Mode of foreign entry, technology transfer, and FDI policy *

Aaditya Mattoo[†], Marcelo Olarreaga[‡], Kamal Saggi[§]

Abstract

Foreign direct investment (FDI) can take place either through the direct entry of foreign firms or the acquisition of existing domestic firms. The preferences of a foreign firm and the host country government over these two modes of FDI are examined in the presence of costly technology transfer. The trade-off between technology transfer and market competition emerges as a key determinant of preferences. The paper identifies the circumstances in which the government and foreign firm's choices diverge, and domestic welfare can be improved by restrictions on FDI which induce the foreign firm to choose the socially preferred mode of entry.

JEL classification numbers: F13, F23, O32

Keywords: Foreign Direct Investment, Technology Transfer, Investment Policies

*We are grateful to Mary Hallward-Driemeier, Maurice Schiff, Beata Smarzynska, Michael Nicholson and participants at a seminar at the World Bank for very helpful comments and suggestions. The views expressed here are those of the authors and do not necessarily correspond to those of the institutions to which they are affiliated.

[†]The World Bank, 1818 H Street, N.W., Washington, DC 20433. Phone: (202) 458-7611, fax: (202) 522 1159, e-mail: amattoo@worldbank.org.

[‡]The World Bank and CEPR, London, UK. Phone : (202) 458.8021, fax: (202) 522.1159 e-mail: molarreaga@worldbank.org.

[§]Department of Economics, Southern Methodist University, Dallas, TX 75275-0496. Phone (214) 768-3274, fax (214) 768-1821, e-mail: ksaggi@mail.smu.edu.

Non-Technical Summary

Host countries often associate inflows of foreign direct investment (FDI) with a wide variety of benefits, the most common of which are transfers of modern technologies and more competitive product markets. Perhaps surprisingly, restrictions on FDI are also fairly common. The most frequently observed policy restrictions are those on the number of foreign firms and on the extent of foreign ownership allowed. The pattern of these restrictions differs across countries and often across sectors within countries. For instance, consider policy in basic telecommunications services. At one end, in the Philippines, a high degree of competition co-exists with limitations on foreign equity partnership. Bangladesh and Hong Kong are examples of countries that have no limitations on foreign ownership, but both have monopolies in the international telephony and oligopolies in other segments of the market. The objective of this paper is to shed light on the economic rationale behind these restrictions.

The paper develops a simple model of FDI, where a foreign firm can choose between two modes of entry: *direct entry* wherein the foreign firm establishes a wholly-owned subsidiary that competes with domestic firms, and *acquisition* of an existing domestic firm (we also allow for partial acquisition). The foreign firm's mode of entry affects both the extent of technology transfer and the degree of competition in the host country. Divergence between the foreign firm's choice and the welfare interest of the domestic economy can create the basis for policy intervention.

Results suggest that when a foreign firm faces high costs of technology transfer, it will generally prefer direct entry to acquisition. This is because a high cost of technology transfer is associated with a smaller cost advantage over domestic firms and a high acquisition price. The government on the other hand will prefer acquisition because it leads to a larger extent of technology transfer by the foreign firm and a relatively higher acquisition

price for the domestic firm. The higher technology transfer under acquisition partly offsets its anti-competitive effect which when combined with the larger producer surplus under acquisition makes it more attractive relative to direct entry. Thus, when costs of technology transfer increase sharply with the extent of technology transfer, restricting direct entry in order to induce acquisition, even in highly concentrated markets, can help achieve a higher level of welfare in the host country.

On the other hand, if the cost of technology transfer is low, the government prefers direct entry to acquisition. Under this scenario, direct entry is not only associated with a more competitive domestic market, but will also brings more technology transfer due to the foreign firm's stronger 'strategic' incentive to transfer technology. But, the foreign firm would rather acquire an existing firm. Not only does acquisition yield greater market power but also the acquisition price is small when the cost of technology transfer is low. Under this scenario, restricting foreign equity (i.e., acquisition) in existing domestic firms becomes desirable if it help induce direct entry, even in relatively competitive markets.

Policy interventions, both in terms of foreign equity restrictions and direct entry may then be justified in oligopolistic markets. Note that the objective of these policies interventions is not to restrict access by foreign firms into the domestic market, but rather to induce a different mode of entry.

1 Introduction

Host countries often associate inflows of foreign direct investment (FDI) with a wide variety of benefits, the most common of which are transfers of modern technologies and more competitive product markets. Perhaps surprisingly, restrictions on FDI are also fairly common. The most frequently observed policy restrictions are those on the number of foreign firms and on the extent of foreign ownership allowed. The pattern of these restrictions differs across countries and often across sectors within countries. For instance, consider policy in basic telecommunications services. At one end, in the Philippines, a high degree of competition co-exists with limitations on foreign equity partnership. Bangladesh and Hong Kong are examples of countries that have no limitations on foreign ownership, but both have monopolies in the international telephony and oligopolies in other segments of the market. Pakistan and Sri Lanka have allowed limited foreign equity participation in monopolies to strategic investors, and deferred the introduction of competition for several years. Korea, however, is allowing increased foreign equity participation more gradually than competition. The objective of this paper is to shed light on the economic rationale behind these restrictions.[1]

The paper develops a simple model of FDI, where a foreign firm can choose between two modes of entry: *direct entry* wherein the foreign firm establishes a wholly-owned subsidiary that competes with domestic firms, and *acquisition* of an existing domestic firm (we also allow for partial acquisition). In our model, the foreign firm's mode of entry affects both the extent of technology transfer and the degree of competition in the host country. Divergence between the foreign firm's choice and the welfare interest of the domestic economy can create the basis for policy intervention. We provide conditions

[1] Political economy explanations associated with domestic and foreing lobbying may also help explain these restrictions, but we abstract from them in this paper.

under which such divergence arises and show that policy restrictions on FDI may force the foreign firm to adopt the government's preferred mode of entry.

The policy considerations that arise in our model are most relevant to situations where cross-border delivery is either infeasible or not the most efficient mode of supply. For example, in many services, ranging from construction to local telecommunications, the protection granted to national suppliers and social welfare, depend directly on the restrictions on FDI.[2] In our model, FDI can lead to enhanced competition and serve as a vehicle for transferring technology, but the relative strengths of these effects depends on the form that FDI takes. The competition enhancing effect of FDI is greater under direct entry. But one mode does not unambiguously dominate the other in terms of the extent of technology transfer. On the one hand, the relatively larger market share that the foreign firm enjoys under acquisition increases its incentive for transferring costly technology ('scale' effect). On the other hand, technology transfer may be larger under direct entry due to the stronger incentive that the foreign firm has to transfer technology in a more competitive market environment ('strategic effect'). In any case, the spectrum of observed policy choices may partly reflect the balancing by governments of these conflicting considerations in their specific circumstances.

