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Market Information Transparency and Transaction Cost

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Abstract

This paper investigates the impact of market information transparency on transaction costs. We employ a static mathematic economic model by extending Schultz's demand function to incorporate transaction costs. According to the derivation of this paper, we proposed four propositions: (1) Increasing market information transparency leads to higher transaction cost paid by producers. (2) The consumer's required degree of market information transparency for oligopolist is higher than the fair trade firm. (3) The transaction cost that consumers paid in the fair trade firm is lower than the cost paid in the oligopolist. (4) The profit obtained by the fair trade firm is less than that obtained by the oligopolist. A discussion of managerial implications and suggestions for future research are all presented.

Keywords: Market Information Transparency, Transaction Cost, Fair Trade, Oligopoly, Consumer

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1. Introduction

According to the definition of market competition in economic theory, it is assumed that market information is symmetric. Both consumers and producers are assumed to have the same amount of market information, and the market has full transparency and has no transaction costs. In other words, full transparency involves more market information and lower transaction costs for consumers. Because of the greater degree of transparency on market information, consumers are better informed about prices and product characteristics and are usually thought to promote competition¹. Therefore, higher transparency can reduce information asymmetry in the market and transaction costs on the consumer side. For example, producers can use the advertisements to increase market transparency to promote their product. Advertisements are used to announce sales². In reality, markets are often inefficient (e.g., information asymmetry) and uncertain (e.g., product and process uncertainty)³. As a result, extra costs will increase for consumers or producers to advance transaction-related incur transaction activities cost. One particular feature that we inspect here is the cost associated with the transaction process. If all other factors are equal, a consumer will choose a location that offers lower transaction costs⁴. Therefore, this study will explore the relationship between market information transparency and transaction cost.

The father of economics, Adam Smith once said, "The real price of anything is the toil and trouble of acquiring it". This means that the total consumer cost includes the purchasing time, energy, psychic and other non-monetary costs. Consumers evaluate these elements together with the monetary cost to appearance a total consumer cost. In

¹ C. Schultz, "Market transparency and product differentiation," *83 Economics Letters*, 173-178 (2004).

² Liao C. N., "The effects of transaction cost on market transparency when Hotelling market," *28(1) Journal of Information & Optimization Sciences*, 81-94(2007a).

³ R. H. Coase, "The nature of the firm," *Economic*, 4, 386-405 (1937).

⁴ Liang T. P. and Huang J. S., "An empirical study on consumer acceptance of products in electronic markets: A transaction cost model," *24 Decision Support Systems*, 29-31(1998).

addition, producers must also provide an additional set of diverse costs such as service, information, and psychical evidence costs associated with consumers. For example, Kotler⁵ stated that more consumers would be attracted to the producers who offer product information or free services such as free parking, which will lead the consumers to be more informed about the product and more satisfied with the service. This example clearly pointed out that a consumer would estimate which offer delivers the most value. Consumers care about maximizing value given time costs and energy costs. These are useful in understanding the consumer's transaction costs. Therefore, based on the concept of real price, p^R (i.e., total expenditure) from Adam Smith, the total cost of a consumer to buy a product will be $p^R = p_p + C$, where p_p is the product price (i.e., monetary), and C is the extra cost in proportion for consumers to pay, which is identical the transaction cost⁶.

Market information transparency and transaction cost have not been discussed in the literature. In this paper, we ask whether increasing market information transparency can truly reduce consumers' transaction costs. We measure the effects of market information transparency on the transaction cost under two different firms to provide empirical research on consuming markets. One of the firms is a fair trade firm⁷, and the other is an oligopolist firm⁸. In the following sections, we will provide a clear definition and discussion.

The remainder of this paper is organized as follows. In the next section, we review the relevant literature. Section 3 presents our model and derives and discusses the equilibrium outcomes. Section 4 concludes with a summary of research findings and

⁵ P.Kotler, *9/e Marketing management*, Prentice-Hall, 611-612 (2003).

