

A Multitask Model of Multinational Maker's Control of Foreign Distribution Channels

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Abstract

When a multinational producer of consumer goods enters the foreign market, the maker must utilize the distribution channels located in the local area. To do so, the multinational maker can outsource distribution service to the local firms, or it can build its own distributive subsidiary. Often there is a conflict of interests between the maker (Principal) and the distributor (Agent) about multi-dimensional actions (such as pricing strategies vs. costly sales efforts) which the distributor can take. The maker prefers higher price and high level of sales effort to maintain its product's strong brand image while the distributor might like lowering price with low effort level because effort is costly. Utilizing the multitask Principal-Agent model, first developed by Holmstrom and Milgrom (1991) and later elaborated by Gibbons (2005), this paper proposes a model that tries to explain how multinational makers control foreign local distributors. Especially, I try to derive comparative static results depending on the various changes in the economic environment. When the degree of competition in the local consumer market is high, the multinational firms tend to avoid outsourcing and build its own subsidiary in order to gain larger control over the two dimensional channel strategy because the divergence in the conflict of interests tend to be large.

JEL Classification: F23, L14

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1 Introduction

Recent discussion about globalization focuses not only on increase in trade volume but also rising international outsourcing and foreign direct investment. Many researchers on multinationals talked about the issue of FDI versus outsourcing in relation to the vertical integration that involves building the production plants for intermediate goods. Incomplete contract approaches have been taken to discuss the issues of boundary of firms in a global context. Most previous literature utilized Grossman-Hart-Moore property rights approach. This is probably because it is appropriate to use hold up problems and relation specific investments in talking about the contracting in the production process. However, if we want to model the vertical relationship between the maker and the distribution channel, principal-agent approach might be better. This paper tries to understand the reasons behind the boundary of firm questions in relation to the sales distribution channel by using the multi-task principal agent approach.

WHEN a consumer-goods company casts around for the best growth prospects, rarely does anything look more promising than emerging economies. These markets are growing so rapidly that within just two years they will account for half of all the world's consumer spending, estimates Harish Manwani, head of the Asian and African businesses of Unilever, a giant of the world's consumer-goods industries. (*The Economist*, February 2, 2008¹)

As the consumer-goods markets in emerging economies become important, the strategic focus of the multinational companies shifted from setting up the manufacturing plants in such economies to establishing the distribution channels there. In considering the multinational firms supplying the consumer-goods markets, the importance of controlling distribution channels cannot be stressed more. Distribution channels are the marketing intermediaries that take a product from the manufacturer to the end-users. The channels include wholesalers and retailers who serve as agent to sell the consumer-products made by the multinationals.

When a multinational producer of consumer-goods enters the foreign market, the maker must utilize the distribution channels located in the local area. To do so, the multinational manufacturer can outsource distribution service to the local firms, or it can build its own distributive subsidiary. Some firms may conduct mergers and acquisitions in order to gain access to consumer markets. For example, Procter & Gamble(henceforth, P&G)'s merger with Gillette in 2005 may certainly have involved the consideration of entry into the Brazilian consumer market where P&G product was hardly known but where Gillet had about a third of the market for toothbrushes. The merged firm can combine its effort, perhaps to launch a joint brand of toothpaste in the Brazilian market, possibly by utilizing the distribution network held by Gillet. (*The Economist*, February 5, 2005)

¹The legacy that got left on the shelf - Unilever and emerging markets (from Lexis.Com.)

Often there is a conflict of interests between the manufacturer (Principal) and the distributor (Agent) about multi-dimensional actions (such as pricing strategies vs. costly sales promotional efforts) which the distributor can take. The manufacturer prefers higher price and high level of sales effort to maintain its product's strong brand image while the distributor might like lowering price with low effort level because making effort is costly.

Utilizing the multitask Principal-Agent model, first developed by Holmstrom and Milgrom (1991, 1994) and later elaborated by Gibbons (2005), this paper proposes a model that tries to explain how multinational manufacturers control foreign local distributors. Especially, I try to understand when the maker wants to integrate the distribution subsidiary and when it wants to outsource the distribution services to a local contractor.

