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Learning to sell in new markets: A preliminary analysis of market entry by a multinational firm

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Abstract

We consider the multinational firm's decision on whether to enter a new market immediately via direct investment or to contract initially with a local agent and (possibly) invest later. Use of a local agent allows the multinational to avoid costly mistakes by finding out if the market is large enough to support direct investment. However, the agent is able to extract information rents from the multinational due to being better informed about market characteristics. We derive the optimal sequence of agent contracts and discuss situations in which the multinational contracts initially with a local agent and then converts subsequently to an owned sales operation.

1 | INTRODUCTION

It is common for a multinational enterprise (MNE) entering a new foreign market to export to that market from an existing production facility and to contract initially with a local distributor who serves both as the importing agent and wholesale distributor. Nicholas (1982, 1983), for instance, notes that among his sample of British multinational firms operating during the pre-1939 period, 88 percent sold their products initially under a contract with a local agent in the foreign country before converting to direct sales or production branches. In instances where conversion to direct investment did occur, the period of agency varied from 4 to 25 years. According to Nicholas, the historical record indicates that the decision to terminate the relationship was a conscious one on the multinational's part (as opposed to being the result of business failure by the agent) based both on a desire by the firm to avoid agency costs and on its having learned, through the agency arrangement, that information on local market characteristics that made the agency contract valuable in the first place.

Nicholas, Purcell, Merritt and Whitwell (1994) provide survey data on direct investment by Japanese multinational firms into Australia. Of the firms responding, 60 percent indicated that they used an Australian agent for some period of time before making any direct investment decisions. Further indirect evidence on this phenomenon is provided by Thompson (1994) and McIntosh/Baring (1993). These authors survey Australian firms' experiences selling in East Asia. They document various problems with Asian contractual partners, including lack of reliability of market information, and problems with distribution, servicing customers, and product promotion. In general, the Australian firms felt disadvantaged by their own ignorance of the Asian markets. The studies recommend the use of local agents for relatively short-term projects or ventures involving commodity products. Direct investment with majority control is found to be important for long-term projects or those involving more complex production. Finally, Arnold and Quelch (1998) document a similar phenomenon for a large US manufacturer of chemical sealers and adhesives. They also indicate that, over time, the company often converts to an owned sales and distribution operation. After doing so, the company typically sees a significant jump in sales.

These observations suggest that multinational firms often face information problems about the characteristics of new foreign markets that make investing directly in these markets a risky proposition. An alternative for the firm is to contract with a local agent and try to discover information through this process. These observations also suggest, however, that in doing so the multinational firm faces potential moral hazard problems with its contracted agent. These problems represent an offsetting cost. Finally, we see that, in some cases, a multinational firm that initially contracts with a local agent transitions to its own sales operation and, in doing so, mitigates these moral hazard problems.

In this paper, we develop a model of MNE contracting and investment that captures these various phenomena. The setting is one in which a firm is seeking to sell its product in a new (foreign) market. Because it is entering a new market, the firm is uncertain about the revenues it can expect to generate. In entering the market, it can either choose to invest immediately in its own sales operation or it can contract for sales via a local agent. The local agent, having experience in the market, has information on market characteristics not available to the multinational. This information makes a contract with the local agent potentially valuable, in that the MNE prefers not to invest if the market is too small. Realized sales revenues in the foreign market are stochastic and are influenced by the level of selling effort an agent, which could be either the local agent or the MNE's employee agent, expends. Only realized revenues, and not agent sales effort, are observable. This presents the MNE with an additional moral hazard problem. Because the MNE cannot commit to a long-term contract with the local agent, this moral hazard problem may be particularly acute in this case: the local agent understands that superior sales performance can induce the MNE to let the contract lapse and switch to its own sales branch. Within this setting, we derive the optimal two-period contract and the optimal entry decision for the multinational and analyse when the multinational adopts a strategy of contracting initially then switching to an owned sales branch.

As the previous discussion would suggest, the multinational's decision regarding initial entry mode depends on the size of the returns to information gathering relative to the rents that the agent can be expected to extract. Things that make investment mistakes more costly, like large set-up costs relative to expected market size (revenues) make a contract more attractive. In general, the model predicts that a contractual arrangement is more likely when markets are on average small and investment mistakes are costly. The latter arises when there is large potential profit variability due to the possibility of very low sales outcomes. In this case, we also observe, on average, that poor initial performance, as measured by sales revenue, is associated with a contract renewal with the local agent. Superior sales performance is, on average, associated with conversion to owned sales operations. We also show that the optimal contracts are linear, with the share of revenue accruing to the agent being higher the more likely the market is large.

This paper builds on Horstmann and Markusen (1996) and does so in two ways. One, Horstmann and Markusen allowed the multinational to commit to long-term contracts. In this paper, no such commitment is possible. Second, while both assume that the agent is better informed about market size, this paper allows the agent to mask market size by choice of effort: there is both moral hazard and adverse selection. Horstmann and Markusen (1996) only have adverse selection. The paper is also related to work by Watson (1999, 2002) and Rauch and Watson (2003). These papers look at relationship building in a framework of incomplete commitment. They show that it pays for the agent to start small and build to larger relationships as they gather information about each other. In our paper, the multinational can "start small" by contracting with the local agent and then building to investment—becoming large—as it learns about market conditions.