⁶ 前掲註 2。

⁷ Fair trade is defined as transparent management and commercial relations, equality and mutual respect among trading partners. For example, the Fair Trade Federation (FTF), created in 1994, is an association of Canadian and American fair trade wholesalers, importers, and retailers. The organization links its members to fair trade producer groups while acting as a clearinghouse for information on fair trade and providing resources and networking opportunities to its members. (<http://www.fairtradefederation.org>, last visited on date:2011/8/1.). Therefore, a fair trade firm is defined as a market that is likely to be equitable, where consumers and producers know the prices charged by firms, current trade and quote information is readily available to consumers, and transaction costs are low.

⁸ Oligopolist firm is defined as a market with a small group of firms, substantial barriers to entry, the ability of firms can influence prices with their strategic interdependence, and transaction costs are high.

managerial implications and areas for future research. Our derivations are presented in the Appendix.

2. Literature review

2.1 Transaction cost analysis

In recent years, transaction cost analysis (TCA) has received an increased amount of attention from a broad audience. TCA has become a popular theoretical framework that has been used in many management studies. In a transaction process in which the consumer will incur extra cost (e.g., distance and transportation costs)⁹, the costs involved in such transaction-related activities are called transaction costs. Transaction costs are the “cost of running the system” and include such ex ante costs as drafting and negotiating contracts and such ex post costs as monitoring and enforcing agreements¹⁰. Grover and Malhotra¹¹ have pointed out that the transaction process includes a number of uncertain factors, such as environment uncertainty and behavioral uncertainty. The former can be reflected in constructs such as the unpredictability of the environment, technology and the variety and volume of demand. The associated transaction costs include the direct costs of communicating new information, renegotiating agreements, or coordinating activities to reflect new circumstances¹². The latter includes performance evaluation and information asymmetry problems. To the extent that a party’s true level of performance is not readily apparent, direct measurement costs may need to be incurred¹³. Uncertainty refers to the cost associates with the unexpected outcome and asymmetry information (or market

⁹ M. M. Klimenko, “Competition matching and geographical clustering at early stages of the industry life cycle,” *56 Journal of Economics and Business*, 177-195 (2004).

¹⁰ A. Rindfleisch and J. B. Heide, “Transaction cost analysis: Past, present and future applications,” *61 Journal of Marketing*, 46 (1997).

¹¹ V. Grover and M. K. Malhotra, “Transaction cost framework in operations and supply chain management,” *21 Journal of Operations Management* (2003).

¹² Liao C. N., “Salesforce incentive within organizational life cycle: A transaction cost analysis,” *26 Human Systems Management*, 1-9(2007b).

¹³ 前掲註 10。

transparency). TCA argues that high uncertainty can increase the transaction costs.

A transaction is a process by which a good or service is transferred across a technologically separable interface¹⁴. The basic principle of transaction cost is that consumers like to conduct transactions in a way that minimizes their transaction cost¹⁵. For example, consumers and producers are engaged in a double-search process in the marketplace. The process of search involves uncertainty because producers are not certain of consumers' needs, and consumers are not certain that they will be able to find what they want¹⁶. There are many factors that may affect a consumer's decision to purchase from location stores-the monetary cost (e.g., product's price) and the non-monetary cost (e.g., buyer's time, energy, and psychics sacrifice). Transaction cost theoretically explains why a transaction subject chooses a particular form of transaction instead of others. The basic principle of transaction cost is that people like to conduct transactions in a way that minimizes their transaction cost because transaction cost provides no value to either the consumers or the producers¹⁷. The assumption of the economics principle is that the market is fully transparent, and that the transaction process involves no cost. However, in reality, markets are often not transparent. To proceed with a transaction, consumers must conduct activities such as searching for information, negotiating payments terms, and monitoring the ongoing process to ensure a favorable deal¹⁸. The consumers must compare the location, price, and product characteristics among producers to reduce their costs. In short, lower transaction costs paid by consumers lead to higher transaction costs paid by producers, as shown in Figure 1; a point can be moved to click arbitrarily with left and right sides.

Transaction cost has been applied to analyze many issues such as financial analysis¹⁹,

¹⁴ O. E. Williamson, *The economics institutions of capitalism*, Free Press, New York (1985)

¹⁵ 前掲註 4。

¹⁶ L. W. Stern, A. I. El-Ansary and A. T. Coughlan, *5/e Marketing channel*, Prentice Hall-International, Inc. (1997).

