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Multinational enterprises, cross-border acquisitions, and government policy

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Abstract

This paper analyzes the optimality of policy specifications used to regulate the acquisition and operation of local firms by multinational enterprises(MNE). We emphasize the consequence of such regulation on the price of the domestic firm in the market for corporate control. We show that it is optimal to impose ceilings on foreign ownership of domestic firms when the government's objective is to maximize domestic shareholder profits. While the optimal ceiling is high enough for the MNE to gain control of the domestic firm, it nevertheless influences the price that the MNE must pay for the domestic firm's shares to the advantage of the domestic shareholders. Restrictions on transfer pricing are either irrelevant or strictly suboptimal. The consequences of alternative specifications of the government's objective function are also analyzed.

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1 Introduction

Both in the developed and developing world, foreign direct investment (FDI) by multinational enterprises (MNEs) has grown significantly in recent years.[1] One of the ways in which an MNE enters the domestic market in a host country is by acquiring a domestic firm (DF). Cross-border mergers and acquisitions in developing countries are on the rise and constitute about a third of the total FDI inflows in value terms (Norbäck and Persson, 2007).[2] Such acquisitions are motivated by the possibility of significant benefits that may accrue to the MNE if it gains control of the DF.[3] These benefits of control may be a result of several different sources. For example, there may be a pre-existing vertical relationship between the MNE and the DF which is governed by a contract. It is well known that such arm's-length trading may give rise to inefficiencies stemming from asymmetries of information, or from the difficulty of including quality specifications in an enforceable contract.[4] Vertical integration, resulting from acquisition, could lead to the elimination of these inefficiencies, thus producing corresponding benefits. Alternatively, the DF may form an important node in an elaborate network of inputs, outputs, and markets for the MNE, and the MNE might not be able to take advantage of this link unless it has full control over the DF (as opposed to, for example, being merely an input supplier to the DF). These benefits, after the MNE acquires the DF, may of course accrue either to the subsidiary or to the parent.

Although such benefits correspond to gains in efficiency following integration, most LDC governments impose substantial restrictions on the acquisition of domestic firms by MNEs. These restrictions resulted, presumably, from the feeling that while the foreign owners of the MNE gain from such acquisitions, there are no corresponding benefits flowing to the erstwhile domestic owners. On the other hand, loss of domestic control over the operations of the firm may lead to outcomes inconsistent with the objectives of domestic policy. For example the MNE, once in control of the DF, may evade taxes in the host country by engaging in transfer

[1]See sections 1.1-1.3 in Chapter 1 of Markusen (2002) for an overview of FDI inflows in recent years.

[2]In the developed countries, more than half of the foreign company investment is in the form of mergers and acquisitions. See Horn and Persson (2001).

[3]The issue of "control" is discussed more fully in Section 2.

[4]See, for example, Williamson (1975) and Ethier (1986).

pricing.[5]

In this paper, we present a different rationale for policies restricting the acquisition of domestic firms by foreign owners. When acquisitions are motivated by the existence of potential benefits, we show that policy can be designed so that the original domestic shareholders (DSH) of the acquired firm also obtain a share of the benefits. The optimal policy response is to impose a ceiling on the equity participation by the MNE on the DF. We show that while the optimal ceiling is high enough for the MNE to gain control of the DF, it nevertheless influences the price that the MNE must pay for the DF's shares, to the advantage of the DSH.

Restrictions on foreign ownership are the most obvious barriers for FDI and have been in effect in several countries (Golub, 2003). In India until mid-1990's, for projects which are not wholly export-oriented, the normal ceiling on foreign equity was 40%, 74% when advanced technology is involved. Similar restrictions have been in place in some other countries, including Mexico which requires majority domestic ownership in all foreign ventures, and Nigeria which restricts foreign ownership to either 40% or 60% (Svejnar and Smith, 1984).[6] While China has opened up to trade, it still has several restrictions on foreign ownership. To a lesser degree, such ownership restrictions are also prevalent in a number of OECD countries. Majority domestic ownership is required in the airlines industry in the European Union and North American countries, in the telecommunications industry in Japan, and in the coastal and freshwater shipping industry in the United States (Golub, 2003). In Canada, foreign ownership restrictions are in place in a variety of sectors including telecommumications, transportation, and the financial services sector (Globerman, 1999). In Australia, since the privatization of Qantas, the major airline, a special federal act has ensured that Qantas

[5]If the MNE supplies an input to a foreign subsidiary, and the subsidiary's host country taxes profits at a rate higher than the country of the parent company, then it is advantageous for the MNE to price the input above its production cost, and thus avoid profit taxes in the host country. This practice is known as transfer pricing. See Svejnar and Smith (1984) for a full elaboration of this argument. For an analysis of optimal transfer pricing regulations by a domestic government under asymmetric information about the MNE's production cost, see Prusa (1990).

[6]While it may seem that some of these ceilings (e.g. those set below 50%) are designed to prevent foreign ownership of a domestic firm, we explain in section 2 below that such ceilings are not necessarily inconsistent with foreign control.

remains majority Australian-owned.

An interesting implication of our analysis is that if the government's only objective is to maximize the gains of the DSH, and if the ceiling on foreign ownership is set optimally, then the possibility of transfer pricing is not of concern to the government. Specifically, we show that, in this case, restrictions on transfer pricing are either irrelevant or strictly suboptimal. Of course, the government may still lose tax revenue if transfer pricing is allowed. However, if the government's objective is to maximize the sum of tax revenues and DSH profits, or a weighted sum of the two, and the weight assigned to tax revenues is not too high, then restrictions on transfer pricing are still either irrelevant or suboptimal.

