行政院國家科學委員會專題研究計畫 成果報告

買方市場勢力與水平異質產品生產者：隨機異質的偏好
研究成果報告(精簡版)

計 畫 類 別 ：個別型
計 畫 編 號 ：NSC 100-2410-H-004-007-
執 行 期 間 ：100 年 03 月 01 日至 101 年 07 月 31 日
執 行 單 位 ：國立政治大學經濟學系

計畫主持人：王信實

計畫參與人員：碩士班研究生-兼任助理人員：薛博升

報 告 附 件 ：出席國際會議研究心得報告及發表論文

公 開 資 訊 ：本計畫涉及專利或其他智慧財產權，2 年後可公開查詢

中 華 民 國 101 年 10 月 31 日

中 文 摘 要 ： 本研究提出一個同時兼顧垂直及水平競爭的架構，此架構同時考慮買方及賣方雙向的市場勢力。上游廠商供給下游廠商均質產品，而下游廠商則把這種產品加工成水平異質產品。然而，上游市場並不是完全競爭的，因為上游各家廠商坐落於不同的區位，供應下游廠商的運輸成本並非為零。下游廠商（亦即加工者）同樣散落各地，因此會向距離它最近的上游廠商購買。這種空間特性賦予下游廠商買方的市場勢力，因為它們各自成為許多上游廠商唯一的買家。在下游市場中，每一家生產異質產品的廠商企圖吸引不同偏好的消費者（每一個消費者具有不同的「品牌偏好」）。這種水平差異正是模型中賣方市場勢力的來源。這個模型使我們得以將總的市場勢力（也就是「價差」）分解成來自於賣方以及買方市場勢力兩部分。

本研究首先討論一個最簡單的狀況，亦即所有消費者的願意支付價格以及品牌偏好是確定的，廠商則處於 Bertrand 的競爭型態。在這個例子中，模型將探究運輸成本、願意支付價格以及品牌偏好對於下游及上游廠商價差所造成的影響。本文以賣方勢力的文獻為基礎，除研究固定(deterministic)參數的假設下，買方勢力對於市場的影響外，也進一步將參數改成隨機(stochastic)型態，藉由模擬的方式瞭解不確定狀態下的市場情形。模擬分析得到兩個較為明確的結論：首先，不確定性下平均數的改變，其較類似確定性模型的比較靜態分析；例如，隨著消費者偏好平均數的增加，廠商的需求量增加，此與確定性模型分析，有著類似的分析結果。其次，在標準差與相關係數的變化方面，由於涉及變數的分佈狀況，其影響性並不等同於確定參數的結果。此為分析異質消費者的分佈差異，進而對廠商與消費者的影響，這是確定性模型無法補捉到的情況。因此，藉由模擬的方式獲得較為細緻的結果，是本研究第二部份採用不確定模型的主要目的。

最後，本研究根據模擬的結果，比較各種不同情境下的福利水準。此分析之所以重要是因為福利水準經常無法直接從價差推演而來。舉例來說，因為產品差異所帶來的價差提升（並非因為付給上游廠商的價格降低），一般認為將會減少消費者的福利而增進加工者的利潤（因為較高的下游價格）。然而，消費者的福利很可能實際上是有增無減的，因為較高的產品差異會降低消費者的交通成本，而這個效果可能大到足以抵銷較高價格所帶來的影響。

中文關鍵詞： 買方市場勢力、水平差異

英 文 摘 要 ： This study proposes a framework of vertical and horizontal competition where market power is bidirectional: there is buyer as well as seller market power. Upstream firms supply a homogeneous product to downstream firms, which, in turn, process it into a horizontally differentiated product. Supply in the upstream market, however, is not perfectly competitive since firms are situated in different localities and transportation costs to any downstream firm are non-zero. Downstream firms (’ processors’) are also scattered in different locations and buy from the nearest upstream firms； this spatial configuration grants downstream firms buyer market power as each of them becomes the sole buyer for a handful of upstream firms. Firms in the downstream market compete with each other by producing a differentiated product intended to attract consumers who have heterogeneous preferences (i.e. each consumer has a different ’ preferred brand’)； this horizontal differentiation is the source of seller market power in our model. A main feature of our model is that it allows us to decompose total market power (’ the price spread’) into the portion due to seller market power and the portion due to buyer market power.

The study first considers a simplest case where consumers’ willingness to pay and brand preference are deterministic and firms compete in a Bertrand fashion. The model shows impacts of the transportation cost, willingness to pay, and brand preference on downstream and upstream price spreads in this benchmark case. It then studies how the price spread analysis is affected by settings of stochastic and heterogeneous consumer preferences by using a series of simulations.

Finally, this study compares welfare across the different scenarios based on data simulated. The welfare analysis is important as welfare may not be inferred from the price spread. For example, a price spread increase that is due mostly to product differentiation (rather than to a reduced price paid to upstream firms) is usually thought to reduce consumer welfare and increase processors’ profits (because of higher downstream prices); however, consumer welfare might actually rise as larger product differentiation may reduce all consumers’ travel costs enough to offset the effect of higher prices.

英文關鍵詞： buyer market power, horizontal differentiation

行政院國家科學委員會補助專題研究計畫 □期中進度報告
■期末報告

買方市場勢力與水平異質產品生產者：隨機異質的偏好

計畫類別：■個別型計畫　□整合型計畫
計畫編號：NSC100－2410－H－004－007－
執行期間：100 年 3 月 1 日至 101 年 7 月 31 日

執行機構及系所：政治大學經濟學系

計畫主持人：王信實
共同主持人：
計畫參與人員：薛博升

本計畫除繳交成果報告外，另含下列出國報告，共 _1_ 份：
□移地研究心得報告
■出席國際學術會議心得報告
□國際合作研究計畫國外研究報告

處理方式：除列管計畫及下列情形者外，得立即公開查詢
□涉及專利或其他智慧財產權，□一年■二年後可公開查詢

中　華　民　國 101 年 10 月 31 日

Main results of the proposed research are reported separately: the first part consists of those of the deterministic case while the second is for those of the stochastic case. Since the first part has been rewritten into a working paper format in English, I present the results here as what they are in the paper. On the other hand, the second part is still at its early stage and therefore I show the preliminary results in a Chinese version.