Our formal model is a three stage game where, in the first stage, the foreign firm chooses its mode of entry. Subsequently, it chooses the extent of technology to transfer to its subsidiary. In the last stage, all firms compete in the domestic market. FDI policy is set prior to the first stage of the game by the host country government. We begin with a benchmark model in which the domestic market is a monopoly (section 2) and later generalize the model to the case of an arbitrary number of domestic firms (section 3).

[2] This assumption allow us to abstract from the decision facing foreign firms (or governments) which otherwise would have to choose between investing abroad or exporting to the host country.

To anticipate the results, it is shown that for high costs of technology transfer, the government generally prefers acquisition to direct entry, whereas the foreign firm chooses direct entry. Thus, restricting direct entry in order to induce acquisition can improve welfare, even in highly concentrated markets. On the other hand, if the cost of technology transfer is low, the government prefers direct entry whereas the foreign firm would rather acquire an existing domestic competitor. In such a case, restricting the acquisition of the existing domestic firm, say via the use of equity restrictions, can help improve host country welfare by inducing direct entry by the foreign firm, even in relatively competitive markets. Finally, for intermediate costs of technology transfer, both the government and the foreign firm prefer acquisition to direct entry.[3]

Some of the issues addressed here have been studied separately before, but we know of no analytical study of the relationship between technology transfer and mode of FDI (as in direct entry versus acquisition).[4] One of the first rigorous analyses of partial acquisitions (or joint ventures) was by Svejnar and Smith (1984), which demonstrated that the distribution of equity shares did not play a critical role in determining the tax burden of the new firm as long as the firms bargained over transfer prices. But their focus was more on the interaction of transfer pricing and local policy; they allowed neither for technology transfer nor for the possibility of direct entry. A recent paper by Al-Saadon and Das (1996) constructed a model of international joint venture in which ownership shares were endogenously determined as the outcome of bargaining between a multinational firm and a single host firm. They show that complementary choices (taxes or subsidies by the host

[3] An important assumption throughout the paper is that FDI exists in perfectly elastic supply to the host country regardless of policy interventions.

[4] The literature has tended to focus on licensing and direct entry where the foreign firm seeks to prevent the dissipation of its technological advantage (see Ethier and Markusen, 1996, Markusen, 2001, and Saggi, 1996, 1999). Yu and Tang (1992) discuss several potential motivations for international acquisition of firms. These include: cost reduction, risk sharing, and competition reduction (also a consideration in our framework).

country government, and transfer prices for inputs by the multinational firm) may influence the equity distribution of the joint venture. But again the foreign firm was not given the option of independent entry and technology transfer is not an issue. Lee and Shy (1992) demonstrated that restrictions on foreign ownership may adversely affect the quality of technology transferred, but the foreign firm was obliged to form a joint venture.[5] Most recently, Roy et al. (1999) examine a situation in which a foreign firm has already established in the local market and consider alternative collaborative deals between it and a local firm. They identify the degree of cost asymmetry between the foreign and local firm, and the market structure as crucial to determining the optimal choice of policy. However, technology transfer is assumed to be costless, and so the differing incentive to transfer technology under alternative market structures is not considered.

2 Benchmark model: domestic monopoly

There are two goods: z and y. Preferences in the domestic economy are quasi-linear over the two goods:

$$U(z, y) = u(z) + y$$

Good y serves as a numeraire good and it is produced under perfect competition with constant returns to scale technology.

A domestic incumbent firm currently supplies good z at constant marginal cost c. A foreign firm has two options for entering the domestic market. It

[5] Smarzynska (2001) empirically explores the mirror image. In a sample containing information on foreign investment projects in Eastern Europe and former Soviet Union, she founds that the higher the quality of technology to be transferred, the more likely is the foreign firm to choose direct entry to a joint-venture (especially in R&D-intensive industries).

can either acquire the domestic firm (if the foreign firm's share of the new firm is less than 100%, we will term this 'partial' acquisition) or it can set up a wholly owned subsidiary that directly competes with the domestic firm. The game proceeds as follows. In the first stage, the foreign firm chooses its mode of entry (E for direct entry and A for a acquisition). If it wants to acquire the domestic firm, it makes a take-it-or-leave-it offer to the domestic firm which specifies both a fixed transaction price (v) and a share of the new firm's total profits in the output market (θ). If the domestic firm accepts the offer, they form a new firm in which the domestic firm gets $1-\theta$ of the total profit and the foreign firm gets the rest. If the foreign firm's offer is refused by the domestic firm, the foreign firm can enter the market by establishing its own subsidiary.

After selecting its mode of entry, the foreign firm chooses the quality of technology it wishes to transfer to its subsidiary. Technology transfer lowers the marginal cost of production but is a costly process (see Teece, 1976). By incurring the cost $C(x)$, the foreign firm can lower the cost of production of its subsidiary in the domestic economy to $c-x$. In other words, if it opts to transfer no technology, the marginal cost of its subsidiary equals that of the domestic firm.

The last stage of the game involves the product market. In case of acquisition, the foreign firm produces as a monopolist; in case of direct entry, the foreign firm's subsidiary and the domestic firm compete in a Cournot fashion. Let $p(q)$ be the inverse demand function for good z generated by consumer maximization, where q is total consumption of good z. Firm i's profit function at the output stage is given by $\pi_i(q_i, q_j) = (p(q_i + q_j) - c_i)q_i$, where $i, j = h, f$, $c_h = c$, $c_f = c - x$ and $q = q_i + q_j$. The first order conditions for profit maximization for firm i can be written as:

$$\frac{\partial \pi_i(q_i, q_j)}{\partial q_i} = p + p' q_i - c_i = 0 \tag{1}$$

2.1 Technology transfer

Moving backwards, consider the foreign firm's decision regarding technology transfer in either of the two scenarios. At this stage, the ownership structure of the new firm (as parametrized by θ) is taken as given. The foreign firm chooses x to maximize its own profits:[6]

$$\max \pi_f^A(q(x); x) - C(x) \tag{2}$$

where

$$\pi_f^A \equiv \theta \pi^A(q(x); x)$$

To facilitate analytical derivations, for the rest of the paper, we assume that the cost of technology transfer is quadratic and the (inverse) demand function for good z (the relevant industry for our analysis) is linear:

Assumption 1 (A1): Let $C(x) = \frac{\tau x^2}{2}$ where $\tau = \partial^2 C/\partial x^2$ determines the convexity of the cost function of technology transfer and that $q = a - p$ where p denotes the (relative) price of good z.[7]

Then, using A1, and solving the problem in (2) gives the optimal technology transfer under acquisition:

$$x^A = \frac{\theta(a-c)}{2\tau - \theta} \tag{3}$$

[6] For exposition purposes we assume that the cost of technology transfer is only incurred by the foreign firm. Relaxing this assumption would only affect results regarding partial acquisition.