Markusen (1995, 2002) provides an excellent survey of the theoretical literature on FDI and multinational firms. In terms of mergers and acquisitions, the particular kind of FDI that considered here, there is a small but growing literature that examines the welfare impact of mergers and the role of competition policies in an international context (see, for example, Barros and Cabral, 1994; Head and Ries, 1997; Horn and Levinsohn, 2001). More recent work on cross-border mergers examines the endogenous formation of mergers (Horn and Persson, 2001; Lommerud, Straume and Sorgard, 2006) where both national as well as international mergers are allowed. Although the modeling of product market competition is richer in these papers, none of them are concerned with the issue of control.

Falvey and Fried (1986) argue that restrictions on foreign ownership may be optimal because, in order to gain the necessary *domestic* equity participation, the MNE would be forced to show a level of profits acceptable to domestic investors. This may limit the extent of transfer pricing by the MNE. However, this argument assumes that the MNE is able to precommit to a level of profit for the domestic shareholders. In the treatment below, we do not assume such precommitment. Gangopadhyay and Gang (1995) focuses on the issue of domestic versus foreign control. They show that the domestic government's tax revenues are maximized when control of the DF vests with the MNE, as opposed to the case where the DF is domestically owned and transactions with the MNE are at arm's-length by contractual arrangement. Thus the issue of ownership restrictions is also important for their analysis. Without such restrictions, the MNE can completely move its profits away through transfer pricing and thus avoid paying domestic taxes.

In a recent paper, Norbäck and Persson (2007) compare two policies concerning investment liberalization: (i) allowing greenfield investments as well as mergers and acquisitions or (ii) allowing greenfield FDI only. It might seem that allowing greenfield FDI only might be better as it is unlikely to reduce market concentration. However, the authors show that prohibiting mergers and acquisitions might be counterproductive. For example, if the domestic firm holds a scarce asset, competitive bidding among MNEs might fetch a high rent for the domestic firm, provided there is sufficient complementarity between the assets of the domestic firm and the MNEs. Thus, by ruling out mergers and acquisitions, the government may inadvertently lower domestic welfare.[7] Mattoo, Olarreaga, and Saggi (2004) have shown that in the presence of costly technology transfer, direct entry by foreign firms (i.e., greenfield FDI) might lower domestic welfare, and, in fact the host country's government might prefer acquisition by foreign firms to greenfield FDI.

Our paper is related to this body of work. However, the underlying mechanism is quite different. In our framework, there is only one MNE. Hence, unlike in Norbäck and Persson (2008), competitive bidding does not arise. Central to our analysis is government policy. The government chooses the minimal level of profits and places a ceiling on the fraction of the domestic firm that foreign firms can own. At the optimum, the ceiling should not be so low that the MNE cannot exercise control. However, having no ceiling at all is not optimal either.

The rest of the paper is organized as follows. The basic model is outlined in Section 2. Section 3 considers the case where the objective of the government is to maximize the profit of the domestic shareholders. In Section 4 we examine the consequences of a different objective function for the government—maximizing the sum (more generally, a weighted sum) of domestic shareholders' profits and tax revenue. Section 5 concludes the paper.

2 The Model

There are two periods, 0 and 1, indexed by t, and three agents: a domestic firm (DF), a multinational (MNE), and the domestic government. *The control of the firm at time 0 lies with domestic shareholders (DSH).*

[7] See Norbäck and Persson (2008) for endogenous determination of acquisition price, acquisition pattern, and greenfield investments in an oligopoly setting.

The issue of control needs some elaboration. By *control*, we mean decision-making authority over important aspects of a firm's operation, e.g. production, pricing, and marketing. In the formal model, we equate control with the ownership of a certain fraction of the firm's equity. However, it may be worth pointing out that the fraction necessary for control may vary widely in different cases. As Buckley (1985) notes, " a foreign investor holding 30% of voting equity in a company where no other investor holds more than 10% is more likely to be able to exercise control....than if he held 49%, with the other 51% in one person's...hands." Thus a ceiling of, say, 40% may not be incompatible with foreign control. It is also important to note that in some developing countries, a significant share of stocks is often owned by public sector financial institutions, which do not play any active role in the operation of the firm. This further reduces the ownership requirement for control.

Our analysis centers around the conditions under which the MNE may want to take over the DF, and the terms of such a transfer of control. The rationale behind a (potential) takeover is that the MNE may obtain some additional benefits (as discussed in Section 1) if it gains control of the DF.

Let π^D be the net maximum profit generated by the DF when under DSH control. Once the MNE acquires the DF, the latter may show lower profits because the MNE engages in transfer pricing, for example, by charging artificially high prices for some input which the parent firm may supply to the DF. This results in a gain for the MNE shareholders (who are now in control) at the expense of any remaining domestic shareholders. MNE shareholders may also gain at the expense of the domestic government, since the MNE avoids paying domestic profit taxes by showing lower profits.

The domestic government can regulate the extent of transfer pricing in various ways. Common methods used in LDCs include ceilings on the royalty payments which the DF makes to the parent firm, ceilings on the prices for inputs which the MNE charges the DF, and the imposition of indirect taxes on imported inputs (Chudson, 1985). In effect, these regulations imply a minimum level of profits $\bar{\pi}$ which the DF must show when under MNE control. We will accordingly treat $\bar{\pi}$ as a policy variable for the domestic government, indicating the extent to which the government limits transfer pricing.

At $t = 0$, the government announces its policy, which consists of the variable $\bar{\pi}$ as discussed above, and a ceiling on the fraction of the domestic firm that can be under foreign ownership. We denote this ceiling by γ.

At time $t = 1$, the MNE learns about the potential benefits b which will result from acquisition or control. b is assumed to be a random variable drawn from a distribution $F(b)$, with support $[0, \bar{b}]$. This distribution is known to the government at $t = 0$. After learning the realized value of b, the MNE decides whether to bid for control. If it does so decide, then at $t = 1$ it makes an offer to the DSH for some fraction of its shares, to which the DSH respond by tendering part or all of the shares.