Part I Deterministic Case

1. Introduction

In this project we study the farmers-processors relationship conceptually. We consider a model of vertical and horizontal competition where market power is *bidirectional*: processors have buyer as well as seller market power. Farmers supply a homogeneous raw input to the processors, which, in turn, process it into a horizontally differentiated product. Supply in the raw input market, however, is not perfectly competitive because farmers are situated in different localities and transportation costs to any processor are non-zero. Processors are also scattered in different locations and buy from the nearest farmers. This spatial configuration grants the processors *buyer market power* as each of them becomes the sole buyer for a handful of farmers. Finally, the processors in the processed good market compete with each other by producing a differentiated product intended to attract consumers who have heterogeneous preferences (i.e., each consumer has a different "preferred brand"). This horizontal differentiation is the source of *seller market power* in our model.

There has been an increasing concern in several food industries, most notably in meat packing, about the farmers' dollar share of the final product, which has been continuously decreasing. This has often been attributed to increased processor concentration and the consequent increase in buyer market power, although product differentiation at the processor level may have a similar effect. The role of product differentiation as a factor in the declining dollar share of farmers is apparent when we look at how food processors have become more interested in advertising and promotional techniques that allow greater product differentiation and possibly larger margins.

Prior work has studied the effects of processors' market power in acquiring the raw product at a price below competitive levels. The typical assumption is that the final processed product is homogeneous and that processors are price takers. Because most food processing industries buy raw agricultural products and transform them into branded, differentiated products, we add this more realistic dimension into a model that captures several unique features of both raw agricultural product industries (upstream "farmers") as well as food processing industries (downstream "processors"). Our model is motivated by food manufacturing industries (e.g. canned food, packaged beef, etc.) where inputs markets are characterized by a homogeneous product with high transportation costs (or perishability) and processors compete with each other by offering a differentiated product to final consumers. In these industries, a highly debated issue has been whether (and how) downstream concentration, and its consequent enhanced buyer market power, has diminished farmers' profitability (measured by its share of the final price). A main feature of our model is that it allows us to decompose total market power ("the price spread") into the portion due to seller market power and the portion due to buyer market power, thereby informing the above mentioned debate.

We combine two models to capture the unique features of food producers and processors. The model in Rogers and Sexton (1994) is used to capture key characteristics of producers' markets and a variant on Salop's (1979) model of spatial product location is used to embed product differentiation at the processor's level. Under a Bertrand-Nash assumption, our results suggest that farmers receive a decreasing dollar share of the final price in a more concentrated processed good market. On the other hand, the price spread due to processors' buyer (seller) market power decreases (increases) with smaller farmers' transportation costs and with stronger consumers' brand preference. We also examine a welfare analysis: while the surplus of farmers serving a specific processor is adversely affected by a more concentrated processed good market, the total surplus of farmers serving all processors is independent of the industry concentration. Moreover, consumers are worse off when the processed good market is more concentrated and farmers' transportation costs are larger. Consumers' brand preference has two effects on the welfare: while stronger brand preference implies more "travel costs" for consumers, it may encourage more firms to join the market and provide more varieties, which results in welfare gains. For a relatively small brand preference, consumer surplus increases in brand preference.

This study helps us understand the farmers-processors relationship. By using more realistic assumptions that incorporate product differentiation in the processed good market, we study two components of the price spread (due to buyer market power in the raw input market and seller market power in the processed good market) and the corresponding welfare implications of market power. The results provide more complete figures about the effect of the concentrated food processing industry on the structure and performance of the agricultural and food markets and also inform the formation of public policy.

The remainder of this study is organized as follows. We briefly review some related studies in section 2. In section 3 the model describing upstream and downstream markets is presented. Section 4 discusses the main results including the properties of price spreads and welfare analysis. Section 5 provides concluding remarks, limitations, and possible extensions.

2. Literature Review

The closest studies to our work are Sexton (1990) and Rogers and Sexton (1994). These two studies consider a model of a homogeneous good produced by a large number of farmers who produce in different locations. The farmers can sell their product to a few processors but in doing so incur transportation costs. Processors then sell the processed homogeneous goods in a perfectly competitive market. Their analysis of the processor-farmer price margin is relevant to our study. They show that farmers receive a decreasing dollar share of the processors' product price as transportation costs increase and as the number of processors decreases. An important finding is that, because farmers' output is costly to transport, positive margins are possible even under Bertrand competition and homogeneous products. In addition, Chen and Lent (1992) and Hamilton and Sunding (1997) study the unique comparative statics of a farmers' supply shock when the processors enjoy buyer market power and the farmers are price takers in the production of a homogeneous good.

Turning to empirical studies, an often studied topic has been the estimation of buyer market power. Hyde and Perloff (1994) conduct a Monte Carlo study to test the accuracy of a structural model and a nonstructural method for estimating the degree of buyer market power in a homogeneous product market with price-taker sellers. Raper, Love and Shumway (2000), and Schroeter, Azzam and Zhang (2000) extend New Empirical Industrial Organization methods to study the amount of market power enjoyed by sellers (farmers) and buyers (manufacturers / processors). Both studies reach a similar conclusion: manufacturers appear to have buyer market power whereas farmers lack seller market power. In a study that analyzes the type of buying behavior by processors, Just and Chern (1980) find evidence to reject the hypothesis of perfect competition in favor of that of oligopsonistic dominant firm-leadership.

Few studies analyze the simultaneous exertion of market power on both the selling and buying side of the market. Wann and Sexton (1992) find that pear processors enjoy market power in the purchase of the upstream raw product and in the sale of two downstream differentiated products: canned pears and fruit cocktail. Gohin and Guyomard (2000) estimate joint oligopoly-oligopsony market power of French retailers several food product categories. They strongly reject the joint null hypothesis that French retail firms behave with no oligopoly-oligopsony market power.

None of the above studies explicitly model downstream product differentiation in the context of the welfare impact of market power in the purchase of an input. This is our contribution, which we present next.

3. Model

3.1 Spatial Competition in the Upstream Market

In Rogers and Sexton's model, farmers are uniformly distributed on the unit interval and a few processors are located at equally spaced intervals on the line.[1] Processors pay a mill price, W, which farmers receive after incurring a transportation cost, t, per unit of distance, d, to the farm. Hence, the further away a farmer is located from the processor, the lower the net price (W-td) s/he receives. Several characteristics of this model make it suitable for studying procurement of farmers' output by processors. First, by construction, the model reflects the higher concentration of the food processing industry with respect to that of the raw agricultural products industry. Second, even though farmers' products are homogeneous in nature, distance and transportation costs will prevent a given processor from undercutting a rival and gaining all farmers' output, making the model more realistic and appealing.