[7] Technology transfer could take many forms. Had we assume that technology transfer was demand enhancing (brand name, marketing techniques, etc..) rather than cost reducing then one would have to add x to the demand function specified above. Results would be totally robust to this alteranative specficiation.

Lemma 1: *The quality of technology transferred by the foreign firm increases with its share of ownership*

$$\frac{dx^A}{d\theta} = \frac{\theta^2(a-c)}{(2\tau-\theta)^2} > 0$$

Similarly, under direct entry, the foreign firm chooses x to solve the following problem

$$\max \pi_f^E(q_f(x), q_h(x); x) - C(x) \tag{4}$$

The first order condition for the above problem can be written as:

$$\frac{\partial \pi_f^E}{\partial q_f}\frac{dq_f}{dx} + \frac{\partial \pi_f^E}{\partial q_h}\frac{dq_h}{dx} + \frac{\partial \pi_f^E}{\partial x} - \frac{dC(x)}{dx} = 0 \tag{5}$$

From the first order condition at the output stage (see equation 1), the first term of the above equation equals zero. The second term captures the strategic effect of technology transfer: an increase in x lowers the output of the domestic firm thereby increasing the foreign firm's profits (see Brander and Spencer, 1983). The third term captures the stand alone incentive for technology transfer. We call this the scale effect since the higher the output of the foreign firm, the stronger its incentive for technology transfer. The last term simply denotes the marginal cost of technology transfer.

Solving the problem in (4) gives the optimal technology transfer under direct entry

$$x^E = \frac{4(a-c)}{9\tau - 8} \tag{6}$$

Note that $9\tau - 8 > 0$ if the second order condition holds (see the appendix,

subsection 5.2.5).[8] Note from (3) and (6) that $x^A \geq x^E$ iff

$$\theta \geq \theta_t \equiv \frac{8\tau}{9\tau - 4} \tag{7}$$

Proposition 1: *The foreign firm transfers a superior technology to its subsidiary under acquisition than under direct entry iff its share of the acquired firm exceeds a certain threshold θ_t.*

The intuition behind this result is as follows. First note that since technology transfer reduces the cost of production, the higher the sales of the enterprise to which the technology is being transferred, the stronger the foreign firm's incentive to transfer technology (thus the scale effect is stronger under acquisition than under direct entry). But, under acquisition, the foreign firm must share the benefits of technology transfer with domestic firm whereas it must bear the full costs itself. Thus, the foreign firm has a stronger incentive for technology transfer under acquisition if and only if a large enough share of the new firm's profits lies in its hands.

Note, from the right-hand-side of (7) that if $\tau < 4$, then θ_t is larger than 1, i.e., there exists no feasible ownership share for which proposition 1 holds. We thus have the following result:

Corollary 1: *The foreign firm transfers a superior technology to its subsidiary under direct entry than to a fully acquired firm iff $\tau < 4$.*

Thus, even a fully acquired firm may receive less technology than the wholly

[8] Furthermore, since $c > x^E$, we also need that

$$\tau > \frac{4(a+c)}{9c}$$

These restrictions are assumed to be satisfied throughout the paper.

owned subsidiary of the foreign firm if the cost of technology transfer (τ) is low (or to be more precise when the cost function of technology transfer is not too convex). The intuition for this result can be understood in the terms of the scale effect and the strategic effect. First note that the scale effect is stronger under acquisition than under direct entry since the foreign firm's subsidiary produces a higher level of output under acquisition relative to direct entry (which involves competition with the domestic firm). But under direct entry the foreign firm has a strategic incentive for technology transfer (as captured by the second term in equation 5). As we show in the appendix, under assumption A1, the strategic incentive for technology transfer is proportional to the output of the foreign firm and therefore declines in τ. Thus, when τ is small, the strategic effect under direct entry results in greater technology transfer despite the fact that the scale effect is weaker under direct entry relative to acquisition.

2.2 Mode of entry

To determine the foreign firm's choice between acquisition and direct entry, we first need to pin down its equilibrium offer (θ^*, v^*). Consider the decision of the domestic firm which faces an arbitrary offer (θ, v) from the foreign firm to enter into joint production (when $\theta = 1$, the domestic firm is fully acquired). The domestic firm is willing to accept any offer that leaves it with a net payoff equal to that which it makes under direct entry by the foreign firm. Thus, any offer (θ, v) that satisfies the following constraint is acceptable to the domestic firm:

$$(1-\theta)\pi^A(x^A(\theta)) + v \geq \pi_h^E(x^E) \tag{8}$$

where $\pi_h^E(x^E)$ denotes the profits of the domestic firm under direct entry. Since the foreign firm has all the bargaining power, the above constraint

binds in equilibrium. Thus, there exist multiple potential combinations (θ, v) that are acceptable to the domestic firm. Of course, the foreign firm chooses (θ, v) to solve the following problem:

$$\max_{\theta,\, v} \theta \pi^A(x^A(\theta)) - C(x^A(\theta)) - v$$

where we know that the constraint in (8) implies that

$$v = \pi_h^E(x^E) - (1-\theta)\pi^A(x(\theta))$$

Thus the problem confronting the foreign firm is equivalent to

$$\max_{\theta} \pi^A(x^A(\theta)) - C(x^A(\theta))$$

The first order condition for the above problem implies a corner solution (due to the envelope theorem or from first order condition derived from equation (2)):

$$\left[-\frac{\partial \pi^A}{\partial x} - \frac{\partial C}{\partial x}\right] \frac{dx^A(\theta)}{d\theta} = -(\theta - 1)\frac{\partial \pi^A}{\partial x}\frac{dx^A(\theta)}{d\theta}$$

implying that

$$\theta^* = 1$$

Since x is chosen optimally at a later date, it is optimal for the foreign firm to completely acquire the domestic firm and the domestic firm accepts this offer since it fares no worse than the alternative of direct entry.

Proposition 2: *In equilibrium,* $\theta^* = 1$ *and* $v^* = \pi_h^E(x^E)$.

Since $v^* = \pi_h^E(x^E)$, the domestic firm is indifferent between being acquired by the foreign firm or competing with it under direct entry. Since the foreign firm strictly prefers acquisition, in equilibrium, we have $\theta^* = 1$. The logic of the acquisition result is simple: acquisition allows the foreign firm to monopolize

the market and since it offers the domestic firm the lowest transaction price at which it is willing to sell, the deal is acceptable to the domestic firm.

The above result has an interesting implication: when considering the alternative modes of entry from a welfare perspective, we can focus solely on consumer welfare since the domestic firm is indifferent between acquisition and direct entry. Unless, the cost of technology transfer is sufficiently low ($\tau < 4$), acquisition results in a superior level of technology being transferred to the domestic market. However, it also implies monopoly. Thus, the domestic economy may very well be better off under direct entry whereas the market equilibrium yields acquisition.