We make the following assumptions about the acquisition process:

Assumption 1 *In order to obtain a controlling interest, a party must own strictly more than some fraction β of the DF's shares. We shall assume β to be exogenously given. (A simple majority rule corresponds to a $\beta = \frac{1}{2}$).*

Assumption 2 *All the shares of the DF are initially under the ownership of a single shareholder. (However, all our results go through if there is a 'pivotal' shareholder who owns at least $1 - \beta$ of the DF's shares.)*

Assumption 3 *The MNE can make only* unconditional price offers *for the DF's shares. (i.e. it must announce a single price P per 100% of the DF's equity, and it may announce a fraction δ of the equity it wants to buy. However, it must buy any quantity less than δ if that is all that is tendered.)*

To evaluate the optimality of government policy, we need to specify an objective function for the government. We shall examine the consequences of the following alternative assumptions.

W1 The government's objective is to maximize the domestic shareholder's profits.[8]

W2 The government maximizes the sum of DSH profits and its own tax revenue.

W3 The government maximizes a *weighted* sum of DSH profits and tax revenues.

Obviously, W1 and W2 are special cases of W3, but it is instructive to consider the special cases separately.

[8] If we assume that domestic profits are reinvested, then we can also justify this assumption by appealing to the fact that many LDCs are capital-scarce, and maximizing investment is a high priority for the government.

3 Maximizing Shareholder Profits

In this section, we assume that the government's objective function is given by W1, and that the profit tax rate is zero. We are interested in finding the government's optimal choice of policy parameters $\bar{\pi}$ and γ. We do this by using the following sequential procedure: first find the optimal response of the DSH (who has the last move) to a given price offer by the MNE and a policy choice for the government, then isolate the optimal price offer by the MNE under a given policy, and finally deduce the optimal policy choice for the government.

Let $\bar{\pi}$, γ be the government's choice of policy parameters. Let P be the price offered per 100% of the equity by the MNE, and let δ denote the fraction of equity it offers to buy. Clearly $\delta \leq \gamma$. The DSH can sell any fraction $\gamma' \leq \delta$ since the price offer is unconditional by Assumption 3. We will characterize an offer by the pair (P, δ). Define

$$\bar{\gamma} \equiv \frac{b + \pi^D - \bar{\pi}}{\frac{b}{\beta} + \pi^D - \bar{\pi}}$$

and for $\delta \in (\beta, 1]$, define

$$P(\delta) \equiv \frac{(1-\beta)\pi^D - (1-\delta)\bar{\pi}}{\delta - \beta}.$$

Lemma 1 *Suppose $\bar{\pi} < \pi^D$. Then,*
(a) Given an offer (P, δ), where $\beta < \delta \leq \gamma$, the DSH will sell

$$\gamma' = \begin{cases} 0 & \text{if } P < \pi^D \\ \beta & \text{if } \pi^D \leq P < P(\delta) \\ \delta & \text{if } P \geq P(\delta) \end{cases}$$

(b) The MNE will offer $(P, \delta) = (P(\gamma), \gamma)$ if $\gamma \geq \bar{\gamma}$, and will make no offer otherwise.

Proof: See Appendix. □

To see the intuition behind Lemma 1, first note that if the DSH retains control of the DF, it can obtain profits at the rate of π^D on any shares it holds in the firm. Thus, to sell any shares at all, the DSH must be offered a price which is at least π^D. At $P = \pi^D$, the DSH is indifferent between retaining all shares and selling up to β (recall that the DSH must sell $\gamma' > \beta$ to transfer control to the MNE). At $P > \pi^D$, the DSH clearly prefers selling at least β, and can thus obtain a net profit of $\beta(P - \pi^D)$ *while still maintaining control.* The decision regarding whether to hand over control to the MNE or not is thus based upon profits or losses with respect to the remaining fraction $(1-\beta)$ of shares. Suppose the DSH transfers control by selling another $(\gamma'-\beta)$. Since the DF will show operating profits of $\bar{\pi} < \pi^D$, it follows that the DSH will realize capital losses to the amount $(1-\gamma')(\pi^D-\bar{\pi})$ of the shares the DSH retains. Thus the DSH's capital gain on the $(\gamma'-\beta)$ must outweight this loss, i.e., in order to transfer control, we must have

$$(\gamma'-\beta)(P-\pi^D) \geq (1-\gamma')(\pi^D-\bar{\pi}).$$

Since $\gamma' > \beta$ and $\pi^D > \bar{\pi}$, it follows that $P > \pi^D > \bar{\pi}$. But then the DSH will sell as much as it can, i.e. upto δ, since any retained shares yield only $\bar{\pi} < P$.

If the MNE is bidding for control, then it will clearly set P at the smallest value which satisfies the above condition, in which case the condition is satisfied with equality. Let $P(\delta)$ denote this price. This yields

$$(\delta-\beta)P(\delta) + (1-\delta)\bar{\pi} \;=\; (1-\beta)\pi^D$$

which implies

$$P(\delta) = [(1-\beta)\pi^D - (1-\delta)\bar{\pi}]/(\delta-\beta). \tag{1}$$

Thus the total profit realized by the DSH is

$$\begin{aligned}\delta P(\delta) + (1-\delta)\bar{\pi} &= \beta P(\delta) + (1-\beta)\pi^D \\ &= \beta(P(\delta)-\pi^D) + \pi^D.\end{aligned}$$

That is the net capital gain realized, over and above the initial market value of the DF, is,

$$\beta\xi(\delta) = \beta(P(\delta)-\pi^D).$$

Consider the premium $\xi(\delta) = P(\delta)-\pi^D$. This is calculated so that the DSH realizes exactly as much capital gain on the last $(\delta-\beta)$ shares sold, as is needed to compensate it for the capital loss $(\pi^D-\bar{\pi})$ on the $(1-\delta)$ shares it retains. Since the MNE is restricted to an unconditional single-price offer, it must offer $P(\delta)$ on the entire fraction of shares it buys. Hence the DSH realizes a 'free-rider' capital gain on the first β as well.