We analyzed the optimal incentive contracts made between the principal and the agent. The principal is always the multinational maker, but the agent can either be an employee of the principal or an outsourcing contractor. We found the following: when the degree of competition in the local consumer market is high, the multinational firms tend to avoid outsourcing and build its own subsidiary in order to gain larger control over the two dimensional channel strategy because the divergence in the conflict of interests tend to be large.

Often the conflict of interests prevail in the relationship between the manufacturer and the intermediaries in the distribution channels. Usually the sources of conflict are not one dimensional. Many previous works based on property rights approach deal with one dimensional conflict of interests between the firms in vertical relations. However, actual conflicts are multi-dimensional in nature. For example, it is often the case that the objective of the manufacturer is to retain long-run profitability of its product lines, while the distributive intermediaries may simply want to increase sales volume by lowering prices at the expense of various kinds of service provisions.

The remaining parts of the paper are organized as follows: the next section develops the basic principal-agent model with multi-dimensional tasks. In order to understand the basic nature of the conflicts of interests between the principal and the agent, we focus on the case of two tasks. We analyze when the multinational firm choose to integrate with the local distributive subsidiary and when to outsource the service. The final section summarizes the results and suggests some possible extensions.

2 The Model

Consider the multinational maker (MNC) whose headquarters is located in North. MNC is thinking to enter the consumer-goods market in South. Selling its own products in the South consumers market requires the employment of the distribution channel agency. However, the MNC has a choice of how to employ its sales agent. The maker can build its own distribution subsidiary by owning the assets by itself, or it can outsource the distribution services to the local entrepreneur who owns the assets. So the difference between FDI (foreign direct

investment) and outsourcing is who owns the assets of distribution facilities. If the MNC chooses to provide the distribution service by itself (FDI in channel), the head of MNC (the Principal) send its own employee (the Agent) to South and control the employee with the employment contract. In this case, the MNC owns the assets in the local market place in South. If the MNC decides to outsource the distribution channel service to the local entrepreneur, it must form the outsourcing contract with the entrepreneur who owns the assets. In either case, it is impossible to write a contract on the variables which the MNC really cares and the contract must base on some performance measures which the court can observe.

Note that the major difference between the employment relationship (FDI) and the outsourcing relationship is in the ownership of the distribution-outlet assets. (In the most closely related paper by Grossman and Helpman (2004), the difference between FDI and outsourcing is who pays the input costs.) Why would asset ownership matter? Ownership matters when there exist some remaining values of assets which are not contractible.

Now consider the distributive agent (here either the employee or the entrepreneur, henceforth, the agent) who can take multi-dimensional actions (efforts) e_1 and e_2 both of which the principal cannot monitor directly and are costly to the agent. Regardless of the contract type the agent is in (whether FDI or outsourcing), assume that the cost function from effort-making can be written as

$$c(e_1, e_2) = \frac{1}{2} \{(e_1)^2 + (e_2)^2\}$$

so that the marginal costs are e_1 and e_2 without the interaction terms.² Components of the effort vector (e_1, e_2) should be strategic efforts the distributive agent can take, but each component aims for different direction. For example, by following the idea of competitive advantage of Michael Porter (1985), let's say that e_1 represents actions to aim for low price strategy and e_2 represents actions to aim for the strategy for product differentiation. To be more specific, actions in e_1 can include something to increase unit sales by lowering the unit price, to decrease inventory, to hold down sales expenses, to minimize the maintenance or post sale service provisions, and so on. Actions in e_2 can aim to protect brand equity by providing the before sales explanations of the products, by providing ample post sale or maintenance services, and so on.

