

An Economics Explanation of Potential Profit Loss from Logistics Outsourcing

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Abstract

This paper discusses the possible profit loss from logistics outsourcing in terms of transaction cost, non-internalization of externality, inefficient allocation of inputs, and double price-cost mark-up. The theories of information economics and industrial organization are used in the paper.

Key words: logistics outsourcing; information; industrial organization

0. The definition of logistics outsourcing and the focus of this paper

“Logistics Outsourcing” is defined in this paper as an economic activity in which the upstream members and the downstream members in a logistics chain replace their vertical integration with a market relation.

There are so many segments along a logistics chain that it is almost impossible for one company to cover every segment. Therefore, in deciding whether to integrate the upstream and downstream segments or to outsource some segments, one needs to compare the potential differences in profit. In regards to the benefits of outsourcing, there are already a number of researches done from the perspective of efficiency in specialization. However the focus of this paper is to study the potential cost that may follow the outsourcing based on the theory of information economics and industrial organization.

1. Logistics outsourcing and transaction cost

Transaction cost includes all opportunity costs related to the transaction and is the scarce resource consumed in the transaction process. When the vertical integration between the upstream and the downstream gives way to outsourcing, new transaction costs will appear, such as cost of information collection before the transaction, cost of negotiation, cost of execution and cost of follow-up actions.

1.1. Cost of information collection before the transaction

When a logistics company intends to outsource, it will try to locate a suitable supplier from many potential suppliers in a competitive market. This will cost both energy and money. Information is to be collected to know where the supplier is, how the quality is, what the price is, whether the supplier is reliable, whether the supply is stable, etc. Also, due to defects in method, misjudgement on information or even moral hazard from information releaser, the information collected can be distorted or erroneous, which imposes a further cost to the process.

1.2. Cost of negotiation

To outsource is to negotiate beforehand. Costs involved in this process including losses that may incur from the limit in the power of perception, the asymmetry of information and the ambiguity of the expression in the agreement.

1.3. Cost of execution

When the trade agreement is executed, the work of the outsourced supplier needs to be supervised in some form and to some extent. This will bring extra cost to the logistics company. Additional cost may incur due to the asymmetry of information and moral hazard of the outsourced supplier.

1.4. Cost of follow-up actions

No matter how much effort has been put by both sides into the agreement, it will not stipulate all rights and responsibilities for all incidents that may happen afterwards. Therefore, there will be cost of follow-up actions when the logistics

company and the supplier are to amend the agreement or to settle disputes and there will be loss brought by uncertain factors.

2. Outsourcing and loss from non internalization of external economy

When the upstream or downstream segments with a network character (e.g. inter-regional transportation) of a prestigious logistics company are integrated, clients will recognize the high-level service quality of all these segments. This is a benefit from the internalization of external economy. However, outsourcing will not enjoy this advantage.

3. Outsourcing and non efficient combination of downstream company's input

3.1. Basic assumptions of the model

We assume that the upstream logistics company is A while the downstream logistics company is B, i.e., A is the supplier of B. We further assume that A is dominant in the market, while B is faced with competition in the market. B not only acquires services from A but also purchases a second input factor. The production marginal cost of A is MC_A . The price of services sold to B from A is P_A . The price of the second input factor purchased by B from another channel is P_O . The price of services sold to clients from B is P_B . (See Figure 1)

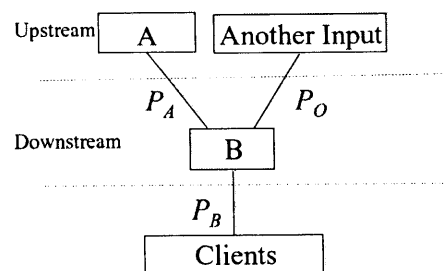


Figure 1

The service provided by A is Q_A . The second input factor in B's production is Q_O . The service sold to clients from B is Q_B . We are to find out if the integration of A and B will result in additional profit.

3.2. On condition that the ratio between inputs is fixed for the downstream company

We assume that the ratio between the two inputs in B's production is fixed. For example, 1 unit Q_A and 1 unit Q_O can produce 1 unit Q_B .