¹⁷ 前掲註 4。

¹⁸ 前掲註 3。

¹⁹ F. Fehle, "A note on transaction costs and the existence of derivation markets," *56 Journal of Economics and Business*, 63-70 (2004).

emissions trading²⁰, and environmental policy²¹. However, previous studies have ignored the impact of market information transparency on transaction cost. Here, we will inspect this particular aspect in the transaction process.

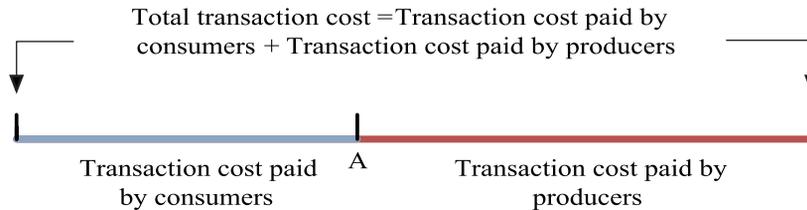


Figure 1. Distribution of Transaction Cost

2.2 Market information transparency

Market information transparency has been a buzzword in consumer protection for a long time, even in antitrust or competition policy. It has reduced the costs of information search, offering consumers various purchasing channels and product options. Producers are increasingly able to use advanced technologies to reveal, conceal, bias, or distort market information. This will cause the market to become inefficient, as consumers do not have access to the information they need for their transaction process. From the consumer's point of view, transparency will increase competition, reduce prices, increase consumer surplus, reductions in price dispersion and reduce profits. Varian²² showed that in the case of homogenous goods and information-symmetric firms, the expected equilibrium profits will decrease with the level of market information transparency. Dudey²³ contributed studies considering firms' geographic location choices in a model of homogeneous goods with a fixed number of locations and consumers with limited price

²⁰ H. Pan and D. V. Regemorter, "The cost and benefits of early action before Kyoto compliance," *32 Energy Policy*, 1577-1486 (2004).

²¹ N. R. Netusil and J. B. Braden, "Transaction costs and sequential bargaining in transferable discharge permit markets," *61 Journal of Environmental Management*, 253-262 (2001).

²² H. Varian, "A model of sales," *70(4) American Economic Review*, 651-659 (1980).

²³ M. Dudey, "Competition by choice: The effect of consumer search on firm location decision," *80(5) American Economic review*, 1092-1104 (1990).

information. Consumers are imperfectly informed about product quality, and high prices signal high quality. Bester and Petrakis²⁴ considered that an increase in advertising would result in lower prices. This means that rising information transparency will increase consumer perceptions of different products and their prices. Boone and Potters²⁵ analyzed a symmetric Cournot-Nash model to differentiated goods, whereas transparency is interpreted by some consumers who are aware of all existing products in the market. Schultz²⁶ identified market transparency with the fraction of consumers who are informed about prices and product characteristics, and he addressed when in a Hotelling market, from the consumer's side, with the endogenous choice of product characteristics increasing, the market transparency on the consumer side leads to less product differentiation, lower prices and fewer profits. Therefore, higher market information transparency can reduce information asymmetries for consumers when the transaction cost is paid by the producers.

Information plays an important role; it creates the link between market transparency and transaction cost. Amihud and Mendelson²⁷ showed that information asymmetry and uncertainty will cause bid-ask spreads, which will then increase the transaction costs. McEachern²⁸ argued that the transaction costs are the costs of time and information required to carry out market exchange. Bester and Petrakis²⁹ studied the information of prices and products provided through advertising by the firms, confirming that it can reduce consumers' information search costs. For example, supermarkets and department stores use newspapers and mail to announce the prices of food, clothing, or appliances. Therefore, all consumers can be well informed about the availability and the characteristics of products to reduce transaction costs (e.g., search cost). Therefore, the

²⁴ H. Bester and E. Petrakis, "Price competition and advertising in oligopoly," *39 European Economic Review*, 1075-1088 (1995).

²⁵ J. Boone and J. M. Potters, "Transparency, prices and welfare with imperfect substitute," *CentER*, July (2002).

²⁶ 前掲註 1。

²⁷ Y. Amihud and H. Mendelson, "Asset pricing and the bid-ask spread," *17 Journal of Financial Economics*, 223-249 (1986).

²⁸ W. A. McEachern, *5/e Economics: A contemporary introduction*, South-Western, 56-57 (2000).