We present a modified version of Rogers and Sexton's model. Farmers' aggregate supply faced by a processor can be computed as

$$R(W) = 2\int_0^M \beta(W - td)\mathrm{d}d = M\beta(2W - tM)\,, \tag{1}$$

[1] While Rogers and Sexton (1994) motivate their model as competition on a line interval, their analysis corresponds to a circular model. We also use the circular model in our analysis below.

where R is the quantity of the raw product, M is the length of half the interval over which the processor is a sole buyer of the product, $\beta(W-td)$ is an individual farmer's linear supply curve, and β is an coefficient.

Moreover, processor's technology for production of Q units of the final good is one of fixed-proportions; i.e., $Q = R/\lambda$ and without loss of generality $\lambda = 1$. This gives the processors' cost function: $c(R) = W(R)R + F$, where F represents fixed costs. As a result, processor's profit expressed as a function of the input quantity R is given by $\pi = p \cdot R - W(R)R - F$, where p is the price of the processed good and $W(R)$ is the inverse supply function of the input faced by the processor. For Bertrand competition, processors' profits can be written as a function of the input price W: $\pi = p \cdot R(W) - WR(W) - F$.

3.2 Product Differentiation in the Downstream Market

To address imperfect competition via differentiated products in the downstream market, we consider a variant of Salop's (1979) circular model of product location. There are two reasons for choosing this model over other alternatives. The linear city model by Hotelling forces more competition only one side of the product space as a product moves to the extremes, which may not be a realistic assumption. This feature makes the Hotelling model less mathematically tractable. On the other hand, a representative consumer model does not allow for several key consumer heterogeneity issues that we deal with below.

Each consumer has a preferred brand location on a circle of circumference size equal to 1. Consumers' preferred brands are uniformly distributed on the circle and firms locate their brands at equally spaced intervals on the circle perimeter (for n firms, the length of the interval is $1/n$). Consumer i has a reservation value "A" and pays two "prices" for purchasing firm j's product (where j denotes the location of the product on the circle): the price of the product, p_j, and a total travel cost of $c|z_i - j|$, where c is the per unit travel cost and z_i is consumer i's preferred brand location. A consumer purchases the product that yields the highest utility (i.e. purchase j if: $U_{ij} = A - p_j - c|z_i - j| > U_{ik}, \ \forall k \neq j$).

Let us focus on two neighboring firms j and j' located at 0 and $1/n$, respectively. Considering a consumer at z receiving equal surplus from these two firms, we have the following equation representing the location of the indifferent consumer:

$$A - p_j - cz = A - p_{j'} - c\left(\frac{1}{n} - z\right) \Rightarrow z = \frac{1}{2c}\left(p_{j'} - p_j + \frac{c}{n}\right). \qquad (2)$$

As a result, firm j's demand is given by

$$Q_j = 2z = \frac{p_{j'} - p_j}{c} + \frac{1}{n}.$$

When all other firms charge $p = p_{j'}$, the maximization problem facing firm j is

$$\max_{p_j} \ \pi_j(p_j, p) = (p_j - W)\left(\frac{p - p_j}{c} + \frac{1}{n}\right) - F,$$

where W is the raw input price paid to farmers and F is the processor's fixed cost. The first-order condition for firm j is $p - 2p_j + W + c/n = 0$. In a symmetric equilibrium, $p = p_j = W + c/n$. In addition, with free entry each firm earns zero profits and therefore $p = W + nF$. The number of firms n can be endogenously determined and the equilibrium number of firms is $n = \sqrt{c/F}$. Hence, the equilibrium price is $p = W + \sqrt{cF}$. It is easy to see that processors charge higher prices when they incur higher marginal and fixed costs. For a given raw input price, it is also reasonable that the downstream price is higher when consumers have stronger brand preference (higher c).[2]

To solve for equilibrium W, we substitute $M = 1/(2n)$ and $R = Q = 1/n$ into equation (1). In equilibrium,

$$R = M\beta(2W - tM) = \frac{\beta}{2n}(2W - \frac{t}{2n}) = \frac{1}{n} = Q \text{, thus } W = \frac{1}{\beta} + \frac{t}{4n} = \frac{1}{\beta} + \frac{t}{4}\sqrt{\frac{F}{c}},$$

where t and F have a positive impact while β and c act inversely. Note that the second term $t/(4n)$ is served to compensate farmers' transportation costs (t). If farmers incur no transportation costs, processors' payments to farmers are based on the market input supply curve ($1/\beta$).

4. Main Results

4.1 Price Spreads

Now we consider the spreads between processed good prices and raw input prices. When Bertrand competition is assumed, processors' profits can be written as a function of the input price W: $\pi = p \cdot R(W) - WR(W) - F$. Since the processed good market is imperfectly competitive, the first order condition for π is:

$$\frac{\partial p(R)}{\partial R}\frac{\partial R(W)}{\partial W}R(W) + p\frac{\partial R(W)}{\partial W} = R(W) + W\frac{\partial R(W)}{\partial W}, \tag{3}$$

where the left-hand side represents the marginal revenue product of using the input and the right-hand side represents its marginal costs. Note that the second term on the right-hand side is the source of buyer market power and it takes this form because each processor is a monopsonist for farmers located in its market area of size $2M$. If the input market were a perfectly competitive market with many buyers, the term $W\partial R(W)/\partial W$ would be equal to zero so that the marginal cost of the input that the processor faces is only given by the aggregate supply $R(W)$.