2.3 Domestic welfare

Given proposition 2, we only need to compare price under direct entry with price under acquisition to determine a welfare ranking of the two regimes:

$$p^E = \frac{a + c - x^E}{3} \text{ and } p^A = \frac{a + c - x^A}{2}$$

Using equations (3) and (6), we have

$$p^A - p^E = \frac{(3\tau^2 - 6\tau + 4)(a - c)}{(2\tau - 1)(9\tau - 8)} > 0 \tag{9}$$

Thus, we have the following result:

Proposition 3: *Domestic welfare is always higher under direct entry relative to acquisition.*

Given that second order conditions require τ to be larger than 2 (see appendix), by (9), it turns out that domestic welfare is always higher under direct entry whereas the foreign firm always opts for acquisition as long as it is free to set the terms (i.e. has all the bargaining power when making the initial

acquisition offer to the domestic firm).

By corollary 1, when $\tau < 4$, direct entry results in greater technology transfer than acquisition. Since competition is always higher under direct entry, domestic welfare is surely higher under direct entry when $\tau < 4$. What proposition 3 informs us is that, under assumption A1, the higher technology transfer under acquisition for the case of $\tau > 4$, is insufficient to counter the adverse effects of reduced competition.

2.4 Policy implication

The analysis above has an interesting implication regarding the welfare effects of equity restrictions imposed on foreign enterprises in many developing countries. Our results indicate that while domestic welfare is higher under direct entry, the foreign firm always prefers full acquisition. Imagine that the foreign firm faces an equity restriction which makes it infeasible to fully acquire the incumbent domestic firm. What are the welfare implications of such a policy?

If θ is not constrained by policy, we know from proposition 3 that the foreign firm prefers to fully acquire the domestic firm. It is easy to show by comparing firms' profits under acquisition and direct entry that if θ were a policy parameter which the foreign firm must take as a given, it prefers acquisition to direct entry iff

$$\theta > \theta_p \equiv \frac{4\tau}{3(3\tau - 2)}$$

Clearly, θ_p decreases in τ: as the cost function for technology transfer becomes more convex, the foreign firm is less willing to accept a smaller share of the new firm. If domestic policy becomes restrictive enough, the foreign firm is induced to enter the market directly thereby yielding the more desirable outcome. However, if domestic policy merely restricts ownership without

making direct entry more attractive to the foreign firm, it simply results in less technology transfer (from lemma 1) thereby hurting domestic welfare:

Proposition 4: *When there is only one incumbent firm in the domestic market, a sufficiently strong equity restriction improves domestic welfare by inducing direct entry by the foreign firm.*

The main insight behind the above result is that a policy restriction on foreign ownership may induce the foreign firm to adopt a strategy that is more favorable to the domestic economy.[9]

The benchmark model is useful for developing intuition but it is also an incomplete treatment of the issue since many markets are actually oligopolistic. Furthermore, in the oligopoly case, strategic considerations change and the foreign firm may prefer direct entry to acquisition (see Kamien and Zang, 1990), in which case the need for government intervention may vanish. However, under oligopoly, the domestic government may not necessarily value direct entry more than acquisition as domestic producer surplus may be higher under acquisition than under direct entry in the oligopoly case. To explore these issues, we examine a more general model in which there are multiple domestic firms.

3 Domestic oligopoly

Let $n-1$ denote the total number of domestic firms. The structure of the game is as follows. As before, the foreign firm makes an offer $(\theta,\ v)$ to one

[9] As we discussed in the Introduction, governments sometimes restrict direct entry by foreign firms. We develop a more general model that can help explain such a policy stance. Even in our basic model, restricting direct entry could increase the bargaining power of the domestic firm thereby increasing the acquisition price v^*. This is because, if direct entry is infeasible, v^* will at least have to equal the existing level of profits of the domestic firm (π_h^E will no longer be the outside option of the domestic firm if direct entry by the foreign firm is infeasible).

of the incumbents say firm i. If firm i accepts the offer, the acquisition takes place. If it rejects it, the foreign firm can make an offer to any one of the other incumbents or decide to enter the market directly.

After choosing its mode of entry, the foreign firm chooses the extent of technology transfer to the relevant production unit. In the final stage, all firms compete a la Cournot in the product market.

3.1 Product market

The product market stage is well understood and requires little discussion. The output levels of all firms are reported in the appendix. The crucial point to remember is that in case the foreign firm acquires a domestic firm, the total number of firms in the market equals $n-1$ whereas if it enters directly, it equals n. Without loss of generality, let the foreign firm's partner be denoted as firm $n-1$.

3.2 Technology transfer

Under direct entry, the foreign firm's first order condition for technology transfer can be written as

$$(n-1)(-q_f^E)\frac{dq_h^E}{dx} + q_f^E - \tau x = 0 \tag{10}$$

where q_h^E denotes the output of a typical domestic competitor and as can be derived from the appendix (subsection 5.2.1)

$$\frac{dq_h^E}{dx} = -\frac{1}{n+1} < 0.$$

The first term in (10) is the strategic effect; the second term is the scale effect and the third term captures the cost of technology transfer. The first order condition in case of acquisition can be recovered from equation (10)

by reducing the number of domestic competitors to $n-2$ and using the appropriate output levels for all firms. Note that since $q_f^E > q_f^E \frac{n-1}{n+1}$, the scale effect is always stronger in magnitude than the strategic effect, holding constant the mode of entry. However, it is quite possible that the strategic effect under direct entry exceeds that under acquisition. In fact, as we know from the analysis of the benchmark model, the strategic effect is *absent* when the only domestic firm is acquired. Thus, intuition suggests that, starting from $n = 2$ (i.e. a single domestic firm), the strategic effect must increase with n, at least locally. The following proposition formalizes this intuition:

Proposition 5: *The strategic incentive for technology transfer increases with n if $n < n^c(\tau)$ and it decreases with n if $n > n^c(\tau)$*[10]

Thus the strategic effect increases with the number of existing domestic firm as long as the domestic market is not too competitive. In relatively competitive market, the presence of an extra firm in the domestic market actually decreases the 'strategic' incentives to transfer technology. The reason for this is that as the market gets more competitive, the scope for strategic interactions among firms is reduced.

Under assumption A1, it is easy to solve for the quality of technology transferred in the presence of acquisition:[11]

$$x^A = \frac{2(n-1)(a-c)}{(4n-2)+(\tau-2)n^2}$$

[10] For a formal proof, see the appendix (subsection 5.2.2). Alternatively, we state the above proposition as follows:

$$\frac{dS(n,\tau)}{dn} \geq 0 \text{ when } \tau \leq \tau^c(n) \equiv \frac{2n(n-2)}{(n+1)(n-3)}$$

.