²⁹ 前掲註 24。

main purpose of the advertising is to provide product information for consumers.

Granados, Gupta and Kauffman³⁰ defined market information transparency as the level of availability and accessibility of information about products and market prices. In this paper, we deal with effects of market information transparency on transaction cost, so we will focus on product and price information, which are important drivers of a consumer's purchase decision³¹. Product transparency is related to the revelation of product attributes and quality information, while price transparency is related to information about market prices, such as price quotes and historical transaction prices. A more transparent market for consumers will result from greater transparency in one or both of these dimensions³².

3. The model

3.1 Utility function

We use the market information transparency approach proposed by Schultz³³ in 2004; he considers a homogeneous market where product characteristics as well as prices are not obvious to all consumers. This paper considers the transaction cost rather than a traditional product price and assumes that consumers have unit demand, namely that a consumer buys at most one unit of the good. We assume that a consumer is located at $\tau \in [0, 1]$. There are two firms, labeled X and Y, where X is labeled as an oligopolist; Y is labeled as a fair trade firm. First, in the market information transparency spectrum, these two firms select a and b , respectively, where $a + b < 1$. In addition, a and b can be identified as the consumer's required degree of market information transparency for firms.

³⁰ N. Granados, A. Gupta and R. J. Kauffman, "Designing online selling mechanisms: Transparency levels and prices," *45(4) Decision Support Systems*, 729-745 (2008).

³¹ J. Y. Bakos, "Reducing buyer search costs: implications for electronic marketplaces," *43(12) Management Science*, 1676-1692(1997).

³² 前掲註 30。

³³ 前掲註 1。

Let p_x and p_y denote the monetary prices charged by the two firms X and Y, respectively. If u denotes the surplus enjoyed by each consumer while he is consuming the good, the utility of a consumer located at τ is

$$u - p_x - t(\tau - a)^2 \quad (1)$$

if the consumer purchases goods from firm X, and

$$u - p_y - t(1 - b - \tau)^2 \quad (2)$$

if this consumer purchase goods from firm Y. The parameter t measures the degree of production differentiation, where $t > 0$.

Consider now that a consumer has the ability and willingness to pay the total expenditure p^R , buying products from firm X or Y. Accordingly, the pervious concept of real price, from equations (1) and (2), the monetary prices can be rewritten as $p_x = p^R - \lambda_x E_x$ and $p_y = p^R - \lambda_y E_y$, where we assume that E_x is a part of the transaction cost borne by firm X to pay and λ_x is an consumer's efficiency index of transaction cost denoting the consumers be affected to spend from firm X. The item $\lambda_x E_x$ represents the transaction cost cut down by consumers to pay, when the consumer buys from firm X, (E_y , λ_y , and $\lambda_y E_y$ are similarity by firm Y). To simplify the analysis, we let $p^R = 1$ and substitute $p_x = 1 - \lambda_x E_x$ and $p_y = 1 - \lambda_y E_y$ into equation (1) and equation (2), respectively; we can then rewrite the equations as

$$u - (1 - \lambda_x E_x) - t(\tau - a)^2, \quad (1a)$$

and

$$u - (1 - \lambda_y E_y) - t(1 - b - \tau)^2. \quad (2a)$$

From (1a) and (2a), Schultz explained that the consumers who know the price and location (required degree of market information transparency) of the firms are indifferent between buying from firm X and Y, if the consumer is located at (see, Appendix A)

$$\tau = \frac{1+a-b}{2} + \Omega, \quad (3)$$

where $\Omega = \frac{\lambda_x E_x - \lambda_y E_y}{2t(1-a-b)}$, and $\lambda_x < \lambda_y$, assuming that the affection of the firm X's transaction cost expending is less than firm Y³⁴.

In many markets, firms are able to conduct discriminatory strategies based on whether customers prefer a competitor's product or their own³⁵. Using the concept and according to Schultz's information that types are uniformly distributed along the interval [0, 1], he proposed that there are two different information types of consumers: some consumers θ are informed about firms' prices and location, while others $(1-\theta)$ are uninformed. Therefore, the demand for firm X's product is given by

$$D = \theta\tau + (1-\theta)\frac{1}{2}. \quad (4)$$

The demand for firm Y's product is $1-D$:

$$1-D = (1-(\theta\tau + (1-\theta)\frac{1}{2})), \quad (5)$$

where the variable θ represents the degree of market information transparency, with a higher value indicating a more transparent market, $0 < \theta < 1$.