Now consider the MNE. It is correspondingly forced to pay a premium $\beta\xi(\delta)$ for control of the firm. This premium is minimized at $\delta = \gamma$, since $P(\delta)$ is decreasing in δ. However, the MNE obtains an additional benefit of b if it assumes control. Thus it will assume control if and only if $b \geq \beta\xi(\gamma)$. Substituting for $\xi(\gamma)$, we obtain

$$\begin{aligned}
b &\geq \beta[\frac{(1-\beta)\pi^D - (1-\gamma)\bar{\pi} - (\gamma-\beta)\pi^D}{(\gamma-\beta)}] \\
&= \frac{\beta}{\gamma-\beta}[(\pi^D - \bar{\pi})(1-\gamma)] \\
\Rightarrow \quad \gamma b - \beta b &\geq \beta(\pi^D - \bar{\pi}) - \gamma\beta(\pi^D - \bar{\pi}) \\
\Rightarrow \quad \gamma\beta[\frac{b}{\beta} + \pi^D - \bar{\pi}] &\geq \beta[b + \pi^D - \bar{\pi}] \\
\Rightarrow \quad \gamma &\geq \frac{b + \pi^D - \bar{\pi}}{\frac{b}{\beta} + \pi^D - \bar{\pi}} \equiv \bar{\gamma}
\end{aligned}$$

as the condition under which the MNE will assume control.

Note that the premium is paid to compensate the DSH for the capital loss it will suffer as a result of the transfer of control. This loss occurs because $\bar{\pi}$ is set below π^D, i.e., some transfer pricing is permitted. This leads directly to the conclusion that

Lemma 2 *Suppose $\bar{\pi} > \pi^D$. If $\gamma \leq 1$, then*

(a) The MNE will offer (P, δ), where $P = \frac{\pi^D - (1-\beta)\bar{\pi}}{\beta} + \epsilon < \pi^D$ and $\delta = \beta + \epsilon_1$.

(b) The DSH will tender δ and get $\pi^D = \pi^D + \epsilon_2$,

where ϵ, ϵ_1, and ϵ_2 are positive and arbitrarily small.

Proof: Straightforward. □

Owing to the presence of the additional benefits in the event of the MNE acquiring control, a situation in which the MNE controls the DF generates higher overall surplus. The object of Lemmas 1 and 2 is to investigate whether, by precommitting to suitable values of γ and $\bar{\pi}$, the government can induce a transfer of the benefits to the DSH. It would seem that by restricting $\bar{\pi}$ to be greater than π^D, this would be achieved. However, this intuition turns out to be false. In fact, we have shown in Lemmas 1 and 2 that in any optimal choice of the parameters, $\bar{\pi}$ must be strictly less than π^D, since $\bar{\pi} \geq \pi^D$ implies that, for any b, the DSH gets (arbitrarily close to) π^D, whereas $\bar{\pi} < \pi^D$ implies that the DSH earns $\beta\xi$ over and above π^D.

Lemmas 1 and 2 indicate that, in the context of the takeover model, some degree of 'dilution' is optimal for the domestic shareholders. Grossman and Hart (1980) have argued that dilution may allow the shareholders of a firm to get around a free-rider problem, which arises as follows. Suppose that a potential acquirer can increase the value of a firm, and each current shareholder is so small that his individual tender decision does not influence the outcome of a takeover bid. Clearly it is not in the interest of an individual shareholder to tender at a price below the post-takeover value of the firm. But then the acquirer has no incentive to take over. Shareholders can collectively overcome this problem by framing a constitution which allows the acquirer, after takeover, to reduce the value of the firm to those shareholders who have not tendered. This is known as *dilution*. Dilution can occur, for example, when the acquirer issues shares to himself which are not matched by new equity, or by selling some assets of the target firm at a price below their true value to another firm owned by the acquirer, or through transfer pricing.

Setting $\bar{\pi}$ below π^D in our model (which implies that the government allows some transfer pricing) amounts to dilution. Although there is no free-rider problem here in the sense of Grossman and Hart since there is a single shareholder, dilution is still optimal. By setting $\bar{\pi}$ below π^D, the government allows the DSH to obtain a capital gain on the fraction β of its shares.

We now come to the question of optimal choice of the policy parameters γ and $\bar{\pi}$. The government sets these policy parameters at time $t = 0$, based on the distribution $F(b)$ from which b will be drawn at time $t = 1$.

Theorem 1 *(a) The optimal maximum ownership restriction γ is strictly greater than β and strictly less than one,*
(b) The minimum profit requirement $\bar{\pi}$ is irrelevant, as long as it is strictly less than π^D,
(c) The probability of takeover is independent of $\bar{\pi}$, π^D, and β.