The key feature of this model, however, is that the term $\partial R(W)/\partial W$ is a function of both how much additional input can be acquired as a result of an increased input price, and

[2] However, when W is endogenously determined, the brand preference may have a positive or negative impact on downstream prices. See the welfare analysis below for details.

how much the market area M is affected by such an increase. After rearranging terms, the price-cost margin (or spread between processors' and farmers' prices) can be expressed as:

$$\frac{p-W}{W}=\frac{1}{\eta}-\frac{p}{W}\frac{1}{\varepsilon_D},$$
$$\eta=\frac{\partial R}{\partial W}\frac{W}{R}+\frac{\partial R}{\partial M}\frac{M}{R}\frac{\partial M}{\partial W}\frac{W}{M}=\eta_{R,W}+\eta_{R,M}\eta_{M,W}, \tag{4}$$
$$\varepsilon_D=\frac{\partial Q}{\partial p}\frac{p}{Q}.$$

It turns out that the price spread has two components: one due to *buyer market power* in the raw input market, $1/\eta$, and one due to *seller market power* in the processed good market, -$P/(W\varepsilon_D)$. The demand elasticity ε_D is negative in the imperfectly competitive processed good market. As a result, the price spread is usually larger than that of the competitive processed good market. In Rogers and Sexton (1994), this term is zero due to the assumption of a perfectly competitive processed good market.

The three elasticity terms $\eta_{R,W}, \eta_{R,M}, \eta_{M,W}$ are positive, and, in general, the higher η, the lower the price spread. The key term in this expression is $\partial M/\partial W$, which in turn is a function of how rivals' would react to changes in the mill price W (i.e. $\partial W^*/\partial W$, where W^* is rival's processor mill price). We will first examine the case of Bertrand competition in the analysis.[3]

One of Sexton and Rogers (1994) findings is that transportation costs matter in how price-spreads are determined. For example, under Bertrand competition price-spreads are zero if transportation costs are ignored, but positive if they are taken into account. In general, price spreads increase as transportation costs increase, suggesting that farmers' dollar share of the final product's price is likely to be smaller than that of other industries where perishability and transportation are not important. In addition, as the number of processors increases, the price-spread decreases.

As mentioned previously, a critical assumption in Sexton and Rogers' approach is that the market for the processed good is perfectly competitive and hence its price p is taken as given by processors. The price spread is then solely a function of the equilibrium input price W. Thus a higher price spread $(p-W)/W$ necessarily translates into a lower input price W, which need not be the case if p is endogenously determined by imperfect competition in the processed good market. Given farmers' frequent criticisms of how higher processor concentration has caused farmers to receive a smaller dollar share of the final product price, the interesting question that arises is what portion of this lower share is due to buyer market power as described by Sexton and Rogers, and what portion is due to higher prices of the processed good (p) as a consequence of imperfect competition in the downstream market.

Let us turn to the characteristics of price spreads in equation (4). From equation (1),

[3] The different behavioral assumptions will be considered, including Bertrand ($\partial W^*/\partial W=0$), collusion ($\partial W^*/\partial W=1$) and Cournot competition ($\partial R^*/\partial R=0$).

$$\eta_{R,W} = \frac{\partial R}{\partial W}\frac{W}{R} = 2M\beta\frac{W}{R} \text{ and } \eta_{R,M} = \frac{\partial R}{\partial M}\frac{M}{R} = 2\beta(W - tM)\frac{M}{R}.$$

To derive $\eta_{M,W}$, we apply a similar logic as in equation (2): an indifferent farmer between a processor and its adjacent rival receives equal net prices and the distance between the processor and the indifferent farmer (*M*) can be expressed as

$$W - tM = W^* - t\left(\frac{1}{n} - M\right) \Rightarrow M = \frac{1}{2t}\left(W - W^* + \frac{t}{n}\right),$$

where *W** is the mill price of an rival. Therefore,

$$\eta_{M,W} = \frac{\partial M}{\partial W}\frac{W}{M} = \frac{1}{2t}\left(1 - \frac{\partial W^*}{\partial W}\right)\frac{W}{M} = \frac{\alpha}{2t}\frac{W}{M},$$

where producer conduct α is defined by $1 - (\partial W^* / \partial W)$. For example, $\partial W^* / \partial W = 0$ and α = 1 in Bertrand competition. Hence,

$$\eta = \eta_{R,W} + \eta_{R,M}\eta_{M,W} = 2M\beta\frac{W}{R} + 2\beta(W - tM)\frac{M}{R}\frac{\alpha}{2t}\frac{W}{M} = \frac{W\left(2tM + (W - tM)\alpha\right)}{tM(2W - tM)}$$

Taking the expression for the price spread in equation (4), if we define $S_u = 1/\eta$ and $S_d = -p/(W\varepsilon_D)$, then the total price spreads $S = S_u + S_d$, where S_u is the component of price spreads due to buyer market power in the raw input market (upstream) and S_d is the one due to seller market power in the processed good market (downstream). As a result, two components of the price spreads can be expressed by

$$S_u = \frac{1}{\eta} = \frac{tM(2W - tM)}{W\left(2tM + (W - tM)\alpha\right)} = \frac{16\beta t\sqrt{c/F}}{\left(4\sqrt{c/F} + \beta t\right)\left(4\beta t + \left(4\sqrt{c/F} - \beta t\right)\alpha\right)} \qquad (5)$$

$$S_d = -\frac{P}{W}\frac{1}{\varepsilon_D} = \frac{c}{nW} = \frac{4\beta c}{4\sqrt{c/F} + \beta t} \qquad (6)$$

Since the price spreads come from market power in both upstream and downstream markets, they are influenced by the variables in these two markets. In other words, any exogenous variable in either upstream or downstream market (*c*, *F*, *t*, or β) has impacts on both spreads. Such a feature has not been fully explored in previous studies. To examine the characteristics of price spreads, we provide the following comparative statics[4]:

---

[4] The results of S_u are based on an assumption that $n > \beta t\sqrt{(4-\alpha)} / (4\sqrt{\alpha})$. If Bertrand competition, α = 1, is assumed, $n > \sqrt{3}\beta t / 4$. The inequalities might be reversed as α decreases; for example, α = 0 in a collusion case.

$$\frac{\partial S_u}{\partial c} < 0,\ \frac{\partial S_d}{\partial c} > 0;\ \frac{\partial S_u}{\partial F} > 0,\ \frac{\partial S_d}{\partial F} > 0;\ \frac{\partial S_u}{\partial t} > 0,\ \frac{\partial S_d}{\partial t} < 0;\ \frac{\partial S_u}{\partial \beta} > 0,\ \frac{\partial S_d}{\partial \beta} > 0.$$

We first discuss the impact of processor's fixed costs (*F*) on the price spreads. An increase in fixed costs, (e.g., R&D expense, capacity expansion, increased safety regulation), which results in a decrease in the number of firms, it is reasonable to see both components of the price spreads increase because of the resulting increase in market power of processors in both the buying and selling side of the market. A large coefficient of farmer's supply function (β) implies inputs supplied by farmers are more sensitive to the price received (*W*). For a given quantity supplied, farmers receive lower prices with a larger β, resulting in larger upstream and downstream spreads.