If A integrates downstream, its dominance in market will pass on to the market of Q_B . The marginal cost of the integrated company for output Q_B will be MC_A+P_O . An integrated company will make its marginal cost equal to its marginal revenue to achieve maximum profit. (See Figure 2) $P(Q_B)$ is the demand curve of Q_B . MR is the marginal revenue of the integrated company for the sale of Q_B . When the marginal revenue equals to the marginal cost, for the integrated company, where the output is Q_B^* and the price is P_B^* , the profit π^* is $(P_B^*-(MC_A+P_O))Q_B^*$.

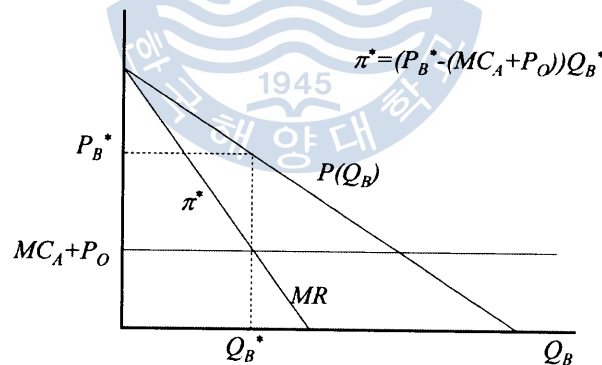


Figure 2

If A does not integrate downstream, the market for Q_B will remain a competitive one. Then, the demand curve for A can be derived from the demand curve of B as the demand curve faced by A represents in fact the highest price that A can charge B at any specific Q_A . As an competitive company, B can sell its products at the price of P_B while paying P_O for the second input factor Q_O to generate 1 unit of output. Thus, the maximum extra B is willing to pay for 1 unit Q_A is P_B-P_O .

So, the demand curve faced by A is the demand curve of B minus P_0 . The demand curves are shown in figure 3.

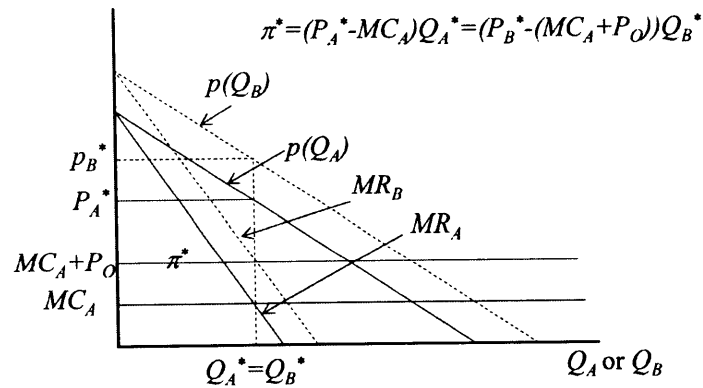


Figure 3

From above, we see that the demand curve faced by A $P(Q_A)$ is acquired when the demand curve of B is moved downwards by P_0 . MR_A is the marginal revenue of A. When the marginal revenue equals the marginal cost, for A, where the output is Q_A^* and the price is P_A^* , the profit π^* is $(P_A^* - MC_A)Q_A^* = (P_B^* - (MC_A + P_0))Q_B^*$. Hence, profit is exactly the same with or without integration.

To summarize, when the ratio between inputs is fixed for the downstream competitive company, profit will be the same whether the upstream dominant company integrates downstream or acts as an outsourced supplier of the downstream company, reason being that an increase of 1 dollar in the service price of the upstream company will lead to 1 dollar increase in the marginal cost of the downstream company and in turn, 1 dollar increase in the selling price to clients. That is to say, the upstream company can fully control the final selling price to clients even without vertical integration.

3.3. On condition that the ratio between inputs is variable for the downstream company

We assume that the ratio between the two inputs in B's production is variable. If A does not integrate downstream, A will not have full control over B as B will

replace part of A's service with alternative Q_0 when A increases price. We know that to achieve efficient production, the slope of the Isoquant Curve should be the same as the ratio of costs of inputs. While in the above case, B employs too much Q_0 and too little Q_A and therefore, the replacement will lead to non-efficient production of B and consequently, less profit for A.

However, when A integrates downstream, it will have full control to ensure that the most efficient combination of Q_A and Q_B is used to increase profit.