[11] For a discussion of the second order conditions and other parameter restrictions implied by the model, see the appendix.

Similarly, the technology transferred to the subsidiary under direct entry is given by:

$$x^E = \frac{2n(a-c)}{(\tau-2)n^2 + (2n+1)\tau}$$

The equilibrium technology transfers have reasonable properties: under both direct entry and acquisition, technology transfer diminishes with n as well as with the cost parameter τ.[12] Corollary 1 can be generalized as follows:

Corollary 2: *The foreign firm transfers less technology under acquisition ($\theta = 1$) than under direct entry iff $\tau < \tau_t(n)$ where*

$$\tau_t(n) = \frac{2(n^2-n)}{n^2-n-1}$$

Furthermore, $\tau_t(n)$ is decreasing in n (as n approaches infinity, $\tau_t(n)$ approaches 2).

Thus, again as in the monopoly case, direct entry may yield more technology transfer if τ is sufficiently small (i.e., the cost function of technology transfer is not too convex). The intuition as same as before: the strategic effect is strong when τ is small. The fact that $\tau_t(n)$ approaches 2 when n approaches infinity implies that when the domestic market is extremely competitive, acquisition delivers greater technology transfer (since τ cannot be less than 2). The intuition for this result comes from proposition 5: when n is large, the strategic effect decreases with n. As a result, the strategic effect is stronger

[12] If a full acquisition were infeasible, the dependence of x^A on θ is of interest. In this context, proposition 1 can be generalized as follows: The foreign firm transfers a better technology under acquisition than under direct entry iff $\theta \geq \theta_t(n)$ where

$$\theta_t(n) = \frac{\tau n^3}{\tau(n^3+n^2-n-1) - 2n(n+1)}$$

Furthermore, (i) $\theta_t(n)$ is increasing in n (as n approaches infinity, $\theta_t(n)$ approaches 1) and (ii) strictly decreasing in τ.

under acquisition than it is under direct entry. Thus, when n is large, both the scale effect and the strategic effect are stronger under acquisition resulting in greater technology transfer.

3.3 Mode of entry

As in the case of a single domestic firm, it is easy to show that full acquisition is always optimal. However, unlike in the benchmark model, if one domestic firm rejects the foreign firm's offer, it does not automatically imply that the foreign firm must enter directly since it can acquire another domestic firm. We assume that the transaction price v at which the acquisition occurs is $\pi_h^A(x^A)$: the profits of a typical home firm that competes with the acquired firm. The argument for this transaction price is that a firm that agrees to sell out to a foreign firm should fare no worse than those that compete with the new enterprise.[13]

Thus, $v = \pi_h^A(x^A)$, and the foreign firm opts for an acquisition iff

$$\pi^A(x^A) - \pi_h^A(x^A) \geq \pi_f^E(x^E)$$

In a setup without technology transfer, Kamien and Zang (1990) have shown that the foreign firm will always prefer direct entry to acquisition when there is more than one firm ($n \geq 3$) in the domestic market (their result is reproduced in the appendix).[14] As shown below, this result does not hold in the presence of technology transfer. The reason is that the larger degree of technology transfer associated with the stronger scale effect under

[13] A second reasonable candidate for the acquisition price is $\pi_h^E(x^E)$: the profits of a typical domestic firm under direct entry. Results are qualitatively robust to such an assumption. The acquisition price does not alter the nature of the product market equilibrium; it simply affects the preferences of firms (both foreign and domestic) regarding the alternative modes of entry.

[14] Although the formal game they analyze differ significantly from ours, the mechanism underlying their result is also behind ours.

acquisition results in a greater increase in the relative profits of the acquired firm, making acquisition more attractive than direct entry.

The foreign firm prefers acquisition to direct entry iff $\Gamma = \pi^A - \pi_h^A - \pi_f^E > 0$. The expression for Γ is quite cumbersome and non-linear in τ and n (see the appendix). However, dividing Γ by $(a-c)^2$ and plotting the residual for values of $\tau > 2$ and $n \geq 3$, yields the *zero iso-net-profit surface* shown in Figure 1.

Thus for relatively low cost of technology transfer ($2 < \tau < 2.5$), the foreign firm prefers acquisition to direct entry. The lower the cost of technology transfer, the smaller the profits of the typical domestic firm under direct entry and therefore the lower the acquisition price (v) collected by the acquired domestic firm. Note also that as n increases, direct entry becomes more likely for a given cost of technology transfer (i.e., the iso-curves are negatively slope in the space $\{\tau, n\}$).

Similarly, when τ is large, and n is small, an acquisition is unattractive to the foreign firm because of the high acquisition price and because technology transfer is of secondary importance (due to its high cost). Under this scenario, the considerations studied in Salant et. al. (1983) and Kamien and Zang (1990) dominate, making an acquisition less profitable than direct entry. However, for small τ, technology transfer is an important consideration and the foreign firm prefers acquisition to direct entry because the larger scale effect under acquisition makes the acquired firm more profitable. Thus, even in relatively competitive markets, technology transfer can make acquisition more profitable than direct entry.

Next, we compare domestic welfare under acquisition with that under direct entry. The trade-off between these regimes is clear from the domestic viewpoint: acquisition may result in greater technology transfer whereas direct entry encourages competition.

3.4 Domestic welfare under oligopoly

Let us first consider how consumers and producers fare under alternative entry modes. We prove the following result in the appendix:

Proposition 6: *Regardless of the number of firms (n) in the domestic market and the convexity of the cost of technology transfer (τ), consumers are better off under direct entry than under acquisition ($p^A > p^E$) whereas domestic producers are better off under acquisition ($\pi_h^A > \pi_h^E$).*[15]

Thus, in the oligopoly case, we have a conflict between the interests of domestic producers and consumers. Given this conflict, the main question is whether total domestic welfare (defined as the sum of consumer surplus and producer surplus) is higher under direct entry or acquisition. Let ΔCS denote the amount by which consumer surplus under acquisition falls short of consumer surplus under direct entry:

$$\Delta CS = \int_{p^E}^{p^A} = \left[ap^E - \frac{(p^E)^2}{2}\right]\left[ap^A - \frac{(p^A)^2}{2}\right] < 0 \tag{11}$$

Similarly, let ΔPS be the amount by which domestic profits are higher under acquisition relative to direct entry:

$$\Delta PS = (n-1)\left[\pi_h^A - \pi_h^E\right] > 0 \tag{12}$$

Change in total domestic welfare is then defined as:

$$\Delta W \equiv W^A - W^E = \left[ap^E - \frac{(p^E)^2}{2}\right]\left[ap^A - \frac{(p^A)^2}{2}\right] + (n-1)\left[\pi_h^A - \pi_h^E\right] \tag{13}$$

As can be expected, the expression for (13) is quite complicated and non

[15] The difference in prices under acquisition and direct entry declines as the number of firms increases. At the limit, when n approaches infinity, this difference tends to zero.

linear in τ and n, but dividing (13) by $(a-c)^2$, we can plot the expression as a function of τ and n.