Transaction costs are incurred in the process as follows. First, consumers form expectations about firm's locations and transaction cost. Then, firms choose locations, learn each other's location and finally choose how much transaction cost to pay. Some consumers learn the locations and transaction cost. Based on expectations, consumers decide which firm to buy from. A consumer can only go to one firm. Then, the

³⁴ In this paper, we assumed that X is an oligopolist firm; Y is a fair trade firm. Under more transparent market information, the consumer is perfectly informed of the prices in firm Y, and the consumer is imperfectly informed and must conduct a search to discover prices in the firm X. According to the definition, the latter of consumer's efficiency index of transaction cost would be greater than the former.

³⁵ R. B. Wallace, "Preference-based discrimination and profit: On the profitability of discrimination spatial policy," *13 (2) Journal of Economics and Management strategy*, 351-369 (2004).

transaction cost takes place³⁶.

3.2 Reaction function

We assume that the firms' marginal costs are constant and normalize them to zero. Firm X's optimal problem involves selecting E_x to maximize its own profit

$$\max_{E_x} \pi_x = (1 - \lambda_x E_x) [\theta \tau + (1 - \theta) \frac{1}{2}], \quad (6)$$

and the firm Y's profit is

$$\max_{E_y} \pi_y = (1 - \lambda_y E_y) [(1 - (\theta \tau + (1 - \theta) \frac{1}{2}))]. \quad (7)$$

The first-order condition for equations (6) and (7) are $\partial \pi_x / \partial E_x$ and $\partial \pi_y / \partial E_y$, with these amounts set equal to zero. From setting equations (6) and (7) to be simultaneous, we obtain the reaction function of transaction costs:

$$E_x = \frac{3t(a+b-1) + \theta(a^2t - b^2t - at + bt + 3)}{3\lambda_x \theta} \quad (8)$$

$$E_y = \frac{6t(a+b-1) + \theta(-a^2t + b^2t - 2at - 4bt + 3)}{3\lambda_y \theta}. \quad (9)$$

To show the influence of θ , we differentiate E_x and E_y with respect to θ and set these amount equal to zero. We are given

$$\frac{\partial E_x}{\partial \theta} = -\frac{(a+b-1)t}{\lambda_x \theta^2} > 0 \quad (10)$$

$$\text{and } \frac{\partial E_y}{\partial \theta} = -\frac{2(a+b-1)t}{\lambda_y \theta^2} > 0. \quad (11)$$

According to equations (10) and (11), we found that the transaction costs are increasing in θ . The increasing market information transparency makes the firm increase transaction costs to offer information to consumers, which leads to more

³⁶ 前掲註1。

competition, such as when the consumer is given a certain amount of information. In other words, increasing the market information transparency for consumers will increase competition among firms as the given consumers require degree, and the firms would like to ease this effect by differentiating their products further. Most important of all, whether a consumer would buy their product is determined by the transaction cost paid by firms. Because of this, consumers can reduce their total purchase cost. Further, the result of equation (10) minus (11) leads to the following relationship: $\partial E_x / \partial \theta - \partial E_y / \partial \theta < 0$ (see, Appendix B). We found that increased market information transparency would make a fair trade firm pay a transaction cost more than an oligopolist. Therefore, this study postulated:

Proposition 1. *Increasing market information transparency leads to higher transaction cost paid by producers.*

3.3 Transaction costs, required degree of market information transparency and profits

We use the reaction functions (8) and (9), substituting into the firms' profit functions (6) and (7), respectively. The consumer's equilibrium required degree of market information transparency can be derived from the following first-order conditions of the respective firms' profit maximization problems:

$$\frac{\partial E_x}{\partial a} = \frac{(2a\theta - \theta + 3)t}{3\lambda_x\theta} = 0, \quad (12)$$

$$\frac{\partial E_y}{\partial b} = \frac{(2b\theta - 4\theta + 6)}{3\lambda_y\theta} = 0. \quad (13)$$