There is also related theoretical literature on information gathering in new product markets and the firm's investment decision. McGahan (1993) considers whether a new product monopolist should engage in immediate, large-scale investment that would deter entry by future competitors or explore the market initially with prototypes requiring smaller capacity investments and only invest further if the market proves large. While entry deterrence is not an issue in our model, there are the same information gathering features as in McGahan's model. Chen (2011) investigates the decision by a firm either to outsource the production of some input to a third party provider, in the presence of both adverse selection and moral hazard, or to integrate upstream and provide the input "in house". The latter avoids the adverse selection problem. Chen provides no option, however, for the firm to switch from one form of sourcing to another over time. Finally, our paper also draws heavily on the mechanism design literature, in particular Laffont and Tirole (1986).

The specifics of our model are detailed in the next section. Section provides the optimal agency contracts for both a one-period and two-period problem and discusses the multinational's optimal investing and contracting decisions. Section contains a discussion of possible multi-period contracting settings. Section provides concluding remarks.

2 | THE FOREIGN SALES MODEL

We consider a situation in which a producer (the MNE) of an established product, X, located in Country H (the home country) has decided to sell this product in Country F (the foreign country), a market in which the MNE has no previous sales experience. Among the options for selling in the foreign country, two are potentially most profitable: (i) contracting with a local sales agent or (ii) establishing an owned local sales operation. The foreign market is characterized by a potential pool, N, of identical customers with individual demand functions given by the expression $x = f(p)$, where x is the quantity demanded of X by any individual customer if the price of X is p. Because the product is established, the characteristics of the demand function are known to both the MNE and any potential local sales agent. Such is not the case for the size of the potential customer pool, N. The sales agent is assumed to know the value of N, due perhaps to past experience in the local market; the MNE, on the other hand, is initially uninformed as to its actual value. The MNE does know the distribution of values for N, however. For simplicity, we assume that this distribution is such that N may take on one of two possible values: $\underline{N}$ and $\overline{N} > \underline{N}$. The probability that $N = \underline{N}$ is given by ρ with $0 < \rho < 1$.

While the potential customer pool is of a fixed size, the number of customers to actually purchase the MNE's product is a random variable that depends on sales effort. In particular, it is assumed that the number of actual customers is proportional to the size of the potential customer pool, with the variable of proportionality depending on sales effort. Whether the MNE employs its own sales agent or contracts with a local agent, the number of actual customers, n, given any potential customer pool, N, is defined as $n = eN\varepsilon$, where e is the agent's (either employee or contracted) sales effort and is normalized such that $0 \leq e \leq 1$. The variable ε is a random variable,which, for simplicity, we assume is uniformly distributed on [0, 1]. Sales effort is assumed costly for both the local agent and the MNE's own sales force; however, we allow this cost to differ between the two modes. In particular, the cost of effort for a local sales agent is given by function $C_a = c(e)$. For the MNE's own (employee) agent, effort cost is given by the function $C_m = \alpha c(e)$, where $\alpha > 1$ implies the employee agent is less efficient at selling than the local agent while $\alpha < 1$ implies that the employee agent is more efficient. In all cases, we assume that the effort cost function is increasing and strictly convex with $c'(0)=0$ and that the MNE observes neither the level of agent sales effort or the effort cost. We assume in what follows that there are no other variable costs associated with producing and selling the good.

Finally, it is assumed that the cost of establishing a sales operation in the foreign country depends on the choice of sales mode. Should the MNE establish its own sales operation, then it incurs a one-time set-up cost of $G \geq 0$. This cost represents a sunk cost and captures such things as legal costs, cost of dealing with bureaucratic red-tape, any specific investment costs and the like. In addition, it incurs a per-period fixed cost of $K \geq 0$, representing various administrative and overhead costs and any costs of compensating its own sales force for foregone alternative opportunities. In contrast, the local sales agent, having already established its operation and already incurring various costs due to other contracts, is assumed able to add the MNE's contract with no additional set-up costs (G=0 for the local agent). In essence, set-up costs are assumed to result from establishing and operating a sales agency and not from adding an additional product to the sales line. The local agent does incur a lump-sum cost of $R \geq 0$ from adding the MNE's product that represents any added administrative costs for the agent due to adding an additional contract as well as costs of the agent's foregone alternatives (any lost revenues from not entering into an alternative contractual arrangement). Beyond these costs (and the sales effort costs), it is assumed that neither the MNE nor the local agent incur any other direct costs in producing or marketing the product. It is also assumed that the MNE (or its agent) faces no direct competition (either actual or potential) for its product in the foreign country.[1]

The model implies that, in making a decision on the form of foreign sales operations, the MNE is confronted with a trade-off. The sales agent has the advantage of having better information regarding market size as well as having lower set-up costs. These features favor the agency contract. On the other hand, the use of a sales agent must inevitably result in agency costs for the MNE arising from the agent's ability to exploit the better information that the agent has. In addition, the agent may be less efficient at producing customers than the MNE. These features favor an ownership arrangement. In what follows, we explore the nature of this trade-off in a setting in which the MNE and the agent (potentially) interact over multiple periods and the MNE cannot commit to multi-period contracts. We are particularly interested in how the probability of contract renewal with the local sales agent evolves over time under the optimal contracting arrangement.