3.4. Summary of this section

On condition that the input ratio is variable for the downstream company, the profit of the dominant upstream company will decrease if it does not integrate vertically because outsourcing by the downstream company will lead to non-efficient combination of the latter's production input.

4. Outsourcing and double mark up

4.1. Basic assumptions of the model

We assume that the upstream logistics company is A while the downstream logistics company is B, i.e., A is the supplier of B. The only input required for B's production is Q_A purchased from A, 1 unit of which produces 1 unit of Q_B . We further assume that both A and B are dominant in the market. The production marginal cost of A is MCA . The price of services sold to B from A is P_A . The price of services sold to clients from B is P_B .

4.2. On condition that the upstream and the downstream are not vertically integrated,

As illustrated in Figure 4, the demand of B is $P(Q_B)$, the marginal revenue is MR_B and the marginal cost is the service price of A, P_A . For any P_A , B will align its marginal revenue with P_A , resulting in a marginal revenue curve for B the same as the demand curve $P(Q_A)$. For A, the marginal revenue is MR_A and the marginal

cost is MC_A . The marginal revenue of A will be brought in line with the marginal cost. So, when the output is Q_A^* and the price is P_A^* , the profit π_A is $(P_A^* - MC_A)Q_A^*$.

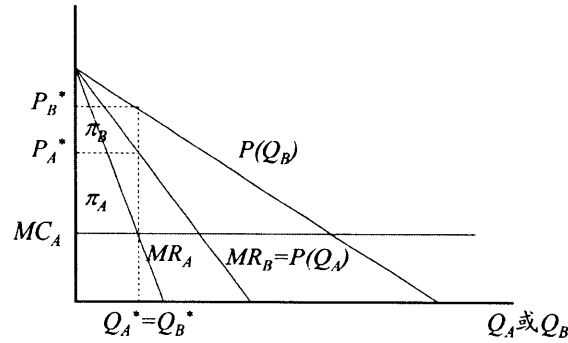


Figure 4

When the service price of A is P_A^* , B will align its marginal revenue with P_A^* . Hence, $Q_B^* = Q_A^*$. When price is P_B^* , the profit π_B is $(P_B^* - P_A^*)Q_B^*$.

From the above, we can see a clear double price-cost mark-up as both companies added price mark-up on their cost.

4.3. On condition that the upstream and the downstream are vertically integrated

When a new company is formed through vertical integration of the upstream and the downstream, its profit is explained in figure 5.

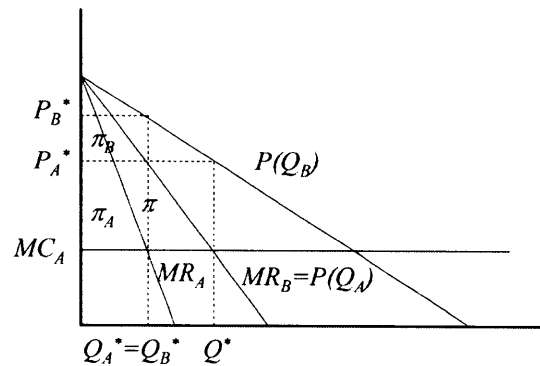


Figure 5

The demand curve is $P(Q_B)$. The marginal revenue is MR_B . The marginal cost is MC_A . When the marginal revenue is the same as the marginal cost, for the company where the output is Q^* and the price is P_{A^*} , the profit π^* is $(P_{A^*}-MC_A)Q^*$.

As $Q^*=2Q_{A^*}=2Q_{B^*}$, $\pi^*-\pi_{A^*}>\pi_{B^*}$, i.e., $\pi_{A^*}+\pi_{B^*}<\pi^*$.

4.4. Summary of this chapter

On condition that both the upstream company and the downstream company dominate the market, profit of both companies will decrease when their integrated relationship is replaced by market outsourcing because of a doubling up in price-cost markup.

5. Conclusion

Logistics outsourcing will lead to reduction in profit. Reasons as listed below:-

- 1) Additional transaction cost;
- 2) Loss from non-internalization of external economy;
- 3) Non-efficient input combination of competitive downstream company with variable input ratio when the upstream company is dominant in market;
- 4) Double price-cost markup for market dominant upstream company and downstream company.

References

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