. The difference in fixed cost is given by $F > 0$. Though for derivation of results we assume the fixed cost of operation of the foreign firm is zero and the fixed cost of operation of the domestic firm is F which appears to be reasonable as explained below, some of the results of this section like Propostion 5 will be valid even if the assumption is made the other way round. The assumption made above clearly brings out the fixed cost advantage a foreign firm usually possesses compared to a domestic firm by operating in more than one country around the world: it optimally spreads out the fixed cost of operation in many countries so that the fixed cost of operation in a particular country appears to be nearly zero.

The addition of fixed cost in the model does not change the output level chosen by the individual firms either in the monopoly or in the oligopoly equilibrium discussed above. So the market output and market price also remains unchanged in each situation as discussed above. Only the profit level of the domestic firm is going to change. In a duopoly set up the domestic firm now will earn $\hat{\pi}_d = (1-x)\left[\frac{(a-2c+t)^2}{9} - F\right] = \pi_d - (1-x)F$ instead of π_d in equation (2). The value of $t < \bar{t}$ will be decided by the politician/bureaucrat from maximization of her payoff $\hat{\pi}(t) = \frac{x}{1-x}[\pi_f + \pi_d] - F$ such that $\pi_f > 0$ and $\hat{\pi}_d > 0$. Notice using the definition of $\pi(t)$, $\hat{\pi}(t)$ can also be written as:

$$\hat{\pi}(t) = \pi(t) - F. \tag{4}$$

So now the corrupt politician/bureaucrat can earn less at each possible choice of t. The difference in fixed cost of operation between the domestic firm and foreign firm acts as an effective constraint on the rent-extraction ability of the corrupt politician/bureaucrat.

Proposition 5: *The more is the difference of fixed cost of operation between the domestic and the foreign firm, the lower is the level of corruption associated with a rent-seeking equilibrium.*

Proof: Follows from the discussion above.

The interesting observation about Proposition 5 is that it is independent of the assignment of fixed costs between the firms who are participating in the rent-seeking competition: what really matters is the difference of fixed cost of operation between them. However the rest of the propositions that follows are sensitive to assignment of the fixed cost between the firms as have been assumed here.

Note from (4) since $\hat{\pi}(t)$ differs from $\pi(t)$ only by F which is independent of t, $\hat{\pi}(t)$ shares the same non-monotonicity of $\pi(t)$ as discussed in the basic model above with its unique minimum at $t^* = \frac{a+4c}{5} \in (0, \bar{t})$. However the feasible set of t left for choice of the corrupt politician/bureaucrat now

changes as it has to satisfy a more restrictive constraint $\hat{\pi}_d > 0$ instead of $\pi_d > 0$ in the basic model.

Notice $\hat{\pi}_d > 0$ if and only if $\frac{(a-2c+t)^2}{9} > F$. Since $\frac{(a-2c+t)^2}{9}$ is a continuous and monotonically increasing function of t in $[0, \bar{t})$ from the above inequality it follows that $\hat{\pi}_d > 0$ if and only if $t > \tilde{t}'$ where $\tilde{t}' = 3\sqrt{F} - (a - 2c)$. Note $\tilde{t}' > 0$ if and only if $c > \frac{a-3\sqrt{F}}{2}$. As we rule out the scope of import subsidy in this paper, if $c \leq \frac{a-3\sqrt{F}}{2}$, $\tilde{t}' = 0$. So if $c > \frac{a-3\sqrt{F}}{2}$ the politician/bureaucrat can choose a suitable value of t only from $(\tilde{t}', \bar{t})$. But if $c \leq \frac{a-3\sqrt{F}}{2}$, the choice set of the politician/bureaucrat expands to $(0, \bar{t})$. So we have a new insight compared to the basic model: the greater is the fixed cost of operation of the domestic firm, the higher is the value of $\tilde{t}'$ and more restrictive is the choice of reform left to the politician/bureaucrat.