While the effects of farmer's transportation costs (*t*) and consumer's brand preference (*c*) are more complicated, they are generally unambiguous. When farmers incur more transportation costs (i.e., *t* increases), processors can exercise more buyer market power and the upstream component of the price spread (S_u) increases. In addition, the impact of *t* on the downstream component of the price spread (S_d) is by way of raw input prices (*W*). Increasing transportation costs should push up input prices and, in turn, result in smaller downstream price spreads. When consumers have stronger brand preference, they are willing to pay more for a preferred product and their brand selections are relatively restricted. The processors can enjoy more seller market power and the downstream component of the price spread (S_d) is larger. However, stronger brand preference results in a smaller upstream component of the price spread (S_u) because the equilibrium number of firms increases and processors' buyer market power gets smaller.

4.2 Welfare

In this section, we illustrate the welfare of farmers and consumers while all processors receive zero profits due to free entry. We first look at farmers' surplus.

4.2.1 Farmers' Surplus

Since farmers' production costs are assumed to be 0 in the current model, farmer *i* at location d_i receives $\pi_{fi} = W - td_i$. Recall that $W = \frac{1}{\beta} + \frac{t}{4n}$ and maximal $d_i = M = \frac{1}{2n}$. We have

$$\pi_{fi} = W - td_i \geq W - tM = \frac{1}{\beta} + \frac{t}{4n} - \frac{t}{2n} = \frac{1}{\beta} - \frac{t}{4n} \geq 0.^{5} \qquad (7)$$

An individual farmer is worse off as the processing industry is more concentrated (small *n*). Surplus of farmers serving a processor is given by

[5] Note that the circle of the upstream market can be larger than that of the downstream market (the downstream circumference size equals 1). According to equation (7), farmers located from a processor further than 1/*M* do not supply raw inputs because positive profits are not feasible to them. As a result, the upstream suppliers (farmers) to different processors are not connected in this case.

$$2\int_0^M (W - td)\mathrm{d}d = M(2W - tM) = \frac{1}{2n}\left(\frac{2}{\beta} + \frac{t}{2n} - \frac{t}{2n}\right) = \frac{1}{n\beta}.$$

Though the surplus of all farmers serving a specific processor is inversely affected by the number of processors, the total surplus of all farmers serving n processors is $1/\beta$; i.e., the total surplus is independent of the industry concentration. For a flatter input supply curve (larger β), farmers receive smaller total surplus. They may have no surplus when facing an infinite elasticity of supply (horizontal input supply curve).

The other interesting feature is that the farmers' total surplus has nothing to do with farmers' transportation costs (t). This is because a change in farmers' total surplus due to t is completely offset by a change caused by raw input prices (W). To see this, we differentiate π_{fi} with respect to t and get

$$\frac{\partial \pi_{fi}}{\partial t} = \frac{1}{4n} - d_i .$$

The effects of an increase in t include an increase of raw input prices ($1/(4n)$) and an additional transportation cost (d_i). When t increases, a farmer located close to a processor ($0 \le d_i < 1/(4n)$) has a welfare gain while one far away from a processor ($1/(4n) < d_i \le 1/(2n)$) has a loss. However, if we take all farmers serving a specific processor into consideration, the total effects of increasing t on the farmers' surplus are

$$2\int_0^{1/(2n)} (\frac{1}{4n} - d)\mathrm{d}d = 2\left(\frac{1}{2n}\frac{1}{4n} - \frac{1}{8n^2}\right) = 0, \text{ for all processors.}$$

The above expression explains why the farmers' transportation costs do not appear in farmers' surplus.

4.2.2 Consumer Surplus

We turn to consumer surplus in this section. Consumer surplus can be derived by

$$\begin{aligned} CS &= 2n\int_0^{1/(2n)} (A - p - cz)\mathrm{d}z = 2n\int_0^{1/(2n)} (A - W - \frac{c}{n} - cz)\mathrm{d}z \\ &= A - \frac{1}{\beta} - \frac{5c+t}{4n} = A - \frac{1}{\beta} - \frac{1}{4}\sqrt{\frac{F}{c}}\left(5c + t\right). \end{aligned}$$

In the above derivation, we have used $p = W + \frac{c}{n}$, $W = \frac{1}{\beta} + \frac{t}{4n}$, and $n = \sqrt{c/F}$. We then examine some properties of consumer surplus below.

$$\frac{\partial CS}{\partial F} = -\frac{1}{8\sqrt{cF}}\left(5c + t\right) < 0,$$

$$\frac{\partial CS}{\partial t} = -\frac{1}{4}\sqrt{\frac{F}{c}} < 0 \,,$$

$$\frac{\partial CS}{\partial \beta} = \frac{1}{\beta^2} > 0 \,.$$

Through equilibrium price charged by processors (p), raw input price received by farmers (W), and number of processors (n), consumers receive less welfare with larger fixed costs (larger F) for the processors, larger transportation costs (larger t) for the farmers, and steeper farmer's supply curve (smaller β). For the impact of consumer's brand preference (c), there are two effects: stronger brand preference has 1) a direct effect that consumers have to pay more "travel costs" and 2) an indirect effect that stronger preference may encourage more firms (brands) to join the market and provide more varieties (larger n). From equilibrium p, W, and n, we can see how brand preference (c) affects p and W through n and ultimately through t. Let us examine the impact of brand preference on prices first:

$$\frac{\partial p}{\partial c} = \frac{\partial}{\partial c}\left(W + \frac{c}{n}\right) = \frac{\partial}{\partial c}\left(\frac{1}{\beta} + \frac{1}{4}\sqrt{\frac{F}{c}}\left(4c+t\right)\right) = \frac{1}{8c}\sqrt{\frac{F}{c}}\left(4c-t\right).$$

That is, the equilibrium price charged by processors are decreasing in brand preference if farmers' transportation costs are sufficiently large ($t > 4c$). This reduction in prices of processed product is related to the decreasing input prices (W) through large enough farmers' transportation costs (t), which dominate the effect of stronger preference causing higher prices. Together with travel costs, the second component of the total prices facing consumers, the farmers' transportation costs (t) have to be even larger such that consumers have welfare gains due to their strong brand preference. The result can be seen in the following equation:

$$\frac{\partial CS}{\partial c} = \frac{1}{8c}\sqrt{\frac{F}{c}}\left(-5c+t\right) > 0 \quad \text{if } t > 5c \,.$$

The impact of brand preference on consumer surplus depends on relative magnitudes of brand preference to farmer's transportation costs. For a relative small brand preference ($c < t/5$), as a result, consumer surplus increases but price decreases in brand preference. On the other hand, for a relative large brand preference ($c > t/4$), consumer surplus decreases but price increases in brand preference. For a median case ($t/5 < c < t/4$), both consumer surplus and price decrease in brand preference. The result of the median case is because the reduction in price is not sufficient to cover the increase in the travel costs, which results in consumers' welfare loss.