The efforts (e_1, e_2) provided by the agent can directly affect the gross payoff of the principal (MNC) which is written as

$$\pi(e_1, e_2; \varepsilon) = f(e_1, e_2) + \varepsilon$$

where ε is a noise term with zero mean. The gross payoff $\pi(e_1, e_2; \varepsilon)$ is what the principal cares for from the distribution channel operation; something like long-run profitability from the consumers market in South. Let f_1 denote the

²This assumption rules out the possibly important case where the efforts in different actions compete for the agent's attention. However, I adopt the above specification in favor of simplicity.

derivative with respect to the first argument and so on. Both efforts by the agent will increase gross payoff of the principal: $f_1 > 0$ and $f_2 > 0$. For simplicity, let's assume there is no interaction between the efforts: $f_{12} = 0$. Assume further that the contribution of differentiation (sales) effort is larger than the that of low price strategy for the gross payoff: $f_1 > f_2$. Although what the principal cares is this gross payoff $\pi(e_1, e_2; \varepsilon)$, it is not contractible between the principal and the agent. (It is OK if $\pi(e_1, e_2; \varepsilon)$ is observable to both the principal and the agent. We must require that the third party including court cannot verify $\pi(e_1, e_2; \varepsilon)$.) This holds true for both cases of the agent being an employee or being an outsourcing entrepreneur. Then what can they write a contract on?

Instead of writing a contract on the gross payoff $\pi(e_1, e_2; \varepsilon)$ directly, the principal and the agent can agree on the contract terms with respect to the observable (and verifiable to a third party) performance measure which is written as

$$\rho(e_1, e_2; \varepsilon) = g(e_1, e_2) + \phi$$

where ϕ is a noise term with zero mean. The performance measure $\rho(e_1, e_2; \varepsilon)$ is what the third party including the court can easily verify; something like total retail sales with limited ability to adjust quality differences for both product itself and services accompanying the product purchases. The variables such as unit price and level of service provided cannot be the part of performance measure. Similar to the assumptions about $f(e_1, e_2)$, let us assume that $g(e_1, e_2)$ satisfies $g_1 > 0$, $g_2 > 0$ and $g_{12} = 0$. Contrary to the case of gross payoff for the principal, the contribution of each effort affects differently for the performance measure. Assume that the performance measure (total sales) can relatively be easily enhanced by low price strategy: $g_2 > g_1$.

The efforts (e_1, e_2) provided by the distribution agent (either an employee or an entrepreneur) may affect one more thing. The difference between the channel FDI (an employment contract with an employee) and the outsourcing (an outsourcing contract with a local entrepreneur) is who owns the assets (in South) used for the distribution services. The agent's effort levels will affect the value of the assets after their use. This remaining value of the assets can be written as

$$v(e_1, e_2; \varepsilon) = h(e_1, e_2) + \mu$$

where μ is a noise term with mean zero. This value $v(e_1, e_2; \varepsilon)$ of assets is not contractible, i.e., whoever owns the assets can receive this payoff. One of the possible reasons why the value is not contractible is that the value of assets may include (involve) the human capital skills of the sales people who work with the assets. Another reason might be the value of the distribution channel may come from intangible nature: business goodwill. (For example, everyday low price images for a certain retail outlet may be some kind of goodwill. Another example might include the image of high quality maintenance services after the purchase of the products for the case of premium autodealers.) Assume that $h(e_1, e_2)$ satisfies $h_1 > 0$, $h_2 > 0$ and $h_{12} = 0$. The relative importance of two tasks may differ depending on the competitive situations in the consumers market in South.

Both the principal and the agent are assumed to be risk neutral. We also would like to limit our contract style to be the two part franchise contract using the performance measure or the linear incentive employment contract. The purpose of adopting linear contract is for simplicity and for reality. Timing of the model is as follows:

1. Principal chooses from FDI or outsourcing by hiring Agent in South or send an employee
2. Principal and Agent forms the contract based on performance measure
3. Agent maximizes expected payoff given the contract with respect to actions
4. Principal takes optimum choice of actions by Agent and receives the gross payoffs

The solutions to the problem is done by backward induction. In the following subsections, we analyze two cases of organizational forms: vertical integration and outsourcing.

2.1 An employment contract under FDI (Vertical Integration)

Suppose the principal (MNC manufacturer) chooses to enter into the consumers market in South by itself, then the principal must acquire the assets located in South. The principal will send its employee (the agent) to South by the wage contract of the form:

$$w(\rho) = w_0 + b \cdot \rho$$

where w_0 is the fixed portion of the salary and b is the bonus rate on the performance measure. The larger the size of b , the higher the incentive of the agents to increase ρ . For simplicity, let us assume that the wage contract is the one of take-it-or-leave-it.