3 | THE CONTRACTING PROBLEM

In any period in which the MNE contracts with a local sales agent, the MNE observes the realized value of sales revenues but not market size (N) or agent sales effort (e). The MNE also does not observe the transaction price with any customer (the MNE does not observe p). A contract, therefore, can only condition on the realized values of sales revenue and any reports the agent may make about the value of N. Lump-sum transfers between the MNE and the local sales agent are possible. Both the MNE and the agent are assumed to be risk neutral and seek to maximize the present value of their respective income streams. They share a common discount factor of δ, with $0 \leq \delta \leq 1$. To help fix ideas and define some of the issues involved in the MNE's choice of sales mode, we consider first a simple one-period contracting problem.

3.1 | A one-period contracting problem

To begin, we consider the optimal contract should the MNE choose to employ a local sales agent in the foreign country. If we let realized sales revenues be defined as $\widetilde{R} = pf(p)Ne\epsilon$ and the agent's report of market size as $\widetilde{N}$, then a contract is essentially characterized by a transfer function $t(\widetilde{R}, \widetilde{N})$. That is, we assume that the contract specifies that the MNE retains all sales revenue and makes a transfer $t(\cdot,\cdot) > 0$ to the agent. As is usual in these settings, the contract is assumed designed by the MNE to maximize its expected profits, subject to satisfying the local sales agent's individual rationality and incentive compatibility conditions.

Before solving for the MNE's optimal one-period contract, we make two observations. First, it is always in the agent's interest (and the MNE's as well) to choose a price that maximizes per customer revenue, $pf(p)$. Given that transfers depend only on revenue levels (price is not contractible), doing so allows the agent to achieve any level of revenue at minimum effort cost. As a a result, the per-customer revenue maximizing price must always maximize agent expected income. We define the maximized value of per-customer revenue as r. Second, given that $\overline{N} > \underline{N}$, a sales agent faced with a market size of $\overline{N}$ can reproduce the exact revenue distribution arising with a market size of $\underline{N}$ by exerting effort of $\hat{e} = e(\underline{N})\underline{N}/\overline{N} < e(\underline{N})$, where $e(\underline{N})$ is the incentive compatible level of effort when $N = \underline{N}$. In essence, the sales agent faced with a large market size can always reproduce the outcome from a small market size and do so at lower effort cost than when the market is actually small. This fact means that the sales agent earns information rents (receives positive profits) when the market size is large. Finally, since both the MNE and sales agent are risk neutral, each is interested in expected profits. Therefore, for notational conveniece, we define $T(\widetilde{R}, \widetilde{N})$ as the expected value of the transfer and $R(N, e)$ as expected revenue given market size N and agent sales effort of e.

The MNE's optimal one-period contract is defined by the mechanism-design problem:

$$\max_{e(\underline{N}),e(\overline{N}),T(\widetilde{R},\underline{N}),T(\widetilde{R},\overline{N})} E\pi_M = \rho[.5re(\underline{N})\underline{N} - T(\widetilde{R},\underline{N})] + (1-\rho)[.5re(\overline{N})\overline{N} - T(\widetilde{R},\overline{N})]$$

subject to

$$(C1) \qquad \begin{array}{c} T(\widetilde{R},\underline{N}) - c[e(\underline{N})] \geq T(\widetilde{R},\overline{N}) - c[e^d(\underline{N})] \\ T(\widetilde{R},\overline{N}) - c[e(\overline{N})] \geq T(\widetilde{R},\underline{N}) - c[e^d(\overline{N})] \\ T(\widetilde{R},\underline{N}) - c[e(\underline{N})] \geq 0 \\ T(\widetilde{R},\overline{N}) - c[e(\overline{N})] \geq 0 \end{array}$$

where the first two constraints are the two incentive compatibility conditions and the variables $e^d(\underline{N})$ and $e^d(\overline{N})$ give the optimal deviations for the sales agent when misreporting the market size, N. The last two constraints are the individual rationality constraints and we have assumed, for simplicity, that $R = 0$. From the above, it should be clear that the IR constraint is not binding when the market size is $\overline{N}$ but that the IC constraint is binding; similarly, when the market size is $\underline{N}$, the IR constraint is binding but the IC constraint is not.