Figure 2 shows that for low values of τ, welfare is higher under direct entry than under acquisition. The rationale for this result is that technology transfer is larger under direct entry than under acquisition, as the scale effect is dominated by the strategic effect. On the other hand, the loss for producers under direct entry is large when τ is small since greater technology transfer implies that the foreign firm is even more competitive than it would have been under acquisition. As this occurs, the relative importance of the increase in competition (i.e., lower prices) associated with direct entry tends to dominate.

Similarly, when τ is large, domestic welfare is higher under acquisition relative to direct entry. Clearly, this result contrasts with the foreign firm's preferences over the two modes of entry, which prefers acquisition for low values of τ and entry for high values of τ.

Thus, again, as in the monopoly case, the interest of the foreign firm may be opposite to the interest of the host country. In the next section we explore the policy implications of this conflict.

3.5 Government intervention under oligopoly

To understand under what conditions policy intervention may be justified, we plot in figure 3, the zero level iso-curves of the change in welfare $\Delta W/(a-c)^2$ and the difference in foreign firms profits $\Gamma/(a-c)^2$, i.e., the locus of $(\tau; n)$ at which they intersect the zero surface.

Thus for a given n, and high τ, the foreign firm prefers direct entry, whereas the government prefers acquisition. For low levels of τ, the opposite is true whereas for intermediate values of τ, both the government and the

foreign firm prefer acquisition to direct entry.[16]

Thus both, in north-east region ([A;E]) and the south-west region ([E;A]) of figure 3 there is room for government intervention. In the south-west region, a restriction on acquisitions may induce entry by the foreign firm (as in our benchmark model of domestic monopoly). Similarly, in the north-east region, restricting direct entry induces an acquisition by the foreign firm and thereby improves domestic welfare.

Policy interventions, both in terms of foreign equity restrictions and direct entry may then be justified in oligopolistic markets. Note that the objective of these policies interventions is not to restrict access by foreign firms into the domestic market, but rather to induce a different mode of entry.

Our results have some further implications. In industries with more complex technologies we should observed both a higher cost of technology transfer (τ) and a more concentrated market structure, as the cost of entry should increase with the level of technological complexity. In terms of figure 3, industries with complex technologies (services) will lie in the north-east region of the diagram, whereas industries with less complex technologies (manufacturing) will be lie in the south-west region of the diagram. If so, our analysis indicates that governments may have incentives to restrict different modes of entry by foreign firms depending on the industry. In services one should observe restrictions in terms of the number of foreign firms allowed in the market, whereas in manufacturing acquisition would be restricted in order to promote direct entry by foreign firms. This is broadly consistent with the evidence provided for different regions in OECD (2001) and UNCTAD (2000), where it is reported that the ratio of foreign mergers and acquisition with respect to greenfield FDI is much larger in services than in manufacturing.

[16] Note that welfare may be higher under acquisition even if direct entry leads to more technology transfer because of the fact that producers are better off under acquisition.

4 Conclusion

The observation that governments in developing countries praise the merits of FDI inflows may not necessarily be at odds with some of the restrictions they impose on FDI. Equity restrictions that limit ownership of existing domestic firms can be justified if direct entry is welfare superior. Similarly, restrictions on direct entry may be justified, if acquisition offers a better alternative from the host country perspective.

This paper shows that when a foreign firm faces high costs of technology transfer, it will generally prefer direct entry to acquisition. This is because a high cost of technology transfer is associated with a smaller cost advantage over domestic firms and a high acquisition price. The government on the other hand will prefer acquisition because it leads to a larger extent of technology transfer by the foreign firm and a relatively higher acquisition price for the domestic firm. The higher technology transfer under acquisition partly offsets its anti-competitive effect which when combined with the larger producer surplus under acquisition makes it more attractive relative to direct entry. Thus, when costs of technology transfer increase sharply with the extent of technology transfer, restricting direct entry in order to induce acquisition, even in highly concentrated markets, can help achieve a higher level of welfare in the host country.

On the other hand, if the cost of technology transfer is low, the government prefers direct entry to acquisition. Under this scenario, direct entry is not only associated with a more competitive domestic market, but will also brings more technology transfer due to the foreign firm's stronger 'strategic' incentive to transfer technology. But, the foreign firm would rather acquire an existing firm. Not only does acquisition yield greater market power but also the acquisition price is small when the cost of technology transfer is low. Under this scenario, restricting foreign equity (i.e., acquisition) in ex-

isting domestic firms becomes desirable if it help induce direct entry, even in relatively competitive markets.

Given our discussion above, it is clear that for intermediate levels of technology transfer, both the government and the foreign firm prefer acquisition, and therefore there is no need for policy intervention.

The policy implications of our analysis should be treated with caution. We have developed our results in a simple model under some special assumptions. For example, domestic entry, licensing agreements or technological spillovers are not considered. However, the model offers some crisp insights. In particular, it is difficult to argue against the point that when a foreign firm has different modes of entering the domestic market, its preferences need not align perfectly with those of the domestic economy. This divergence stems from the different objectives of the foreign firm and the government. Of course, such a divergence is almost implied by the existence of an imperfectly competitive market structure, something our model assumes. But there are good reasons to argue that services markets, particularly in those in which technology transfer is an important consideration, are usually not perfectly competitive. Furthermore, it is well known that multinational firms are found, by and large, in oligopolistic industries. As a result, our analysis is useful to obtain a better understanding of the implications of mode choice for technology transfer and welfare.

References

[1] Al-Saadon, Yousef and Satya P. Das, 1996. "Host-country policy, transfer pricing and ownership distribution in international joint ventures: A theoretical analysis," International Journal of Industrial Organization 14: 345-364.

[2] Beamish, Paul W., "Joint ventures in LDCs: Partner selection and performance," Management International Review 1987, 1, 23-37.

[3] Brander, James and Barbara Spencer, 1983. "Strategic commitment with R&D: the symmetric case," Rand Journal of Economics 14(1): 225-235.

[4] Campbell, HF and A.J. Hand, 1998. "Joint ventures and technology transfer: the Solomon Islands pole-and-line fishery", Journal of Development Economics 57, 421-442.

[5] Ethier, W.J., Markusen, J.R., 1996. "Multinational firms, technology diffusion and trade," Journal of International Economics 41, 1-28.

[6] Kamien, Morton I. and Israel Zang, 1990. "The limits of monopolization through acquisition," Quarterly Journal of Economics 105 (2): 465-499.