The agent's (employer's) expected payoff is

$$E(w(\rho(e_1, e_2; \varepsilon))) - c(e_1, e_2)$$

which will be maximized with respect to effort levels (e_1, e_2) . The optimal effort levels for each action will be written as

$$\begin{cases} e_1^*(b) &= b \cdot g_1 \\ e_2^*(b) &= b \cdot g_2 \end{cases} \quad (1)$$

where superscript $*$ represents the optimal values for the case of employment contracting within the same firm.

Consider now the problem faced by the principal. In this case of vertical integration (VI), the principal owns the assets located in South, so he tries to maximize his expected profit

$$\Pi_{VI} = E[\pi(e_1, e_2; \varepsilon) + v(e_1, e_2; \varepsilon) - w(\rho(e_1, e_2; \varepsilon))]$$

by choosing the proper wage contract parameters: w_0 and b . In this choice, the first-mover principal takes the agent's actions as given by (1). However, the principal's choice is constrained by the following participation constraint of the agent:

$$E(w(\rho(e_1, e_2; \varepsilon))) - c(e_1, e_2) \geq r_N$$

where r_N represents the reservation payoff of the employer (agent) who belongs to the MNC of North. Because the principal has the first mover advantage, the above (e_1, e_2) shall be taken to be (e_1^*, e_2^*) . Also, the participation constraint shall be binding for the principal maximizing his own expected payoff. In effect, the optimal choice by the principal is the same as the maximizing the total surplus with respect to the bonus rate b :

$$\max_b E [\pi(e_1^*, e_2^*; \varepsilon) + v(e_1^*, e_2^*; \varepsilon)] - c(e_1^*, e_2^*)$$

whose solution is

$$b^* = \frac{(f_1 + h_1)g_1 + (f_2 + h_2)g_2}{g_1^2 + g_2^2} = \frac{\|\mathbf{f} + \mathbf{h}\|}{\|\mathbf{g}\|} \cos \theta_v$$

where $\|\mathbf{x}\| = \sqrt{x_1^2 + x_2^2}$ and θ_v represents the angle between the vectors $\mathbf{f} + \mathbf{h} = (f_1 + h_1, f_2 + h_2)$ and $\mathbf{g} = (g_1, g_2)$. The optimal fixed salary is

$$w_0^* = r_N + \frac{1}{2} \{e_1^*(b^*)^2 + e_2^*(b^*)^2\} - b^* \cdot g(e_1^*(b^*), e_2^*(b^*)).$$

Given these values, the expected payoff for the principal in vertical integration will be written as

$$\Pi_{VI}^* = f(e_1^*(b^*), e_2^*(b^*)) + h(e_1^*(b^*), e_2^*(b^*)) - w_0^* - b^* g(e_1^*(b^*), e_2^*(b^*))$$

which can be simplified to

$$\Pi_{VI}^* = f(e_1^*(b^*), e_2^*(b^*)) + h(e_1^*(b^*), e_2^*(b^*)) - \frac{1}{2} \{e_1^*(b^*)^2 + e_2^*(b^*)^2\} - r_N. \quad (2)$$

2.2 An outsourcing contract with a local entrepreneur (Outsourcing)

Suppose now that the principal decides to hire an independent contractor in South. An outsourcing contract can be written in the following form of two part tariff franchise contracting:

$$\omega(\rho) = \omega_0 + \beta \cdot \rho$$

where ω_0 is the fixed franchise fee and β is the discount rate on the wholesale price. The latter interpretation comes from the fact that the performance measure ρ is taken to be final retail sales unit.

Because the local contractor owns the assets, the agent's expected payoff is

$$E(\omega[\rho(e_1, e_2; \varepsilon)] + v(e_1, e_2; \varepsilon)) - c(e_1, e_2)$$

which will be maximized with respect to effort levels (e_1, e_2) . The optimal effort levels for each action by the agent will be written as

$$\begin{cases} e_1^+(\beta) &= \beta g_1 + h_1 \\ e_2^+(\beta) &= \beta g_2 + h_2 \end{cases} \quad (3)$$

where superscript + represents the optimal values for the case of outsourcing.