Because it is potentially complicated to define the best deviation for the $\overline{N}$–type agent when faced with transfer function $T(\widetilde{R}, \underline{N})$ (having misrepresented market size as $\underline{N}$) , we solve a simpler problem in which the agent in such a case is constrained to choose effort level $\hat{e}$. Later, we show that the allocation that results in this constrained problem can be implemented via a set of (essentially) linear contracts that impose no effort constraint.[2] Since the effort constraint in the mechanism (weakly) limits the information rents that the agent can obtain, this set of linear contracts must be optimal. For simplicity, we also assume here and in what follows that the effort cost function is quadratic and given by the expression $c(e) \equiv ce^2$.

Given the above, we can define the constrained contracting mechanism by the problem:

$$\max_{e(\underline{N}),e(\overline{N}),T(\widetilde{R},\underline{N}),T(\widetilde{R},\overline{N})} E\pi_M = \rho[.5re(\underline{N})\underline{N} - T(\widetilde{R},\underline{N})] + (1-\rho)[.5re(\overline{N})\overline{N} - T(\widetilde{R},\overline{N})] \tag{1}$$

subject to

$$T(\widetilde{R},\overline{N}) - ce(\overline{N})^2 = T(\widetilde{R},\underline{N}) - c\hat{e}^2 \tag{2}$$

$$T(\widetilde{R},\underline{N}) - ce(\underline{N})^2 = 0 \tag{3}$$

Using the two constraints and the definition of $\hat{e}$, we have that $T(\widetilde{R},\underline{N}) = ce(\underline{N})^2$ and that $T(\widetilde{R},\overline{N}) = ce(\overline{N})^2 + ce(\underline{N})^2(\overline{N}^2 - \underline{N}^2)/\overline{N}^2$. We can then define the optimal constrained mechanism as the solution to the problem:

$$\max_{e(\underline{N}),e(\overline{N})} E\pi_M = \rho[.5re(\underline{N})\underline{N} - ce(\underline{N})^2] + (1-\rho)[.5re(\overline{N})\overline{N} - ce(\overline{N})^2 - ce(\underline{N})^2\Theta] \tag{4}$$

where $\Theta = (\overline{N}^2 - \underline{N}^2)/\overline{N}^2$. The solution to this problem is given by:

$$\frac{\partial E\pi_M}{\partial e(\underline{N})} = .5\rho r\underline{N} - 2\rho ce(\underline{N}) - 2(1-\rho)ce(\underline{N})\Theta = 0 \tag{5}$$

$$\frac{\partial E\pi_M}{\partial e(\overline{N})} = (1-\rho)(.5r\overline{N} - 2ce(\overline{N})) = 0 \tag{6}$$

This solution implies that the optimal constrained contract sets sales agent effort to the full information level when the market size is large: $e(\overline{N}) = r\overline{N}/4c$. When the market size is small, agent effort is distorted below the full information level as a means of reducing information rents for the $\overline{N}$ type agent: $e(\underline{N}) = (r\underline{N}/4c)[\rho/\rho + (1-\rho)\Theta]$. The expected value of profits for the MNE under this constrained contract is given by:

$$\pi_M^*(\rho) = \rho\frac{\beta r^2\underline{N}^2}{16c}(2-\beta) + (1-\rho)\left[\frac{r^2\overline{N}^2}{16c} - \frac{r^2\underline{N}^2\beta^2}{16c}\Theta\right] \tag{7}$$

where $\boldsymbol{\beta} = \rho/[\rho + (1-\rho)\Theta]$. MNE profits are reduced relative to the full-information level both because the agent earns information rents in the case of a large market (the term $\frac{r^2\underline{N}^2\beta^2}{16c}\Theta$) and because agent effort is distorted away from the full-information level in the case of the small market ($\beta < 1$).

Now consider implementing the above outcome with a pair of linear contracts $\{[f(\underline{N}), \beta(\underline{N})], [f(\overline{N}), \beta(\overline{N})]\}$, where $f(\cdot)$ is a lump-sum payment between the MNE and the sales agent and $\beta(\cdot)$ is the share of realized sales revenue alloted to the agent ($1-\beta$ share going to the MNE). Clearly, $\beta(\underline{N}) = \rho/[\rho + (1-\rho)\Theta]$ implements $e(\underline{N})$ and $f(\underline{N}) = [\beta(\underline{N})r\underline{N}]^2/16c$ yields zero profit for the agent. For the case of $N = \overline{N}$, $\beta(\overline{N}) = 1$ and $f(\overline{N}) = r^2\overline{N}^2/16c - \Theta[\beta(\underline{N})r\underline{N}]^2/16c$ implements the constrained optimal allocation as long as the agent (weakly) prefers choosing this contract rather than choosing the contract $[f(\underline{N}), \beta(\underline{N})]$ and taking the profit maximizing effort level associated with it. Incentive compatibility ensures this as long as the $\overline{N}$ type agent would not choose an effort level greater than

$\hat{e}$ under the contract [$f(\underline{N})$, $\beta(\underline{N})$]. By the definition of $\hat{e}$, should the agent choose $e > \hat{e}$, then, with positive probability, realized sales revenues will reveal that $N = \overline{N}$. If the linear contract includes a large penalty in these cases, it will be optimal for the $\overline{N}$ type agent to choose effort level of exactly $\hat{e}$. Then, this set of linear contracts, augmented by a large penalty should revenue reveal that the agent is misrepresenting market size, implements the constrained optimal allocation. As a result, this set of contracts is the optimal contract structure for the MNE should it employ a local sales agent. These results are summarized below:

Proposition 1 *The MNE can implement the allocation under the constrained optimal mechanism using a pair of contracts that are observationally linear in equilibrium. These contracts take the form of a fixed payment, f, from the local sales agent to the MNE and a revenue sharing parameter, β. The optimal one-period contracts are observed to be* $\{f(\underline{N}) = [\beta(\underline{N})r\underline{N}]^2/16c, \beta(\underline{N}) = \rho/\rho + (1-\rho)\Theta\}$ *and* $\{f(\overline{N}) = r^2\overline{N}^2/16c - \Theta[\beta(\underline{N})r\underline{N}]^2/16c, \beta(\overline{N}) = 1\}$.

Finally, we need to consider the alternative that the MNE operates its own sales branch rather than contracting with a local agent. To make the problem interesting, we assume that the set-up costs $G+K$ are sufficiently large that, should the market size be small ($N = \underline{N}$), the MNE expects higher realized profits under the optimal contract with the local sales agent than it would get if it established its own sales operation. By contrast, if the market is large ($N = \overline{N}$), then the MNE expects higher profits should it establish its own sales operation than realized profits under the optimal contract with a local sales agent. For the latter to be the case, it must be that the MNE's employee sales agent is sufficiently efficient relative to the local agent (α sufficiently small) that the increased sales revenue generated by the employee agent plus the savings on information rents to the local agent more than offset the added set-up costs. This assumption is consistent with anecdotal evidence on employee versus contracted sales agents. Lastly, we assume that the probability that $N = \underline{N}$ is large enough (ρ large enough) that, when confronted with the choice of establishing its own sales operation in the foreign country, not knowing the market size, or implementing the optimal contract with a local sales agent, the MNE prefers the agent contract.

3.2 | A two-period contracting problem

Given the above results, we consider now the case of particular interest; namely the one in which the MNE must decide on the mode of selling in the foreign country over two periods: $t = 1$ and $t = 2$. We assume that, if the MNE contracts with a local agent, it can only commit to period-by-period contracts. Specifically, if the MNE contracts with the local agent at $t = 1$, it cannot commit to continuing with the contract at $t = 2$. Further, even if the MNE continues to contract with the local agent at $t = 2$, it cannot commit to not using any information obtained from the contract at $t = 1$ to modify the $t = 2$ contract. In this setting, should the MNE contract with a local sales agent at $t = 2$, the optimal second-period contract is given by the above set of linear contracts with the value of ρ given by the posterior beliefs from $t = 1$. For now, we assume that, should the MNE contract with a local sales agent at $t = 1$, the optimal first-period contract is linear. Ultimately, we will derive a result to this effect.

Given this setting, we want to derive the MNE's optimal linear contract at $t = 1$ (should it contract with a local agent) and, in particular, uncover the ways that the MNE may use the first-period contract to learn about market size and so make optimal investment decisions in the foreign country. More specifically, we know that the MNE finds it unprofitable to establish its own sales branch if the market is small but profitable if the market is large (both relative to contracting with a local agent).

The question is whether or not the MNE can use the $t = 1$ contract with the local sales agent to learn about market size and so make an optimal investment decision at $t = 2$. If it can, then we can also investigate whether contracting with the local agent is a preferable strategy for the MNE to investing directly at $t = 1$.

The MNE has two possible ways of eliciting information from the local sales agent via a $t = 1$ contract. One way would be to offer a menu of linear contracts at $t = 1$ that satisfy incentive compatibility so that market size information is fully revealed via the agent's choice of first period contracts. Because the agent knows that the revelation of market size information at $t = 1$ will result in zero profits at $t = 2$, satisfying incentive compatibility may be extremely expensive for the MNE. This may make this route a particularly costly way for the MNE to obtain market size information. An alternative method is for the MNE to offer a single contract at $t = 1$ that is accepted by the agent regardless of market size and then allow the agent to decide how much information to reveal via revenue outcomes. While the contract choice reveals no information, the choice of sales effort when the market size is large allows the agent to reveal as little or as much information as is desirable via the sales revenue outcome. While this route can only ever partially reveal information, this "purchase" of partial information by the MNE may be a cost effective means of learning relative either to full separation or immediate investment. It is this issue that we turn to next.