When facing the required degree of market information transparency for firms, the firms would take transaction costs into account and further solve the simultaneous equations (12) to (13); we obtain the equilibrium required degree of market information transparency a^* and b^* , which are

$$a^* = \frac{\theta - 3}{2\theta} \quad (14)$$

$$\text{and } b^* = \frac{2\theta - 3}{\theta}. \quad (15)$$

This consumer's equilibrium required degrees of market information transparency are outside $[0, 1]$ in a and $1-b$ respectively; this means that all consumers can reduce their transaction cost. In addition, a^* and b^* are increasing in θ ; the firms will be closer in a transparent market to consumers. Furthermore, we also found that $a^* > b^*$ (see Appendix C), meaning that the oligopolist is required to increase the degree of market information transparency more than the fair trade firm. Second, we proposed the following:

Proposition 2. *The consumer's required degree of market information transparency for the oligopolist is higher than the fair trade firm.*

Moreover, substituting a^* and b^* into equations (8) and (9), we obtain the optimal transaction costs:

$$E_x^* = \frac{4\theta^2 - 3t(\theta - 3)^2}{4\lambda_x\theta^2} \quad (16)$$

$$\text{and } E_y^* = \frac{4\theta^2 - 3t(\theta - 3)^2}{4\lambda_y\theta^2}. \quad (17)$$

The result of equation (16) minus (17) leads to the following relationship: $E_x^* < E_y^*$ (see, Appendix D). This result indicated that the transaction cost paid by the fair trade firm is more than that paid by the oligopolist. This study thereby postulated the following:

Proposition 3. *The transaction cost that consumers paid in the fair trade firm is lower than the cost paid in the oligopolist.*

Further resolving the optimal problem (6) and (7) with respect to the firms' profits,

we substitute the consumer's equilibrium required degree, a^* and b^* , and the optimal transaction costs E_x^* and E_y^* into equations (6) and (7), and then we give the optimal profit by firm X, π_x^* , and by firm Y, π_y^* , as

$$\pi_x^* = \frac{8\theta^2(\theta-1) - 3t(\theta-3)^3}{16\theta^2} \quad (18)$$

$$\text{and } \pi_y^* = \frac{-3t(\theta-3)^3}{16\theta^2}. \quad (19)$$

Further calculations of the result of equation (16) minus (17) leads to the following relationship: $\pi_x^* > \pi_y^*$ (see, Appendix E). We found that the profits obtained by a fair trade firm are less than an oligopolist. Because a fair trade market involves higher transaction costs, which lead to more transparent market information, this further leads to higher information on the consumer side and lower profits of the firm. Therefore, we proposed the following:

Proposition 4. *The profit obtained by the fair trade firm is less than that obtained by the oligopolist.*

In addition, λ (e.g., λ_x and λ_y) is an efficiency index of transaction costs, denoting the consumer be affected to spend from firms X and Y. Therefore, we consider the effect of λ on equilibrium transaction costs from (16) and (17) that E_x^* and E_y^* decrease with respect to λ_x and λ_y . It means that as λ increases, the transaction costs paid by firms can decrease.

4. Conclusion

In this paper, we use the market information transparency model of Schultz and the method of transaction cost analysis. According to the above derivation, these findings are interpretable in terms of the relative market information transparency and transaction cost. This paper shows the influence of market information transparency on transaction

cost. As firms increase the market information for the consumers, they raise the transaction cost expenditure to increase the amount of market information available (i.e., transaction costs paid by consumers would be small compared to those paid by producers). In other words, more transparency in market information leads to lower transaction costs paid by consumers. Also, in a more transparent market, consumers purchasing products from fair trade firms will pay less than they will pay when purchasing from oligopolists in terms of transaction cost. In addition, we have obtained a number of meaningful managerial insights:

(1) As information about prices and products are provided through advertising, a better advertisement strategy to promote market information transparency to reduce the transaction costs would be made if managers understood how to deliver information about process and product characteristics to certain consumers³⁷.

(2) Firms will pay attention to the transaction cost efficiency index of consumers, which will affect the cost paid by the consumer and his purchase decision³⁸.