When the principal chooses to outsource (OS) the distribution service to a local contractor (agent), he tries to maximize the expected profit:

$$\Pi_{OS} = E[\pi(e_1, e_2; \varepsilon) - \omega(\rho(e_1, e_2; \varepsilon))]$$

by choosing the parameters: ω_0 and β . The agent's participation constraint is

$$E(\omega[\rho(e_1, e_2; \varepsilon)] + v(e_1, e_2; \varepsilon)) - c(e_1, e_2) \geq r_S$$

where r_S represents the reservation payoff of the local contractor (agent) in South. Because the principal has the first mover advantage, the above (e_1, e_2) shall be taken to be (e_1^+, e_2^+) . Also, the participation constraint shall be binding for the principal maximizing his own expected payoff. In effect, the optimal choice by the principal is the same as the maximizing the total surplus with respect to the discount rate β :

$$\max_{\beta} E[\pi(e_1^+, e_2^+; \varepsilon) + v(e_1^+, e_2^+; \varepsilon)] - c(e_1^+, e_2^+)$$

whose solution becomes

$$\beta^+ = \frac{f_1 g_1 + f_2 g_2}{g_1^2 + g_2^2} = \frac{\|\mathbf{f}\|}{\|\mathbf{g}\|} \cos \theta_S$$

where θ_S represents the angle between the vectors $\mathbf{f} = (f_1, f_2)$ and $\mathbf{g} = (g_1, g_2)$. The optimal size of fixed franchise fee is

$$\omega_0^+ = r_S + \frac{1}{2} \{e_1^+(\beta^+)^2 + e_2^+(\beta^+)^2\} - h(e_1^+, e_2^+) - \beta^+ g(e_1^+, e_2^+)$$

which can be positive or negative.

Given these values, we can now calculate the expected payoff for the principal from outsourcing contract:

$$\Pi_{OS}^+ = f(e_1^+, e_2^+) - \omega_0^+ - \beta^+ g(e_1^+, e_2^+)$$

which can be simplified to

$$\Pi_{OS}^+ = f(e_1^+, e_2^+) + h(e_1^+, e_2^+) - \frac{1}{2} \{e_1^+(\beta^+)^2 + e_2^+(\beta^+)^2\} - r_S. \quad (4)$$

2.3 The comparison

If we compare the optimum actions by the agent for two cases: (1) and (3), we can say that effort level will be biased toward the asset value for the case of outsourcing only if the incentive parameters are similar for both cases.

When the degree of competition in the local consumer market is high, the multinational firms tend to avoid outsourcing and build its own subsidiary in order to gain larger control over the two dimensional channel strategy because the divergence in the conflict of interests tend to be large.

3 Conclusion

The paper presented a model of control of distribution channel by a multinational manufacturer. The model utilized the multi-task principal agent framework in order to see if asset ownership may matter for the optimal contract agreed upon by two parties. Depending on how conflict of interest differs between the multinational maker and the sales agent, the optimal contractual arrangement changes. When the degree of competition in the local consumer market is high, the multinational firms tend to avoid outsourcing and build its own subsidiary in order to gain larger control over the two dimensional channel strategy because the divergence in the conflict of interests tend to be large.

The following quotation from The Economist magazine discuss the higher competition levels at retail may require larger spending on trade spending.⁴

Commodity prices have risen sharply recently, pushing up the cost of the foodstuffs, chemicals, packaging and energy that go into making the industry's products. There was a time when consumer-goods firms could pass rising costs on to their customers. But the spread of aggressive, big-box retail chains such as Wal-Mart (whose strategy is built around passing on savings won from suppliers to its shoppers), Carrefour and Costco has destroyed much of the industry's pricing power.

Meanwhile, retailers have begun plugging their own discounted, "private label" brands that compete with the pricier, higher-margin products from Unilever and P&G. As retailers have grown in clout, they have also squeezed the consumer-goods firms for more "trade spending"⁹ the money the likes of P&G must stump up for in-store promotion, displays and eye-level shelf space. About 17% of the consumer-goods industry's sales disappear into such trade spending, says Ms Hulit (of the Boston Consulting Group). (*The Economist*, February 5, 2005)

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