Proof: From Lemmas 1 and 2, we can restrict attention to $\bar{\pi} < \pi^D$.
Define $y(b) = b + \gamma\bar{\pi} + (\pi^D - \bar{\pi}) - \gamma P(\gamma)$.
$y(b)$ denotes the payoff to the MNE if it acquires the DF with a bid of $P(\gamma)$, where $P(\gamma)$ is as given in Lemma 1. Note that the bracketed term denotes the gain to the MNE from transfer pricing.
Let b^* denote the level of benefits such that the MNE is indifferent between acquiring and

not acquiring. Then b^* must satisfy

$$y(b^*) \;=\; 0. \tag{2}$$

Also by virtue of Lemma 1, we have

$$(\gamma - \beta)\; P(\gamma) \;=\; (1-\beta)\;\pi^D \;-\; (1-\gamma)\bar{\pi}. \tag{3}$$

It can be readily checked that (2) and (3) imply

$$.\gamma \;=\; \frac{b^* + \pi^D - \bar{\pi}}{\frac{b^*}{\beta} + \pi^D - \bar{\pi}}. \tag{4}$$

Now using (2) and (3) one can check that $y'(b) > 0$, hence $y(b) \gtreqless 0$ as $b \gtreqless b^*$. Thus only an MNE which draws $b > b^*$ will bid to acquire the firm.

The expected profit for the DSH is given by

$$\int_{b^*}^{\bar{b}} \{\gamma P(\gamma) \;+\; (1-\gamma)\bar{\pi}\} dF \quad + \quad F(b^*)\pi^D.$$

Using equation (2), we can write the government's maximization problem as

$$\max_{b^*} \; \int_{b^*}^{\bar{b}} \{b^* + \pi^D\} dF \quad + \quad F(b^*)\pi^D,$$

which is equivalent to

$$\max_{b^*} \quad b^*(1 - F(b^*)). \tag{5}$$

Let $\tilde{b}$ be the value of b which solves (5). Then $\tilde{b}$ satisfies the first-order condition $\tilde{b} \;=\; \frac{1-F(\tilde{b})}{f(\tilde{b})}$. Clearly $\bar{b} > \tilde{b} > 0$. Part (c) of the proposition follows immediately because $\tilde{b}$ is independent of $\bar{\pi}$, π^D, and β.

Part (b) follows because there is a degree of freedom in equation (4); given any $\bar{\pi} < \pi^D$, one can find an appropriate γ such that the required $\tilde{b}$ is obtained.

Finally, the fact that $\tilde{b} > 0$, together with $\pi^D > \bar{\pi}$, implies that $1 > \gamma > \beta$, so part (a) follows. □

Part (a) of theorem 1 shows that imposing ownership restrictions is always optimal.[9,10] Part (b) of the proposition indicates the irrelevance of restrictions on transfer pricing. Provided that γ is set optimally with respect to $\bar{\pi}$, the level of post-takeover accounting profits of the DF does not matter. In particular, the government could let $\bar{\pi} = 0$,[11] i.e., allow full transfer pricing.

To focus on the issue of control, we have abstracted away from greenfield investment which has also been increasing in recent decades. Under greenfield investment, the MNE sets up a new plant in the host country to serve that market. This leads to increased competition and consequently lower prices and higher consumer surplus (CS) in the host country. This might suggest that the host country's government should always opt for greenfield FDI and prohibit acquisitions. However, note that greenfield FDI also reduces the profits of the DSH. In fact, compared to the case with no FDI at all, social surplus (which is often measured as the sum of consumer surplus and the profits of DSH) might be lower under greenfield investment.[12] A full-blown analysis of optimal government policy in an environment where acquisitions as well as greenfield investments are allowed is left for future research.[13]

[9] It is clear from the analysis that if the MNE owns some non-controlling share of the DF's equity in period 0, then the profits accruing to the DF as a result of the takeover would be decreasing in the MNE's initial ownership proportion. This may explain why many countries have been imposing lower initial MNE holdings for joint ventures.

[10] It might be reasonably asked why we have not allowed bargaining at time $t = 1$, once the benefits of control become known to the MNE. Could bargaining be better for the DSH? The answer is in the negative. It will be seen that the payment made by the MNE to the DSH is independent of the actual realization of the benefit b. Thus the effect of the ownership restriction is to give the MNE a choice between paying the DSH a fixed amount if it enters, and not entering—a 'take it or leave it' offer. This effectively gives all the bargaining power to the DSH, so this outcome is better than any bargaining outcome.

[11] Owing to limited liability on the part of shareholders, negative values for post-takeover profits are not relevant.

[12] Assume that the inverse demand function in the host country is $P = a - Q$ where P denotes the market price and Q denotes aggregate output sold in the host country. Marginal cost of the DF and MNE are c and 0 respectively. If the MNE opts for greenfield investment, $\pi^D = \frac{(a-2c)^2}{9}, CS = \frac{(2a-c)^2}{18}$, and $\pi^D + CS = \frac{2a^2-4ac+3c^2}{6}$. In the absence of greenfield FDI (or for that matter any FDI), $\pi^D = \frac{(a-c)^2}{4}$, CS $= \frac{(a-c)^2}{8}$, and $\pi^D + CS = \frac{3(a-c)^2}{8}$. For $c \in (0, \frac{1}{3})$, $\pi^D + CS$ is higher without greenfield investment. Hence, for a range of parameterizations, ignoring greenfield investment and focusing on acquisition (and control) as the sole form of FDI, as we considered in this section, is without loss of generality.

[13] Not allowing greenfield investments might have an additional benefit in a full-blown game where acqui-

4 Profit Taxes and Alternative Objective Functions

In this section, we assume that profits are taxed at a rate τ in the host country. This rate is previously set, and not a policy variable. The tax rate in the MNE's country of origin is less than τ – for simplicity we assume that it is zero. Given the profit tax, the objective of the domestic government is to set γ and $\bar{\pi}$ so as to maximize objectives W2 or W3.

As a result of the tax rate τ, equation (2) is now replaced by

$$y(b^*) \;=\; b^* \;+\; \gamma(1-\tau)\bar{\pi} \;+\; (\pi^D \;-\; \bar{\pi}) \;-\; P\gamma \;=\; 0. \tag{6}$$

where P is given by

$$\gamma P \;+\; (1-\gamma)(1-\tau)\bar{\pi} \;=\; \beta P \;+\; (1-\tau)(1-\beta)\pi^D.$$

Note that P so defined implies that the DSH is indifferent between tendering β or γ of his shares. We assume that at this value of P he will tender γ.