To uncover the optimal contract at $t = 1$, it proves useful to begin by considering a fully pooling outcome; that is, one in which the MNE offers a single linear contract accepted by the agent regardless of market size and in which agent effort choice reveals no information. It is to this contract that we turn first.

i) Pooling contract

Under a fully pooling contract, the MNE offers a contract $\{f_1,\beta_1\}$ such that profits are zero for the agent when $N = \underline{N}$. From above, the agent will choose effort level $e_1(\underline{N}) = \beta_1 r\underline{N}/4c$ when $N=\underline{N}$ and earn (variable) profits of $(\beta_1 r\underline{N})^2/16c$, which will be the value of f_1. To fully pool, the agent must choose effort level $\widehat{e}$ when $N = \overline{N}$. This choice generates positive net income for the agent of $(\beta_1 r\underline{N})^2\Theta/16c$. Under this contract, the MNE obtains the same profit at $t = 1$ regardless of market size (the contract is independent of market size reports and the distribution of sales revenue is independent of actual market size). This $t = 1$ profit is given by $(2-\beta_1) \times (\beta_1 r\underline{N})^2/16c$. Since no information is revealed at $t = 1$, the optimal choice for the MNE at $t = 2$ is to contract with the local sales agent again, using the optimal one-period contract above. This gives total expected profits for the MNE under the pooling contract of

$$V_M^P(\beta_1)=(2-\beta_1)\times(\beta_1 r\underline{N})^2/16c+\delta\pi_M^*(\rho), \tag{8}$$

where δ is the MNE's discount factor and is such that $0 \leq \delta \leq 1$. It is easily checked that, as long as for any level of β the agent always chooses effort level $\widehat{e}$ when $N = \overline{N}$, the profit maximizing value of β_1 for the MNE is $\beta_1 = 1$. Of course, this presumes that the agent will still choose effort level $\widehat{e}$ in this case. It is this issue that we address next.

ii) Partial pooling contract

As suggested above, when confronted with the contract $\{f_1 = (r\underline{N})^2/16c, \beta_1 = 1\}$ at $t = 1$, it may be in the interest of the local agent to choose some effort level $e > \widehat{e}$ when $N = \overline{N}$. To check this, consider a proposed equilibrium that is fully pooling at $t = 1$ with the contract $\{f_1 = (r\underline{N})^2/16c, \beta_1 = 1\}$ and consider a deviation by the $\overline{N}$ type agent in the neighborhood of $e = \widehat{e}$. If the agent chooses an effort level greater than $\widehat{e}$, then, with positive probability, the agent reveals that the market size is $\overline{N}$. In this case, the MNE chooses to convert to operating its own sales branch at $t = 2$. The probability that sales revenues reveal market size for any $e > \widehat{e}$ is the probability that realized revenues exceed

$R_{max}(\underline{N}) = (r\underline{N})^2/4c$. Given the assumption that ε is uniformly distributed, this probability is given by the value $1-(r^2\underline{N}^2/4cre\overline{N}) = 1-(\underline{N}/4c) \times (r\underline{N}/\overline{N}e)$. The agent's expected two-period profit under the proposed contract is then:

$$V(\overline{N}) = .5r\overline{N}e - ce^2 - f_1 + \delta[(\underline{N}/4c) \times (r\underline{N}/\overline{N}e)] \times [\Theta[\beta_2(\underline{N})r\underline{N}]^2/16c] \tag{9}$$

where $\beta_2(\underline{N})$ is the period 2 value of the revenue sharing parameter in the linear contract offer for the $\underline{N}$ agent under the scenario in which revenues at $t = 1$ are less than R_{max}. Under the proposed equilibrium of full pooling, this value is given by the one-period contract above with prior ρ.

For the $\overline{N}$- type agent to choose effort level $\hat{e}$ (the full pooling outcome), it must be that $\hat{e}$ maximizes the above expression. We need to check, then, the circumstances under which $dV(\overline{N})/de \gtreqless 0$ when evaluated at $e = \hat{e}$. This derivative is given by

$$\frac{dV(\overline{N})}{de} = .5r\overline{N} - 2ce - \delta[\Theta[\beta_2(\underline{N})r\underline{N}]^2/16c] \times [(\underline{N}/4c) \times (r\underline{N}/\overline{N}e^2)]. \tag{10}$$

Evaluated at $e = \hat{e} = e(\underline{N})\underline{N}/\overline{N}$, this derivative becomes:

$$\frac{dV(\overline{N})}{de} = .5r\overline{N} - 2cr\underline{N}^2/4c\overline{N} - \delta[\Theta[\beta_2(\underline{N})r\underline{N}]^2/16c] \times [4c\overline{N}/r\underline{N}^2]. \tag{11}$$

Straightforward algebra shows that the above expression is positive so that, at $e = \hat{e}$, it pays the agent to increase effort when market size is large ($N = \overline{N}$). Since doing so strictly benefits the MNE as well, the optimal first-period contract, should the MNE offer only a single $\{f_1, \beta_1\}$, will induce partial revelation of information. This result is summarized below.