Proposition 6: *Suppose $a \geq \frac{11}{3}\sqrt{F}$. When the domestic firm has fixed cost of operation $F > 0$ and the foreign firm has no fixed cost of operation, in presence of rent-seeking a corrupt politician/bureaucrat*

    (i)   if $c < \frac{a}{11}$, chooses incremental reform;

    (ii)   if $c \in [\frac{a}{11}, \frac{a-3\sqrt{F}}{2}]$, chooses drastic reform;

    (iii)   if $c \in (\frac{a-3\sqrt{F}}{2}, a - \frac{10}{3}\sqrt{F}]$, chooses moderate reform;

    (iv)   if $c \in (a - \frac{10}{3}\sqrt{F}, a)$, chooses incremental reform

in a market.

Proof:

Case 1: $> c > \frac{a-3\sqrt{F}}{2}$.

If $t^* \leq \tilde{t}'$ i.e. if $a - \frac{15}{6}\sqrt{F} \leq c$, $\pi(t)$ is a monotonically increasing function in $(\tilde{t}', \bar{t})$. Therefore the politician/bureaucrat chooses incremental reform where $t \to \bar{t}$.

If $t^* > \tilde{t}'$ i.e. $a - \frac{15}{6}\sqrt{F} > c$, $\pi(t)$ has a minimum at t^* in $(\tilde{t}, \bar{t})$. Now if she chooses incremental reform $t \to \bar{t}$, $\pi(t) \to x\left[\frac{(a-c)^2}{4} - F\right] = \tilde{\pi}_i$. But if she chooses moderate reform $t \to \tilde{t}$, $\pi(t) \to x(a - 2\sqrt{F} + c)^2 = \tilde{\pi}_m$. Since $a - c > 2\sqrt{F}$ (otherwise $\tilde{q}_f \leq 0$) the politician/bureaucrat chooses incremental reform over moderate reform if and only if $\tilde{\pi}_i > \tilde{\pi}_m$ i.e. $c > a - \frac{10}{3}\sqrt{F}$; chooses moderate reform over incremental reform if and only if $c \leq a - \frac{10}{3}\sqrt{F}$.

<u>Case 2</u>: $\leq \frac{a-3\sqrt{F}}{2}$.

Since $\pi(t)$ has its minimum at t^* in $(0, \bar{t})$, unlike the previous case now the politician/bureaucrat is in a position to choose drastic reform. If she chooses drastic reform $t \to 0$, $\pi(t) \to x\left[\frac{(a+c)^2}{9} + \frac{(a-2c)^2}{9} - F\right] = \tilde{\pi}_d$. However if she chooses incremental reform $t \to \bar{t}$, $\pi(t) \to \tilde{\pi}_i$. It turns out that $\tilde{\pi}_i > \tilde{\pi}_d$ if and only if $c < \frac{a}{11}$ and the politician/bureaucrat chooses incremental reform over drastic reform. However, if $c \geq \frac{a}{11}$, she chooses drastic reform over incremental reform.

The condition $a \geq \frac{11}{3}\sqrt{F}$ ensures not only $a - 3\sqrt{F} > 0$ also $\frac{a-3\sqrt{F}}{2} > \frac{a}{11}$. Again, since $a - \frac{15}{6}\sqrt{F} > a - 3\sqrt{F}$ the statement of proposition follows.

Note Proposition 6 is generalization of Proposition 1 of the basic model with $F > 0$. In presence of different fixed cost of operations of the two firms where domestic firm have higher fixed cost than its foreign competitor, an additional contingency arises. If the domestic firm is very inefficient i.e. if $c \in (a - \frac{10}{3}\sqrt{F}, a)$ the corrupt politician/bureaucrat chooses to implement an incremental reform like she would have done if the domestic firm were very efficient (if $c < \frac{a}{11}$). As in both the extremes similar policies are chosen the result appears to be surprising. This happens because in presence of fixed cost if the domestic firm is too inefficient compared to the foreign firm in terms of operating cost the joint profit of the two firms turns out to be higher under incremental reform than under moderate reform: the politician/bureaucrat earns higher rent under incremental reform than under moderate reform (she rules out drastic reform in such a situation because that would create a monopoly in the market).

The next proposition derives the society's preference over the three types of reforms we have described above.

Proposition 7: *When the domestic firm has fixed cost of operation $F > 0$ and the foreign firm has no fixed cost of operation,*

(i) If $c \leq \frac{a-3\sqrt{F}}{2}$ the drastic reform is social optimum;

(ii) If $c > \frac{a-3\sqrt{F}}{2}$ the moderate reform is social optimum.