[7] Lee, Frank C. and Oz Shy, 1992. "A welfare evaluation of technology transfer to joint ventures in the developing countries," The International Trade Journal 2: 205-220.

[8] Marjit, Sugata, Udo Broll, and Indrajit Mallick, 1995. "A theory of overseas joint ventures," Economics Letters: 367-370.

[9] Markusen, J.R., 2001. "Contracts, intellectual property rights, and multinational investment in developing countries," Journal of International Economics 53, 189-204.

[10] OECD (2001), "New patterns of industrial globalization: crossborder mergers and acquisitions and strategic alliances, Paris.

[11] Reynolds, R. and Snapp, B., 1986. "The competitive effects of partial equity interests and joint ventures," International Journal of Industrial Organization 8: 559-574.

[12] Roy, Prithvijit, Tarun Kabiraj, and Arijit Mukherjee, 1999. "Technology transfer, merger, and joint venture: A comparative welfare analysis," Journal of Economic Integration 14(3): 442-466.

[13] Saggi, Kamal, 1999. "Foreign direct investment, licensing, and incentives for innovation," Review of International Economics 7: 699-714.

[14] Saggi, Kamal, 1996. "Entry into a foreign market: Foreign direct investment versus licensing," Review of International Economics 4: 99-104.

[15] Salant S.W., S. Switzer, and R.J. Reynolds, 1983. "Losses from horizontal merger: the effects of an exogenous change in industry structure on Cournot-Nash equilibrium," Quarterly Journal of Economics 98: 185-199.

[16] Smarzynska, Beata, 2001, 'Technological leadership and the choice of entry mode by foreign investors', mimeo, The World Bank.

[17] Teece, David J., 1977. "Technology transfer by multinational firms: The resource cost of transferring technological know-how," Economic Journal 87: 242-261.

[18] Svejnar, Jan and Stephen Smith, 1984. "The economics of joint ventures in less developed countries," The Quarterly Journal of Economics 99(1): 149-168.

[19] UNCTAD, World Investment Report, 1995, Geneva, United Nations.

[20] UNCTAD, World Investment Report, 2000, Geneva, United Nations.

[21] Yu, Chwo-Ming and Ming-Je Tang, 1992. "International joint ventures: Theoretical considerations," Managerial and Decision Economics 13: 331-342.

5 Appendix

Here, we provide all analytical derivations that underlie the results contained in the body of the paper.

5.1 Model with domestic monopoly

5.1.1 Cournot competition

Each firm chooses its output q_i to maximize its profits $\pi_i = (A - q_i - q_j - c_i)q_i$ where $c_f = c - x$ and $c_h = c$. The first order conditions can be solved for each firm's equilibrium output:

$$q_i = \frac{a - 2c_i + c_j}{2}.$$

Furthermore, in equilibrium, $\pi_i = q_i^2$.

5.1.2 Technology transfer by the foreign firm

Under acquisition, the profit function of the foreign firm can be written as

$$\pi_f^A(x) = \theta\pi^A(x) = \theta\left[\frac{a - c + x}{2}\right]^2$$

whereas under direct entry

$$\pi_f^E(x) = \left[\frac{a - c + 2x}{3}\right]^2$$

Recall from equation (5) that, the first order condition for the choice of x can be written as

$$\frac{\partial\pi_f^E}{\partial q_f}\frac{dq_f}{dx} + \frac{\partial\pi_f^E}{\partial q_h}\frac{dq_h}{dx} + \frac{\partial\pi_f^E}{\partial x} - \frac{dC(x)}{dx} = 0$$

which for linear demand and quadratic cost function for technology transfer

can be written as

$$\frac{q_f}{3} - \tau x = 0$$

where

$$q_f = \frac{a - c + 2x}{3}$$

5.2 Domestic oligopoly

5.2.1 Cournot competition

We directly report the output levels of all firms. The output of the acquired firm is given by

$$q^A = \frac{a + (n-1)x - c}{n}$$

whereas that of a typical domestic firm is given by

$$q_h^A = \frac{a - c - x}{n} \text{ for } h = 1...n-2$$

Similarly, in case of direct entry, we have

$$q_f^E = \frac{a + nx - c}{n+1} \text{ and } q_h^E = \frac{a - c - x}{n+1} \text{ for } h = 1...n-1.$$

5.2.2 Strategic Incentive for technology transfer

Substituting from the above expressions for equilibrium output levels into the first order conditions reported in the paper, delivers equilibrium technology transfers under direct entry and acquisition reported in the text.

The strategic incentive for technology transfer is given by

$$S(n, \tau) \equiv -(n-1) q_f^E \frac{dq_h^E}{dx}$$

It is easy to show that $S(n, \tau)$ decreases with τ:

$$\frac{dS(n, \tau)}{d\tau} = \frac{-2(n-1)(a-c)n^2}{(-2n^2 + \tau n^2 + 2\tau n + \tau)^2} < 0$$

Furthermore,

$$\frac{dS(n,\tau)}{dn} = \frac{-(a-c)(-2n^2+\tau n^2-2\tau n-3\tau+4n)\tau}{(-2n^2+\tau n^2+2\tau n+\tau)^2}$$

which implies that

$$n^c(\tau) = \frac{\tau-2+\sqrt{2}\sqrt{(\tau-2)(2\tau-1)}}{\tau-2}$$

Similarly,

$$\frac{dS(n,\tau)}{dn} \geq 0 \text{ when } \tau \leq \tau^c(n) \equiv \frac{2n(n-2)}{(n+1)(n-3)}$$

5.2.3 Mode of entry

The foreign firm's profits under acquisition, gross of the acquisition fee f, are given by:

$$\pi_f^A = \pi^A = \frac{(a-c)^2\tau}{2n(2-n)+\tau n^2} \tag{14}$$

Under acquisition, the profits of a typical domestic firm are given by:

$$\pi_h^A = \left[\frac{(a-c)(\tau n+2-2n)}{2n(2-n)+\tau n^2}\right]^2 \tag{15}$$

Under direct entry, foreign firm's profits equal:

$$\pi_f^E = \frac{(a-c)^2\tau}{2n(\tau-n)+\tau(n^2+1)} \tag{16}$$

whereas that of a typical domestic firm equal:

$$\pi_h^E = \left[\frac{(a-c)(n\tau-2n+\tau)}{2n(\tau-n)+\tau(n^2+1)}\right]^2 \tag{17}$$

5.2.4 Proof of proposition 6

We have

$$p^A - p^E = \frac{(a-c)[n^2(\tau-2)^2 + n(\tau^2-4) + 4\tau]}{((\tau-2)n^2 + \tau(2n+1))((\tau-2)n^2 + 2(2n-1))} \tag{18}$$

Since $\tau > 2$, the above expression is positive.