4.3 Discussions of Price Spreads and Farmers' Surplus

In the previous sections we have discussed the characteristics and comparative statics of price spreads and welfare. It is interesting to compare price spreads and farmers' surplus as the welfare effects may not be necessarily implied by the price spreads.

Though the decreasing dollar share of the final product that farmers receive is a major concern in a more concentrated industry, our response to this concern is that we have to identify the source of the concentration first. The examination of the price spreads indicates that while the higher processor concentration due to increasing fixed costs may cause farmers to receive a smaller dollar share of the final product price, the impact of decreasing consumer brand preference is mixed. That is, if the increasing industry concentration is due to lower consumer brand preference, the total price spreads may or may not increase and the net effect depends on the relative magnitude of $\partial S_u / \partial c$ and $\partial S_d / \partial c$.

In general, farmers receive higher mill prices when there are fewer processors in the market. However, some of the farmers have to travel longer distances to deliver the inputs after the exit of some processors. While the surplus of all farmers serving a processor is increasing in the industry concentration, the total surplus of all farmers serving all processors is independent of the industry concentration. Therefore, while more concentration redistributes welfare among farmers, total farmer surplus remains unchanged.

Our model conforms with the commonly observed fact that industry concentration is directly related to price spreads and inversely related to farmers' dollar share of the final product price. However, we also find that the mill input prices increase with concentration. This means that farmers close to an operating processor have welfare gains when concentration increases, but there are other farmers that face a significant welfare loss as there are fewer (and more distant) processors to sell to. Our analysis suggests that while it is important to address the concern about the increasing price spreads with the concentration trend, it is more straightforward to look at the welfare implication.

5. Concluding Remarks

Motivated by the consolidation trend of food processing industries in past decades, in this study we present a simple model to study the farmer-processor relationship that characterizes a key feature in these industries: the processors exercise increasing market power in both raw input markets as buyers and processed good markets as sellers. We develop a model that allows for homogeneous inputs with high transportation costs in the upstream market and differentiated processed products to final consumers in the downstream market. For a purpose of computational tractability, we make some assumptions to simplify the model: farmers are uniformly distributed on a circle of circumference and incur only transportation casts; processors have a fixed-proportion technology, interact with their competitors in a Bertrand-Nash fashion, and are free to enter the market. Though the model is simple, it performs reasonably well and captures several feature observations in food processing industries.

Given farmers' frequent criticisms of how higher processor concentration has caused farmers to receive a smaller dollar share of the final product price, we successfully decompose the spread between prices that both farmers and processors receive into two components: one due to buyer market power in the agricultural input market and one due to seller market power in the differentiated processed market. We show that farmers receive a decreasing dollar share of the final price in a more concentrated processed good market. The price spread due to processors' buyer (seller) market power decreases (increases) with smaller farmers' transportation costs and with stronger consumers' brand preference. We also complement our study with welfare effects as the welfare may not be necessarily implied by the price spreads. The welfare comparisons indicate that the total surplus of farmers serving all processors is independent of the industry concentration. The farmers' total surplus is also independent of their transportation costs because all changes in farmers' transportation costs are offset by the input prices. Consumers are worse off when the processed good market is more concentrated and farmers' transportation costs are larger. Consumers' brand preference has two effects: while stronger brand preference implies more "travel costs" for consumers, it may encourage more firms to join the market and provide more varieties, which results in welfare gains. When the brand preference is relative small, consumer surplus may increase in brand preference.

Moreover, processors receive zero profits because of the free entry assumption in our study. Though not captured by the model, potential entrants are allowed to enter the markets under this free entry assumption and it may take longer time for the transition of market structure as fixed costs can be a major portion of total costs in the food industries and the entry decision may be significantly delayed. As such, the incumbents may enjoy positive profits during the adjustment process.

For the future plan of this study, we will first consider other behavioral assumptions, including collusion and Cournot competition as mentioned in footnote 4. Collusion has $\eta_{M,W} = 0$ and hence yields the highest markup by making $1/\eta$ as small as possible. For Cournot and Bertrand competition, $\eta_{M,W} \neq 0$ and $\eta_{M,W}$ is larger for Bertrand competition. Therefore, the Cournot price spread is higher than the Bertrand price spread, but lower than the collusive spread. In addition, we may assume that consumers differ in their maximum willingness to pay for the product ("*A*" or reservation price) and their strength of brand preference ("*c*" or transportation cost). Following Borenstein (1985), consumers' preferences are bivariate normally distributed on the two-dimensional (*A*, *c*) space. In this extended model consumers who have a sufficiently large brand preference with respect to their reservation price are served "monopolistically" whereas consumers who have a relatively small brand preference (such that more than one product yields positive utility) are served "competitively". It would be interesting to examine two types of equilibrium and compare them with the current model.