Proof: In our model the market surplus is maximized when the consumer surplus is maximized. The lower is the price of the product at the market the higher is the consumer surplus. So the society would like to adopt that particular type of reform which implements lowest price of the product at the market but avoids a monopoly outcome.

14

Under duopoly the price of the product at the market is given by $\tilde{p} = \frac{a+c+t}{3}$ which is a monotonically decreasing function of t. Therefore if $c > \frac{a-3\sqrt{F}}{2}$ since the duopoly will exist in the tariff range ($\tilde{t}', \bar{t}$) the social optimum will be achieved at $\tilde{t}'$. The society would prefer a moderate reform.

If $c \le \frac{a-3\sqrt{F}}{2}$ the duopoly will exist in the tariff range ($0, \bar{t}$) and therefore the social optimum will be achieved at $t = 0$. The society would prefer a drastic reform.

The statement of the proposition follows.

Comparing proposition 7 with proposition 2 note because of the presence of fixed cost of the domestic firm the condition under which the drastic reform is the social optimum becomes more stringent. This happens because under the presence of fixed cost even if the domestic firm is relatively more efficient in terms of its operating cost it is easier to have a monopoly of the foreign firm at the market which the society wants to avoid.

Now we juxtapose the preference of the corrupt politician/bureaucrat with that of the society to check if any conflict arises at the equilibrium.

Proposition 8: *Suppose* $a \ge \frac{11}{3}\sqrt{F}$. *When the domestic firm has fixed cost of operation $F > 0$ and the foreign firm has no fixed cost of operation, in presence of rent-seeking a corrupt politician/bureaucrat*

(i) if $c < \frac{a}{11}$ while the society prefers drastic reform, the politician/bureaucrat implements incremental reform;

(ii) if $c \in [\frac{a}{11}, \frac{a-3\sqrt{F}}{2}]$ while the society prefers drastic reform, the politician/bureaucrat also implements drastic reform;

(iii) if $c \in (\frac{a-3\sqrt{F}}{2}, a - \frac{10}{3}\sqrt{F}]$ while the society prefers moderate reform, the politician/bureaucrat also implements moderate reform;

(iv) if $c \in (a - \frac{10}{3}\sqrt{F}, a)$ while the society prefers moderate reform, the politician/bureaucrat implements incremental reform.

Proof: Since $a \ge \frac{11}{3}\sqrt{F}$ implies $a - 3\sqrt{F} > 0$, it also implies $3a - 4\sqrt{F} > a - \frac{10}{3}\sqrt{F}$. Therefore the statement of the proposition follows from statements of propositions 6 and 7 above.

15

Proposition 8 in comparison with Proposition 3 shows that in presence of fixed cost of the domestic firm the possibility of conflict between the social preference/the choice of the honest politician/bureaucrat and the choice of the corrupt politician/bureaucrat rises. Without the fixed cost the possibility of conflict could arise only if the domestic firm were sufficiently efficient ($c < \frac{a}{11}$) but now it arises even if the domestic firm is very inefficient (i.e. when $c \in (a - \frac{10}{3}\sqrt{F}, a)$). The conflict of preference and the DWL arise whenever the incremental reform is implemented at the market.

Proposition 9: *Given that the initial monopoly of the domestic firm is also a rent-seeking equilibrium, the domestic nor the foreign firm have a fixed cost of operation and the reform-implementing politician/bureaucrat is corrupt, a reform*

(i) if $c < \frac{a}{11}$, would marginally lower the level of corruption;

(ii) if $c \in [\frac{a}{11}, \ a - \frac{10}{3}\sqrt{F}]$, would raise the level of corruption;

(iii) if if $c \in (a - \frac{10}{3}\sqrt{F}, a)$, would marginally lower the level of corruption.