Rearranging, we get

$$(\gamma-\beta)P \;=\; (1-\tau)[(1-\beta)\pi^D \;-\; (1-\gamma)\bar{\pi}.] \tag{7}$$

Consider first the objective W2. Suppose the government sets $\bar{\pi} < \pi^D$. Then, as before, using the analogue of Lemma 1 and equation (6), we can write the government's payoff (the sum of taxes and DSH profits) as

$$\begin{aligned} W_2^1 \;&=\; \int_{b^*}^{\bar{b}} \{\gamma P \;+\; (1-\tau)(1-\gamma)\bar{\pi}\} dF \;+\; [1-F(b^*)]\tau\bar{\pi} \;+\; F(b^*)(1-\tau)\pi^D \;+\; F(b^*)\tau\pi^D \\ &=\; \int_{b^*}^{\bar{b}} \{b^* \;-\; \tau\bar{\pi} \;+\; \pi^D\} dF \;+\; [1-F(b^*)]\tau\bar{\pi} \;+\; F(b^*)(1-\tau)\pi^D \;+\; F(b^*)\tau\pi^D \\ &=\; b^*[1-F(b^*)] \;+\; \pi^D. \end{aligned}$$

Note that W_2^1 is independent of τ and $\bar{\pi}$, and is equal to the DSH's expected profit in the no-tax case. Thus the cutoff value b^*, which is implemented by the choice of γ, is also given by $\tilde{b}$, which solves (5). Using (6) and (7), one can easily show the optimal restriction $\gamma(\tau)$ to be

$$\gamma(\tau) \;=\; \frac{\tilde{b} \;+\; \pi^D \;-\; \bar{\pi}}{\frac{\tilde{b}}{\beta} \;+\; (\frac{t}{\beta} + 1 - t)(\pi^D \;-\; \bar{\pi})}.$$

sition is also an option for the MNE. It lowers the MNE's threat point in the acquisition game.

It can readily be verified that $\beta < \gamma(\tau) < 1$.

Now consider $\bar{\pi} > \pi^D$. Since the DF can have a maximum profit of $\pi^D + b$ after acquisition, the lowest value of b for which the MNE will acquire the DF is now given by

$$b^{**} \;=\; \bar{\pi} \;-\; \pi^D,$$

since for $b < b^{**}$ the DF (under MNE control) cannot show profits in excess of $\bar{\pi}$.[14] Also note from Lemma 2 that, in this case, the DSH only sells a fraction β of the shares (so the restriction γ is redundant), and gets no premium. The payoff to the domestic government is given by

$$\begin{aligned} W_2^2 \;&=\; F(b^{**})\tau\pi^D \;+\; (\pi^D + b^{**})\tau[1 - F(b^{**})] \;+\; (1-\tau)\pi^D \\ &=\; \tau b^{**}[1 - F(b^{**})] \;+\; \pi^D. \end{aligned}$$

Since τ must be less than unity and since $\tilde{b}$ maximizes $b[1-F(b)]$, it follows that $W_2^2 < W_2^1$. Thus, restricting $\bar{\pi}$ above π^D is still suboptimal. It is also clear that, so long as $\bar{\pi} < \pi^D$ and γ is set optimally (i.e. $\gamma = \gamma(\tau)$), the level of $\bar{\pi}$ does not matter, as in theorem (1).

Consider now the case of the objective function W3. The government's problem is

$$\max_{\gamma,\ \bar{\pi}} \quad [\text{DSH profit}] \;+\; \alpha[\text{Tax revenue}], \qquad\qquad \alpha > 0. \tag{8}$$

Note that $\alpha = 0$ and $\alpha = 1$ correspond, respectively, to cases W1 and W2 discussed above.

Proceeding exactly as above, for $\bar{\pi} < \pi^D$ we obtain the value of the government's objective function as

$$W_3^1(b^*, \bar{\pi}) \;=\; b^*[1 - F(b^*)] \;+\; \pi^D \;+\; (\alpha - 1)\tau\pi^D \;+\; (\alpha-1)\tau(\bar{\pi} - \pi^D)[1 - F(b^*)] \tag{9}$$

[14]We are implicitly assuming that the government cannot induce *reverse transfer pricing* by setting $\bar{\pi}$ higher than this. In fact, it can be checked from Lemma 2 that acquisition remains profitable even when $\bar{\pi}$ is set higher. Since $\bar{\pi} > \pi^D$, the DSH is willing to sell its shares for a price lower than π^D in the expectation of a higher profit later. (However, in this case no premium accrues to the DSH.) We assume that when this future profit requires reverse transfer pricing (e.g. it requires the MNE to price its supplied input below cost in order to show the required profit), this promise is not credible to the DSH.Alternatively, we could use a condition that the price P per 100% of equity which the MNE offers for the shares cannot be negative. From Lemma 2, it will be clear that if $\bar{\pi}$ is sufficiently greater than π^D, the DSH would be willing to transfer control even at some negative price per share. The conclusion which follows stands in substance under either assumption—the one we are making simplifies the algebra.