Part II Simulation of the Stochastic Case

1. 前言

在這一部份本研究根據 Borenstein (1985)的建議，假設消費者偏好為二元常態分配在二維空間(A,c)，此時廠商面對異質消費者，而非第一部份的同質消費者。模擬過程中，本研究進一步假設每家廠商僅知市場中消費者的平均偏好，但無法得知每位消費者確切的偏好，廠商採取單一訂價法，且應用先前所述確定性下的廠商決策行為。此時二元常態分配的參數將影響廠商與消費者的決策，這也是本模擬欲探究的議題。在此部份的最後，將比較固定參數模型和隨機參數模型的結果的異同，並指出未來可能的研究方向。

2. 演算法(algorithm)

在隨機模型的架構下，藉由調整消費者偏好的統計參數，分析消費者的保留價格(reservation price)和交通成本(transportation cost)如何影響廠商的各類需求量(Q_j^d(MNOPOLY), Q_j^d(COMPETITIVE) and Q_j^d(SUPERCOMPETITIVE))、消費者剩餘、消費者需求彈性，與購買者的分佈等情況；其中，調整的參數包括：A 與 c 的平均數、A 與 c 的標準差與 A 與 c 的相關係數。

Parameter Set :(Benchmark)

- A mean = 16 (A : the consumer's reservation price)
- c mean = 16 (c : the decline in his reservation price for a brand per unit of arc distance the brand is from Z_i)
- A std = 2
- c std = 2
- corr(A , c) = 0.8
- β = 10 (farmer's coefficient)
- t = 125 (farmer's cost per unit distance)
- F = 1 (processor's fixed cost)

Step 1：For i=1 to n (n= 1,000,000)

generate consumer i's location Z_i (by Uniform)

generate A and c(by Multivariate normal)

set $U_{i,j} = A_i - p_j - c_i|Z_i - j|$；j：firm j's location.

end

Step 2：蒐集的資料包括：

- 各個消費者的消費者剩：$\{U_i\}, i = 1,2,\ldots,n$
- 消費者的數量與其位置。
- 廠商 j 的各類需求量：
  $Q_j^d(\text{MNOPOLY})$, $Q_j^d(\text{COMPETITIVE})$ and $Q_j^d(\text{SUPERCOMPETITIVE})$
- 計算出廠商 j 的需求價格彈性，與相鄰廠商的交叉彈性。
  其中：
  $U_{i,j}$：消費者 i 向廠商 j 購買商品，獲得的效用水準。
  $U_{i,j\pm1}$：消費者 i 分別向廠商 j 相鄰的兩家廠商購買商品，獲得的效用水準。
  $U_{i,j\pm2\ldots}$：消費者 i 與間隔廠商 j 一家以上的廠商購買商品，獲得的效用水準。
  U_i：消費者 i 所獲得的最大效用；亦即消費者 i 的消費者剩餘。
  $Q_j^d(\text{MNOPOLY})$：廠商 j 的需求量，並滿足「消費者只向廠商 j 購買才有正效用」。

$$Q_j^d(\text{MNOPOLY}) = \frac{\sum_{i=1}^{n} I\left(U_{i,j} > 0, U_{i,k} < 0\right)}{n}; \forall k \neq j$$

$Q_j^d(\text{COMPETITIVE})$：廠商 j 的需求量，並滿足「消費者向廠商 j 與其鄰近廠商購買有正效用」。

$$Q_j^d(\text{COMPETITIVE}) = \frac{\sum_{i=1}^{n} I\left(U_{i,j} > U_{i,j\pm1} > 0, U_{i,q} < 0\right)}{n}; q \geq 2$$

$Q_j^d(\text{SUPERCOMPETITIVE})$：廠商 j 的需求量，並滿足「消費者 i 向廠商 j 與其間隔一家以上的廠商購買有正效用」。

$$Q_j^d(\text{SUPERCOMPETITIVE}) = \frac{\sum_{i=1}^{n} I\left(U_{i,j} > U_{i,j\pm1} > U_{i,j\pm2\ldots} > 0\right)}{n}$$

3. 模擬結果(Simulation)

模擬的目的在分析模型在隨機的表現；其中，調整下游市場中，消費者的平均數、標準差與相關係數：

1. A 的平均數($\mu_A = 14$ to 24)
2. c 的平均數($\mu_c = 14$ to 24)
3. A 的標準差($\sigma_A = 1$ to 3)
4. c 的標準差($\sigma_c = 1$ to 3)
5. A 與 c 的相關係數(corr = -1 to 1)

藉由上述調整分析消費者剩餘、購買者位置與需求量的變化。首先，根據 Benchmark

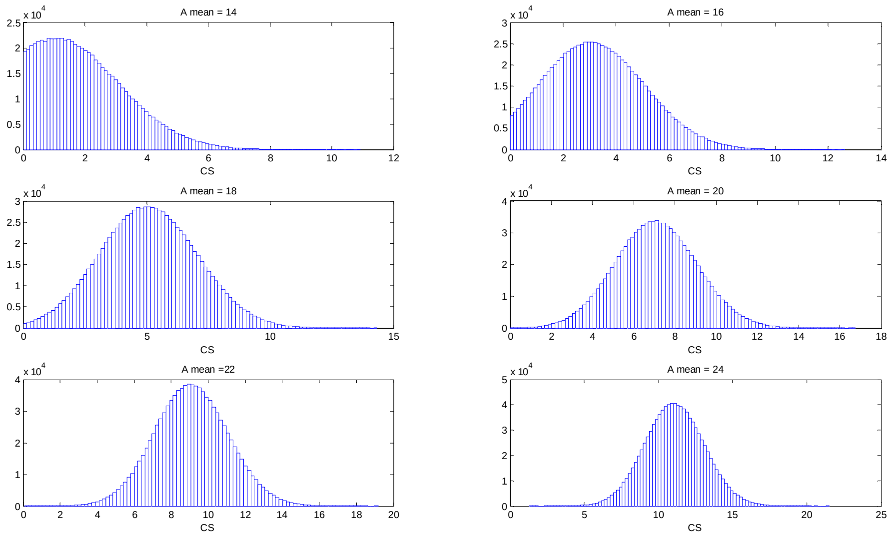
的參數設定，模型將有 4 家廠商。因此，每家廠商對消費者的最大距離為 0.125；4 家廠商的位置分別為 0，0.25，0.5 與 0.75，再根據區間內各消費者的資料進行各種分析。