Proof: At the initial equilibrium the level of corruption is given by $\tilde{\pi}_i$. If $c < \frac{a}{11}$ and the incremental reform is implemented, the level of corruption $\pi(t) \to \tilde{\pi}_i$ but it would be marginally lower than $\tilde{\pi}_i$. If $c \in [\frac{a}{11}, \frac{a - 3\sqrt{F}}{2}]$ drastic reform is implemented and the level of corruption $\pi(t) \to \tilde{\pi}_d > \tilde{\pi}_i$. If $c \in (\frac{a - 3\sqrt{F}}{2}, a - \frac{10}{3}\sqrt{F}]$ the moderate reform is implemented and the level of corruption $\pi(t) \to \tilde{\pi}_m > \tilde{\pi}_i$. If $c \in (a - \frac{10}{3}\sqrt{F}, a)$ the incremental reform is implemented and the level of corruption $\pi(t) \to \tilde{\pi}_d > \tilde{\pi}_i$. Therefore the statement of the proposition follows.

Proposition 9 is similar to proposition 4 of the basic model with the qualification for fixed cost of the domestic firm. Note, in presence of fixed cost of the domestic firm the possibility that an incremental reform is being implemented and marginally lower level of corruption is realized rises.

3. Conclusions

The paper revisits the relation between rent-seeking and reform in a model where the size of rent changes with rent-seeking competition between asymmetric firms and the reform-decision is taken by a corrupt politician/bureaucrat. The consumers do not like a monopoly outcome and a politician/bureaucrat is punished if she fails to implement duopoly equilibrium. In contrast to the existing rent-seeking literature where the asymmetry of firms and endogeneity of reform decision had not been

simultaneously considered before it shows that greater reform/product market competition may be associated with higher level of corruption. However it also finds out that the incremental reform may bring down corruption marginally. Difference in fixed cost of operation between the local firm and the foreign firm generally lowers corruption. If the local firm has higher fixed cost of operation than the foreign firm the possibility that an incremental reform is being implemented and marginally lower level of corruption is realized rises.

While the paper contributes to the rent-seeking literature by adding new insights, it also explains the recent observations that in many countries corruption rise with introduction of product market competition/liberalization especially in fast growing but moderately advanced in technology developing countries like India and China. It highlights the trade-off that exists where the reform is implemented by a corrupt authority: with incremental reform corruption falls marginally but the first-best market equilibrium is not achieved; in contrast the moderate/drastic reform achieves the first-best market equilibrium at the cost of rising corruption.

References

Ades A. and R. Di Tella (1999): Rents, Competition and Corruption, *American Economic Review* 89(4), 982 – 993.

Alexeev M. and Y. Song (2013): Corruption and Product Market Competition: An Empirical Investigation, *Journal of Development Economics* 103, 154 – 166.

Baksi, S., P. Bose and M. Pandey (2009): The Impact of Trade Liberalization on Bureaucratic Corruption, *Journal of Economic Behavior and Organization* 72, 214 – 224.

Fernandez, R. and D. Rodrik (1991): Resistance to Reform: Status Quo Bias in the Presence of Individual- Specific Uncertainty, *American Economic Review* 81(5), 1146-1155.

Grossman, G. and E. Helpman (1994): Protection for Sale, *American Economic Review* 84(4), 833–850.

Hillman, A. and H. Ursprung (1988): Domestic Politics, Foreign Interests, and International Trade Policy, *American Economic Review* 78(4), 729-745.

Kabiraj, T. and S. Marjit (2003): Protecting Consumers Through Protection: The Role of Tariff Induced Technology Transfer, *European Economic Review* 47, 113-124.

Krueger, A. (1974): The Political Economy of the Rent-Seeking Society, *American Economic Review* 64(3), 291-303.

Lahiri, S. and Y. Ono (1999): Optimal Tariffs in the Presence of Middlemen, *Canadian Journal of Economics* 32(1), 55-70.

Lambsdorff, J. (2002): Corruption and Rent-seeking, *Public Choice* 113, 97 – 125.

Marjit, S (1990): On a Non-cooperative Theory of Technology Transfer, *Economics Letters* 33, 293-298.

Marjit, S., A. Mukherjee and T. Kabiraj (2004): Future Technology, Incomplete Information and International Joint Venture, *Research in Economics* 58(3), 219-234.

Meyer, W. (1984): Endogenous Tariff Formation, *American Economic Review* 74(5), 970-985.

Mitra, D. (1999): Endogenous Lobby Formation and Endogenous Protection: a Long Run Model of Trade Policy Determination, *American Economic Review* 89(5), 1116–1134.

Mukherjee, A. and E. Pennings (2006): Tariffs, Licensing and Market Structure. *European Economic Review* 50, 1699-1707.