Proposition 2 *If the MNE offers a single contract at* $t = 1$, $\{f_1, \beta_1\}$ *which the agent accepts regardless of market size, then the optimal contract is* $\{f_1 = (\beta_1^* r\underline{N})^2/16c, \beta_1^* \le 1\}$. *Under this contract, the agent chooses effort level* $e > \hat{e}$ when $N = \overline{N}$ *so that sales revenue reveals market size with positive probability. Further, this contract yields the MNE a two-period profit at least as large as its profit should it choose the contract* $\{f_1 = (r\underline{N})^2/16c, \beta_1^* = 1\}$. *This profit is larger than profit under any pooling contract.*

Under this contract, the MNE avoids the possible costs of investing wrongly should market size be small but still "purchases" information from the agent via observed sales revenues. The MNE purchases only partial information but, if it attaches high probability to the market being small (ρ large) and the losses from an investment mistake are significant, the MNE prefers this contract to initial investment. In this case, with positive probability we observe conversion to FDI at $t = 2$.

iii) Separating contract

The alternative to the above partial pooling contract is for the MNE to offer a menu of contracts at $t = 1$ that fully separate types. Should it adopt such a contract, then, at $t = 2$, the MNE has full information about the value of N. In this case, if $N = \underline{N}$, the MNE will renew the contract with the sales agent with $f_2(\underline{N}) = (r\underline{N})^2/16c$ and $\beta_2(\underline{N}) = 1$. If $N = \overline{N}$, then the MNE will not renew the contract but, rather, will invest in its own sales branch. Doing so yields the MNE profits of π^{fdi}.

Because all information problems are resolved under a separating contract, the contract at $t = 1$ is essentially a one-period contract. As a result, much as above, the constrained optimal allocation can be implemented with a pair of linear contracts (with the appropriate forcing element). This contract pair will have the IC constraint for the $\overline{N}$ type agent binding and the IR constraint for the $\underline{N}$ type agent binding. Also, as in the case of the one-period mechanism, it can be shown that the optimal contract entails sharing parameters $\beta_1(\overline{N}) = 1$ and $\beta_1(\underline{N}) < 1$. Further, because the IR constraint binds for the

$\underline{N}$ type agent, the fixed payment for that agent will be $f_1(\underline{N}) = (\beta_1(\underline{N})r\underline{N})^2/16c$. The fixed payment for the $\overline{N}$ type agent, $f_1(\overline{N})$, is determined by the binding IC constraint and is given by the equation:

$$f_1(\overline{N}) = r^2\overline{N}^2/16c - \Theta[\beta(\underline{N})r\underline{N}]^2/16c - \delta\Theta(r\underline{N})^2/16c \tag{12}$$

where the final term in the above expression is the rents that the $\overline{N}$ type agent can obtain at $t = 2$ should the agent misrepresent the market size as small ($N = \underline{N}$) at $t = 1$ and undertake effort $e = \hat{e}$. This rent expression assumes that the $\overline{N}$ type agent undertakes effort of $\hat{e}$ as well at $t = 2$ and so is the minimum rent the agent can obtain at $t = 2$ by misrepresenting market size at $t = 1$. Implementation of this contract yields expected two-period profits for the MNE of:

$$V_M^{sep} = \rho\left\{\frac{\beta_1(\underline{N})r^2\underline{N}^2}{16c}[2-\beta_1(\underline{N})] + \delta\frac{r^2\underline{N}^2}{16c}\right\} + (1-\rho)\left\{\frac{r^2\overline{N}^2}{16c} - \Theta\frac{r^2\underline{N}^2}{16c}[\beta_1(\underline{N}) + \delta] + \delta\pi^{fdi}\right\}. \tag{13}$$

iv) Contract choice

Given the above results, the contract choice problem for the MNE at $t = 1$ comes down to a choice between the separating contract, with returns given by V_M^{sep} above and the partial pooling contract. From Proposition 2, we know that this latter contract generates higher returns for the MNE than does a fully pooling contract. We also know that it generates returns at least as large as the contract $\{f_1 = (r\underline{N})^2/16c, \beta_1^* = 1\}$ when the $\overline{N}$ type agent chooses effort level $e > \hat{e}$. For the two-period contracting problem, we have the following result:

Proposition 3 *If the MNE finds it profitable to establish its own sales branch when $N = \overline{N}$ and to contract with a local agent when $N = \underline{N}$, then the optimal contract at t = 1 is the separating contract. Under this contract, the MNE converts to an owned sales branch if the agent chooses the contract $\{f_1(\overline{N}) = r^2\overline{N}^2/16c - \Theta[\beta(\underline{N})r\underline{N}]^2/16c - \delta\Theta(r\underline{N})^2/16c, \beta_1(\overline{N}) = 1\}$ and renews the contract with the sales agent otherwise.*

This contract is preferable to initial investment by the MNE when the probability of the market being small is relatively large (ρ is large) and the investment losses significant in this case. The latter occurs when $F + K$ is large and $\underline{N}$ small relative to $\overline{N}$. Conversely, initial investment pays when the likelihood of the market being large is significant (ρ small), $\overline{N}$ is large relative to $F + K$ and the MNE's own sales agent is efficient relative to the local agent (α is small).