where b^* is the cutoff value implemented by choice of γ, such that the MNE will not acquire the DF if it draws $b < b^*$. The government's problem is to maximize (9) by optimally choosing b^* and $\bar{\pi}$. Rather inconveniently, this maximization problem does not have a solution in the domain $\bar{\pi} < \pi^D$ when α is greater than unity. In this case, the last term on the right hand side is negative, and can be made as small as desired by setting $\bar{\pi}$ close to π^D. But the expression does not remain valid for $\bar{\pi} = \pi^D$, so the limit cannot be attained. However, for $\bar{\pi} < \pi^D$, the right hand side is continuous in $\bar{\pi}$, and it follows that

$$\sup_{b^* \in \{\underline{b}, \bar{b}\}, \bar{\pi} < \pi^D} W_3^1 \;=\; \tilde{b}[1 - F(\tilde{b})] \;+\; \pi^D \;+\; (\alpha - 1)\tau\pi^D, \qquad \alpha > 1. \tag{10}$$

where $\tilde{b}$ maximizes $b[1-F(b)]$ as in (5). For $\alpha \leq 1$, the last term on the RHS is non-negative, so the optimum can be attained by setting $\bar{\pi} = 0$ and maximizing the resulting expression with respect to b^*.[15]

For $\bar{\pi} \geq \pi^D$, the ownership restriction is irrelevant, and the cutoff value b^{**} of b is given as before by $b^{**} = \bar{\pi} - \pi^d$. In this case, the DSH gets $(1 - \tau)\pi^D$ irrespective of whether or not acquisition takes place. The value of the government's objective function is

$$W_3^2(b^{**}) \;=\; \pi^D \;+\; (\alpha - 1)\tau\pi^D \;+\; \alpha\tau b^{**}(1 - F(b^{**})) \tag{11}$$

which must be maximized by optimally choosing b^{**}. Clearly this optimal choice is independent of α, and is given by $b^{**} = \tilde{b}$, which solves (5).

Theorem 2 *Suppose that the objective of the government is given by (8). Then*
(i) for $\alpha < \frac{1}{\tau}$ it is suboptimal to restrict $\bar{\pi} > \pi^D$, and there is an optimal foreign ownership

[15] This does not contradict the result in theorem 1. The scenario here (even with $\alpha = 0$) is different from that in Section 2 in that we allow for a positive rate of profit tax. When $\alpha < 1$, the unique optimal value of $\bar{\pi}$ is 0, and the optimal value of b^* is smaller than $\tilde{b}$. $\alpha < 1$ implies that a dollar of profit earned by the DSH contributes more to welfare than does a dollar of tax revenue. Thus setting $\bar{\pi} = 0$ is optimal. In case acquisition does take place, the government earns no tax revenue, and the DSH gets all the surplus. However, in the event that acquisition does not take place ($b < b^*$), the gross profits of the firm are divided between taxes and net DSH profits. Thus acquisition is desirable not only because it generates surplus b^*, but also because it transfers revenue from the government to the DSH. This consideration was not present in cases W1 and W2 (in the former because there were no taxes), thus the optimal vaue of b^* is lower in the present case. Note, however, that when $\alpha = 1$, the level of $\bar{\pi}$ is irrelevant even with a positive profit tax, so long as $\bar{\pi} < \pi^D$.

restriction $\gamma(\alpha)$*, while*

(ii) for $\alpha \geq \frac{1}{\tau}$ *it is optimal to set* $\bar{\pi} = \pi^D + \tilde{b} > \pi^D$*, and there is no optimal ownership restriction.*

Proof: See Appendix. □

5 Conclusion

This paper analyzed the optimality of policy specifications used to regulate the acquisition and operation of local firms by multinational enterprises. The policy instruments consist of limits on transfer pricing of the imported inputs and limits on the extent of foreign ownership of domestic firms. The model presented here explicitly considers the effect of in-place policies on the price of the firm, thus taking into account capital gains which would accrue to the domestic owners in a rational expectations world.

If the objective of the government is to maximize the net gain of the domestic shareholder, we found that restrictions on transfer pricing are either irrelevant or strictly suboptimal. The conclusion carries over to the case where the objective function includes government tax revenues in addition to DSH profits, except when the weight assigned to tax revenues is sufficiently large. Interestingly, restrictions on foreign ownership turns out to be the crucial element in any optimal policy. It may be noted that many countries uniformly impose such requirements.

The effect of ownership restrictions is to reduce the probability of takeovers. Acquisition occurs if the benefits from integration are sufficiently high, and in these cases, part of the rent is transferred to the domestic owners of the firm. This suggests that for an MNE which does not already have units in the country, entry occurs through acquisition because the benefit of establishing the first unit is particularly high.

Appendix

Proof of Lemma 1: Let γ' be the amount of equity that the DSH sells.

Proof of (a):

Define $\pi_1^D(\gamma') = (1-\gamma')\bar{\pi} + P\gamma'$, and

$\pi_2^D(\gamma') = (1-\gamma')\pi^D + P\gamma'$,

i.e. π_1^D is the DSH's profit if control is transferred ($\gamma' > \beta$), and π_2^D if control is not transferred ($\gamma' \leq \beta$).

(i) Suppose $P \leq \pi^D$.

Then for $\gamma' > 0$, $\bar{\pi} < \pi^D$ implies that $\pi_1^D(\gamma') < \pi^D$ and $\pi_2^D(\gamma') \leq \pi^D$. Therefore $\gamma' = 0$ is optimal.

(ii) Suppose $\pi^D < P < P(\delta)$.

$\frac{d\pi_2^D}{d\gamma'} = -\pi^D + P > 0$, hence for $\gamma' \leq \beta$, $\gamma' = \beta$ maximizes profit.

$\frac{d\pi_1^D}{d\gamma'} = -\bar{\pi} + P > 0$, hence for $\beta < \gamma' \leq \delta$, $\gamma' = \delta$ maximizes profit.

Now $[\pi_1^D(\delta) - \pi_2^D(\beta)] = (1-\delta)\bar{\pi} + \delta P - (1-\beta)\pi^D - \beta P$

$= [(1-\delta)\bar{\pi} - (1-\beta)\pi^D] + (\delta - \beta)P$

$< [(1-\delta)\bar{\pi} - (1-\beta)\pi^D] + (\delta - \beta)P(\delta)$

$< [(1-\delta)\bar{\pi} - (1-\beta)\pi^D] + [(1-\beta)\pi^D - (1-\delta)\bar{\pi}] = 0.$

Hence $\gamma' = \beta$ is optimal.