Future research must examine the generalization of these results. First, we consider the four propositions presented here to have empirical value in the future. An example is the ease of changing consumers' purchasing behavior due to the transaction costs on the consumer side to pay. Second, future research could set up a dynamic mathematical model to study the impact of transaction cost, similar to Chen's research³⁹. Finally, future research could further discuss transparency with respect to non-price information in oligopolistic markets, such as analyzing the potential of this information exchange as a collusion-facilitating device.

³⁷ 前掲註 24。

³⁸ 前掲註 2。

³⁹ Chen, M. S., Chang, H. J. and Liao, C. N., "Optimization model for salesforce compensation under effort level," *26(3) Journal of Information and Optimization Sciences*, 587-598 (2005).

Appendix

A. Assuming a consumer in location τ , who is indifferent between buying from firm X and Y, we have

$$\begin{aligned}
 u - (1 - \lambda_x E_x) - t(x - a)^2 &= u - (1 - \lambda_y E_y) - t(1 - b - x)^2 \\
 \Leftrightarrow \tau &\equiv \frac{1 + a - b}{2} + \frac{\lambda_x E_x - \lambda_y E_y}{2t(1 - a - b)}, \tag{A}
 \end{aligned}$$

where $p_x = 1 - \lambda_x E_x$ and $p_y = 1 - \lambda_y E_y$.

B. By subtracting equation (11) from equation (10), we can get the following result:

$$\begin{aligned}
 \frac{\partial E_x}{\partial \theta} - \frac{\partial E_y}{\partial \theta} &= \frac{-(a + b - 1)t}{\lambda_x \theta^2} - \left(\frac{-2(a + b - 1)t}{\lambda_y \theta^2} \right) \\
 &= \frac{(a + b - 1)(2\lambda_x - \lambda_y)t}{\lambda_x \lambda_y \theta^2} < 0 \\
 \Leftrightarrow \frac{\partial E_x}{\partial \theta} &< \frac{\partial E_y}{\partial \theta}, \tag{B}
 \end{aligned}$$

where $a + b < 1$.

C. By calculating equation (14) minus (15), we can get the following result:

$$\begin{aligned}
 a^* - b^* &= \frac{\theta - 3}{2\theta} - \frac{2\theta - 3}{\theta} \\
 &= \frac{3(1 - \theta)}{2\theta} > 0 \\
 \Leftrightarrow a^* &> b^*, \tag{C}
 \end{aligned}$$

where $0 < \theta < 1$.

D. By calculating equation (16) minus (17), we can get the following result:

$$\begin{aligned}
E_x^* - E_y^* &= \frac{4\theta^2 - 3t(\theta - 3)^2}{4\lambda_x\theta^2} - \frac{4\theta^2 - 3t(\theta - 3)^2}{4\lambda_y\theta^2} \\
&= \frac{(\lambda_x - \lambda_y)(3t(\theta - 3)^2 - 4\theta^2)}{4\lambda_x\lambda_y\theta^2} < 0, \\
&\Leftrightarrow E_x^* < E_y^*,
\end{aligned} \tag{D}$$

where $\lambda_x < \lambda_y$.

E. By calculating π_x^* minus π_y^* , we can get the following result:

$$\begin{aligned}
\pi_x^* - \pi_y^* &= \frac{8\theta^2(\theta - 1) - 3t(\theta - 3)^3}{16\theta^2} - \left(-\frac{3t(\theta - 3)^3}{16\theta^2}\right) \\
&= \frac{1 - \theta}{2} > 0 \\
&\Leftrightarrow \pi_x^* > \pi_y^*,
\end{aligned} \tag{E}$$

where $0 < \theta < 1$.

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市場資訊透明度與交易成本

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本研究延伸 Schultz 所提出的需求函數模式並納入交易成本的概念，進一步提出一個靜態的數量經濟模型，其目的主要在探討市場資訊透明度對於交易成本的影響。根據本研究的推導，我們提出以下四個命題：1.廠商增加市場資訊透明度必然會支付較高的交易成本；2.消費者在寡占廠商對於市場資訊透明度的要求程度會比在公平貿易廠商來的高；3.消費者在公平貿易廠商會比在寡占廠商支付較少的交易成本；4.公平貿易廠商所獲取的利潤將會小於寡占廠商。最後，本研究也提出幾點管理上的意涵以及對未來研究的建議。

關鍵詞：市場資訊透明度、交易成本、公平貿易、寡占、消費者

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