4 | MULTI-PERIOD CONTRACTING: A DISCUSSION

In the two-period optimal contract, there is essentially no contracting problem at $t = 2$: the contract is canceled and the MNE invests in its own sales branch when $N = \overline{N}$, leaving a one agent type (degenerate) contracting problem. This fact means that the mechanism at $t = 1$ is effectively a one-period mechanism and so the separating contract is optimal. What happens if there are more than two periods? Specifically, is it possible to see an optimal contract in which conversion to an owned sales branch only occurs probabilistically over time rather than occurring immediately at $t = 2$? Such an outcome would arise in the current model if (i) contracting with a local sales agent initially dominates immediate investment in an owned sales branch and (ii) there is only partial revelation of information in initial periods, either because the partial pooling contract dominates the fully separating contract or the "separating" contract involves randomization by the sales agent. The above analysis suggests that the unravelling that occurs in the two-period problem would continue to arise in any finite period contracting setting. In this case, the separating contract will be implemented immediately leading to immediate conversion of permanent contracting. In an infinite horizon model, it may be possible to develop a randomized mechanism that only results in conversion probabilitstically as long as the mechanism does not have conversion with probability zero or one for any finite time T.[3]

Other modeling alternatives also suggest themselves for this problem of delayed conversion. In the two-period model above, recall that there is a forcing element to the linear contract: if the agent selects the $\underline{N}$ contract but generates a level of sales that occurs with zero probability when $N = \underline{N}$, a large penalty is imposed. This forcing part of the contract limits the information rents available to the $\overline{N}$ type agent by limiting the agent's sales effort to $e = \hat{e}$. Imagine that this forcing element is unenforceable in the final period of the contract. In this case, the optimal contract may no longer be a linear one. However, if attention is restricted only to linear contracts, then the information rents that the $\overline{N}$ type agent can obtain in the next to last period of a separating contract increase substantially. In certain circumstances, it appears that they increase enough that the partial pooling contract dominates the separating contract. In this case, probabilistic conversion over time to an owned sales branch arises.

A second alternative involves modifying the model to one in which the only agency problem is moral hazard. Imagine a setting in which both the MNE and local agent know that, initially, the market size is $\underline{N}$ so that investment initially is not profitable for the MNE. Imagine, further, that the local agent can invest effort in expanding the market. This effort is costly for the agent and unobservable to the multinational. In any period,an effort expenditure of e by the local agent expands the market size to $\overline{N}$ with probability γe and leaves market size unchanged with probability $\gamma(1-e)$. With probability $(1 - \gamma)$ the market remains at size $\underline{N}$ regardless of effort expended by the agent. Neither the agent nor the MNE directly observe in any period whether market size has expanded or not. The only thing observable to both the agent and MNE is sales revenue, which are stochastic but increasing, in a first-order stochastic dominance sense, in market size. As above, the MNE can only write period-by-period contracts with the agent and prefers operating its own sales branch to contracting if $N = \overline{N}$.

In this setting, one can derive the optimal sequence of contracts and the probability that MNE conversion to owned sales operations occurs each period.[4] This allows one to determine the hazard rate of conversion as a function of the time since initial contracting. One could then take this hazard rate prediction to the data to see the extent to which this model captures the actual features of MNE investment in new markets. We hope to develop these predictions and to perform the appropriate empirical tests in future work.

5 | CONCLUSION

This paper has investigated decision making by a multinational enterprise when entering a new foreign market. The MNE can either enter initially by contracting with a local distribution agent, and then deciding whether or not to continue with the agent later on, or by investing immediately in its own distribtuion operation. The benefit of contracting initially with a local distributor is that the distributor is better informed about market demand for the MNE's product and can add the product to its distribution system at low additional cost. In this way, the distributor both saves the MNE from costly investment mistakes—setting up its own distribution system when market demand does not warrant such an investment—and allows the MNE an opportunity to learn about the market. The cost to the MNE of contracting with a local distribution agent is that he agent will extract information rents from the MNE and will present the MNE with possible added moral hazard costs: the agent has less incentive to promote the MNE's product both becaues it comes at the cost of other products that the agent distributes and doing well may result in the subsequent cancellation of the contract. We show that, in a two-period model, the optimal sequence of contracts is linear, with the first-period contract separating the agents so that the MNE learns market demand from the contract. If sales revenues are revealed low in the first period, the MNE renews the contract with the distributor in the second period. If the market demand is revealed as high, the MNE allows the contract with the distributor to lapse in the second period and extablishes its own distribution operation. Contracting dominates investment initially when the market is on average small and the sunk cost of investment is large. In this case, we observe the MNE contracting initially with a local distributor and then switching to its own sales operation if the sales revenue proves large. Otherwise, it continues the contract with the local distributor, albeit on different terms. Finally, we discuss ways of extending this model to many periods and the possibility of obtaining predictions on the hazard rate of conversion to owned distribution as a function of time under contract with the local distributor.

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ENDNOTES

[1]This assumption means that the MNE's decision on sales mode turns on the magnitude of the agency costs implied by different contract forms relative to the costs of establishing an owned sales operation. The use of agency contracts to deter entry (*á la* Aghion & Bolton;1987) is not an issue here.

[2]This methodology was first proposed by Laffont and Tirole (1986).

[3]See Bester and Strausz (2001) for a discussion.

[4]See Ma (1991) for a discussion of contracting with moral hazard and limited commitment.

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