(iii) If $P \geq P(\delta)$, then it can be shown exactly as in (ii) above that β (resp. δ) is the optimal amount to sell in the case where control is not transferred (resp. is transferred), and that $\pi_1^D(\delta) - \pi_2^D(\beta) \geq 0$ according as $P \geq P(\delta)$, implying $\gamma' = \delta$ is optimal.

Proof of (b):

It follows from (a) that in order to acquire control, the MNE must offer to buy a fraction $\delta > \beta$ at a price $P \geq P(\delta)$, and that at this price it will be offered exactly a fraction δ of the shares. Assuming it offers exactly a price $P(\delta)$, the MNE's profit at $t = 1$ is

$\pi_1^M(\delta) = (\pi^D - \bar{\pi}) + b + \delta\bar{\pi} - \delta P(\delta)$

where the first term represents profits from transfer pricing, b is its private benefit from control, $\delta\bar{\pi}$ is its share of the accounting profits of the DF, and the last term is the amount paid for the shares.

Now, substituting the expression for $P(\delta)$, it can be readily checked that $\pi_1^M(\delta)$ is increasing in δ. Thus if the MNE bids for control at all, it will offer $(\gamma, P(\gamma))$ and its profit will be $\pi_1^M(\gamma)$.

Alternatively, the MNE may bid a pair (δ, P) such that $\beta < \delta \leq \gamma$ and $\pi^D \leq P < P(\delta)$. Then it obtains a fraction β of the shares, hence its profits are

$\pi_2^M \ = \ \beta\pi^D \ - \ P\beta.$

It follows immediately that a price of $\pi^D < P < P(\delta)$ is strictly inferior to $P = \pi^D$, and the MNE is indifferent between buying β shares at $P = \pi^D$ and not buying any shares at all.

It can be easily checked that the same conclusion is obtained if the MNE makes an offer (δ, P) where $\delta \leq \beta$.

The choice is therefore between acquiring control, in which case it gets $\pi_1^M(\gamma)$, and not buying any shares, in which case it gets 0. Now substituting the value of $P(\gamma)$ yields, on manipulation, the equivalence

$$\pi_1^M(\gamma) \ \geq \ 0 \qquad \Leftrightarrow \qquad \gamma \ \geq \ \frac{b + \pi^D - \bar{\pi}}{\frac{b}{\beta} + \pi^D - \bar{\pi}} \ \equiv \ \bar{\gamma}(b).$$

Note that $\beta < 1 \ \Rightarrow \bar{\gamma}(b) < 1$. $\square$

Proof of theorem 2: For arbitrary b^* and $\bar{\pi} < \pi^D$, define

$$\begin{aligned} \Delta W(b^*, \bar{\pi}; \alpha) &= W_3^1(b^*, \bar{\pi}) \ - \ W_3^2(\tilde{b}) \\ &= b^*[1 - F(b^*)] \ - \ \alpha\tau\tilde{b}[1 - F(\tilde{b})] \ + \ (\alpha - 1)\tau(\bar{\pi} - \pi^D)[1 - F(b^*)] \end{aligned} \quad (12)$$

That is $\Delta W(b^*, \bar{\pi}; \alpha)$ is the excess of W_3^1 with the parameters set at arbitrary values over the maximized value of W_3^2. We need to show that for $\alpha < \frac{1}{\tau}$, there exist admissible values for b^*, $\bar{\pi}$ such that ΔW is positive, whereas in the converse case, ΔW is negative for all admissible values.

Note that $\tau < 1$, and that $1 - \alpha\tau \gtreqless 0$ as $\alpha \lesseqgtr \frac{1}{\tau}$. Consider the following cases.

Case 1: $\alpha \leq 1$ The last term in (12) is non-negative since $\bar{\pi} < \pi^D$. Setting $b^* = \tilde{b}$ we have

$$\Delta W(\tilde{b}, \bar{\pi}; \alpha) \ \geq \ (1 - \alpha\tau)\tilde{b}[1 - F(\tilde{b})] \ > 0.$$

Case 2: $1 < \alpha < \frac{1}{\tau}$ Using (10), we have

$$\sup_{b^* \in \{\underline{b}, \bar{b}\}, \bar{\pi} < \pi^D} \Delta W \ = \ (1 - \alpha\tau)\tilde{b}[1 - F(\tilde{b})] \ > \ 0$$

$\Rightarrow \quad \forall \epsilon > 0, \quad \exists b^*(\epsilon), \bar{\pi}(\epsilon)$ such that

$$\Delta W(b^*(\epsilon), \bar{\pi}(\epsilon); \alpha) \ > \ (1 - \alpha\tau)\tilde{b}[1 - F(\tilde{b})] \ - \ \epsilon$$

so choose $0 \ < \ \epsilon \ < \ (1 - \alpha\tau)\tilde{b}[1 - F(\tilde{b})]$, then $\Delta W > 0$.

Case 3: $\alpha \geq \frac{1}{\tau}$ In this case we have

$$\sup_{b^* \in \{\underline{b}, \bar{b}\}, \bar{\pi} < \pi^D} \Delta W \ = \ (1 - \alpha\tau)\tilde{b}[1 - F(\tilde{b})] \ \leq \ 0$$

but since $\alpha > 1$, by the discussion following (9) the supremum cannot be attained, which implies that $\Delta W < 0$ for all admissible values of b^* and $\bar{\pi}$.

Part (i) of the theorem follows from cases 1 and 2, and part (ii) follows from case 3. $\square$

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