Domestic firms will always prefer acquisition to direct entry, i.e., for any $\tau > 2$. Using (15) and (17),

$$\begin{aligned} \pi_h^A - \pi_h^E &= (a-c)^2 n(n\tau + \tau + 2 - 2n)(2n\tau + \tau - 4n + 2)(4n^2 - 4n^2\tau + n^2\tau^2 \\ &+ n\tau^2 - 4n + 4\tau)/(n^2\tau - 2n^2 + 2n\tau + \tau)^2(4n - 2n^2 - 2 + n^2\tau)^2 \end{aligned} \tag{19}$$

Again, since $\tau > 2$, the above expression is also positive.

5.2.5 Parameter restrictions

Restrictions that must be satisfied for the oligopoly case:

1. $c > x^E \Leftrightarrow$

$$\tau > \tau^E \equiv \frac{2n(a + (n-1)c)}{c(n+1)^2}$$

2. $c > x^A \Leftrightarrow$

$$\tau > \tau^A \equiv \frac{\theta(n-1)(a + (n-2)c)}{cn^2} \tag{20}$$

3. For the second order condition to hold in the choice of x^A, we need

$$\tau > \tau^{AI} \equiv \frac{2\theta(n-1)^2}{n^2}$$

4. For the second order condition to hold in the choice of x^E, we need

$$\tau > \tau^{EI} \equiv \frac{2n^2}{(n+1)^2} \tag{21}$$

5. Domestic firms produce a positive amount under direct entry iff

$$\tau > \tau^{EQ} \equiv \frac{2n}{n+1} \tag{22}$$

6. Domestic firms produce a positive amount under acquisition iff

$$\tau > \tau^{EQ} \equiv \frac{2\theta(n-1)}{n}$$

Note that if condition 5 holds, 6 automatically does. Similarly, if 4 holds, 3 does as well. Next, we can show that $\tau^{EI} > \tau^{E}$ iff

$$\frac{a}{c} > n+1$$

Similarly,

$$\tau^{AI} > \tau^{A} \text{ iff } \frac{a}{c} > n$$

Thus, we assume the following conditions throughout the paper:

1.

$$\frac{a}{c} > n+1$$

i.e., demand cost ratio is high relative to the number of firms.

2.

$$\tau > \frac{2n(a+(n-1)c)}{c(n+1)^2}$$

i.e. the costs of technology transfer rise sharply enough to guarantee an interior solution.

5.2.6 Kamien and Zang result

In the absence of technology transfer and in the presence of more than one firm in the domestic market, the foreign firm will always prefer entry to acquisition as shown by Kamien and Zang (1990).

In the presence of $n-1$ firms in the domestic market (and in the absence of technology transfers, profits of a Cournot oligopolist are given by:

$$\pi(n) = \frac{(a-c)^2}{n}; \tag{23}$$

Assuming that the foreign firm in case of acquisition has to pay the domestic firm, the profits it will realize had the foreign firm enter the market as a new firm, acquisition will be preferred by the foreign firm if:

$$\pi_{n-1} - \pi_n \geq \pi_n \Leftrightarrow \Pi = \pi_{n-1} - 2\pi_n > 0 \tag{24}$$

where π_{n-1} stands for the profits of each firm in a market with $n-1$ firms. Replacing (23) into (24), one obtains:

$$\Pi = -(a-c)^2 \frac{n^2 - 2n - 1}{n^2(n+1)^2} > 0 \tag{25}$$

It is clear that for $n > 3$ (i.e., duopoly as there are $n-1$ firms in the market), $\Pi < 0$. Thus direct entry is always preferred to acquisition. The only case where acquisition is preferred to direct entry is in the monopoly case (i.e., $n = 2$). Note that as the number of firms in the market increase the relative incentive for the foreign firm to enter through acquisition declines. At the limit (when n approaches infinity), the foreign firm is indifferent between entering through acquisition or direct entry.

Figure 1: Foreign firm's optimal mode of entry

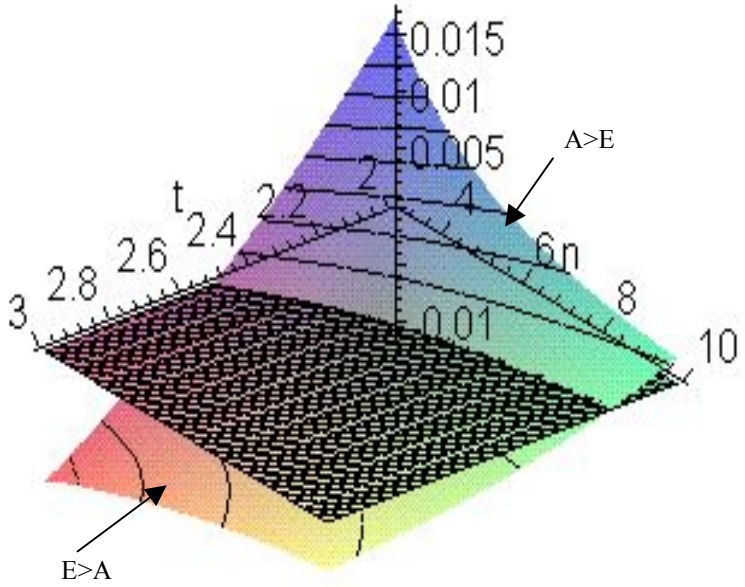

Figure 2: Benevolent Government preferred mode of entry

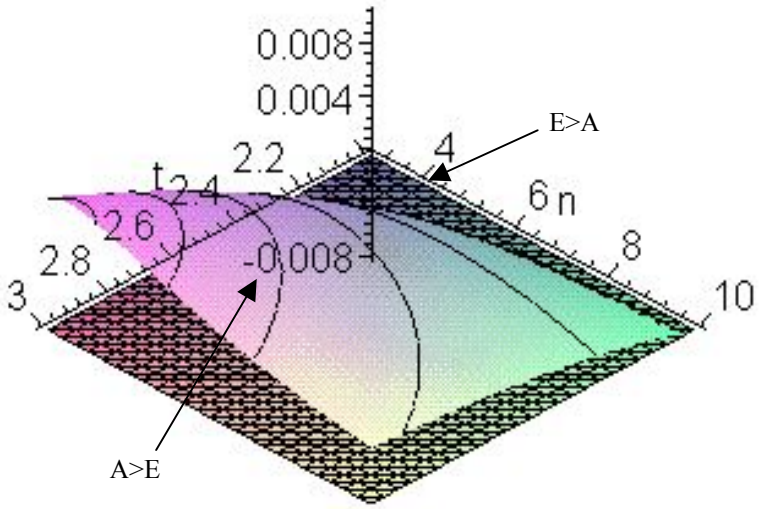

Figure 3: Policy Interventions