3.1 Adjust A's mean ($\mu_A = 14$ to 24)

A 值的高低將影響到消費者的效用水準，藉由逐漸調高 A 的平均數，觀察其影響。

3.1.1 消費者剩餘的變化

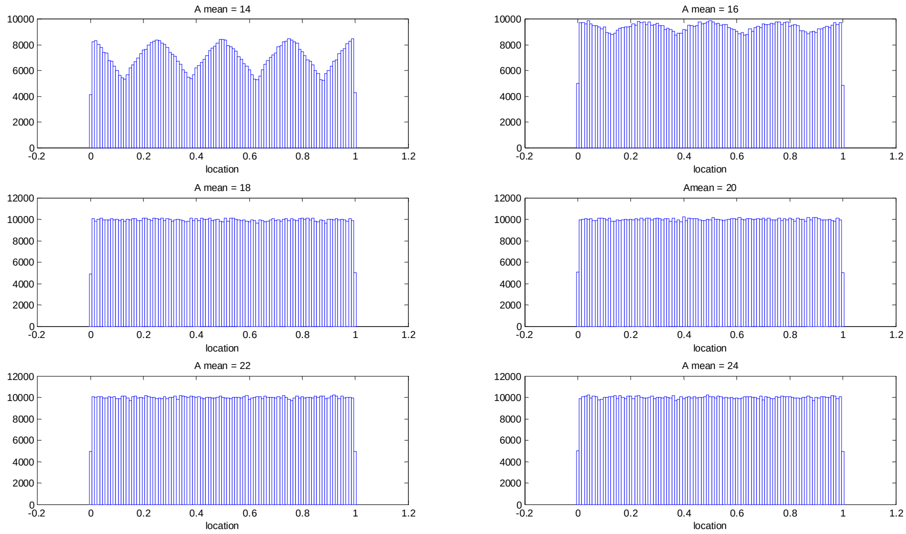
A 平均數逐漸調高，CS 的分佈也逐漸向右邊移動；意謂整體而言消費者的CS是隨A增加而提升，反應出偏好的增加，將增加整體消費者的效用水準，進而增加整體的 CS 值。



3.1.2 購買者的分佈情況

以圖表呈現購買者位置(location)，分析參數帶來的影響。其中，廠商 i (i=1,2,3,4)的位置分別為 0(與 1)，0.25，0.5 與 0.75，高度部份係指表示該區間內購買者數量，橫軸表示消費者的位置。

A 的平均數逐漸調高，購買的情況將逐漸增加隨;偏好提高下，距離愈遠的人，有愈高的機率獲得正的效用，故增加購買的情況，最後幾乎所有消費者，都會向廠商購買。

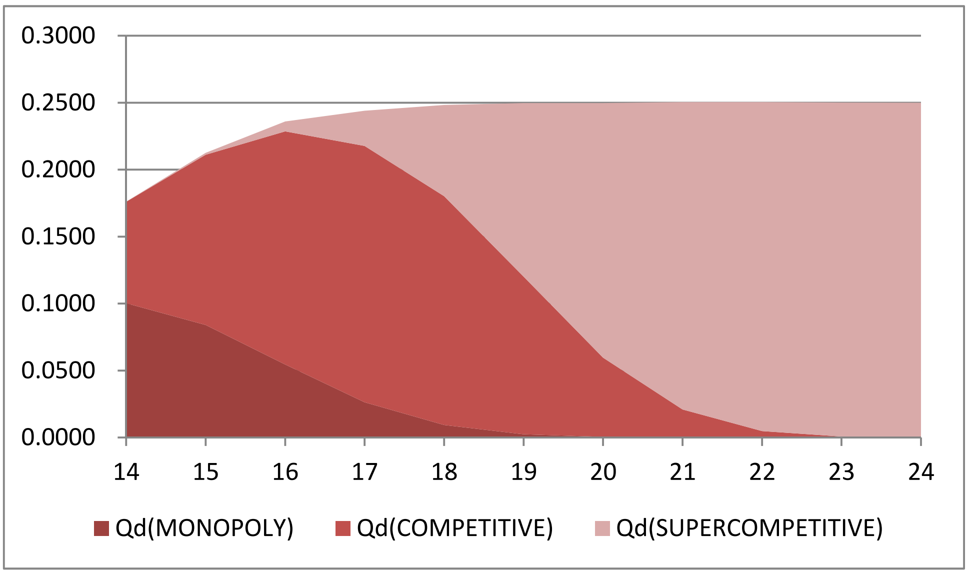


3.1.3 各類需求的變化

A 值愈高將提高消費者的效用，其影響包括：

(1)原先未購買者，隨 A 值提高，使效用為正值的情況增加，故廠商總需求量增加。

(2)隨 A 值提高，廠商帶給消費者正效用的情況也隨之提高。因此，發生的情況減少，COMPETITIVE 先增加，但 A 值更高多數的需求量皆為 SUPERCOMPETITIVE，且 COMPETITIVE 也將隨之減少。

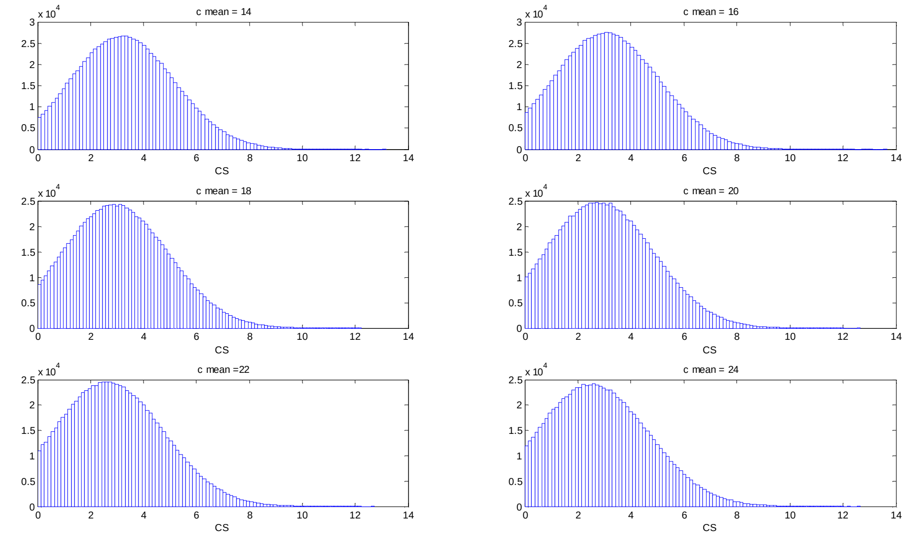


3.2 Adjust c's mean ($\mu_c = 14$ to 24)

c 值意謂品牌差異(距離)對消費者效用的影響，藉由逐漸調高 c 的平均數，觀察其影響。

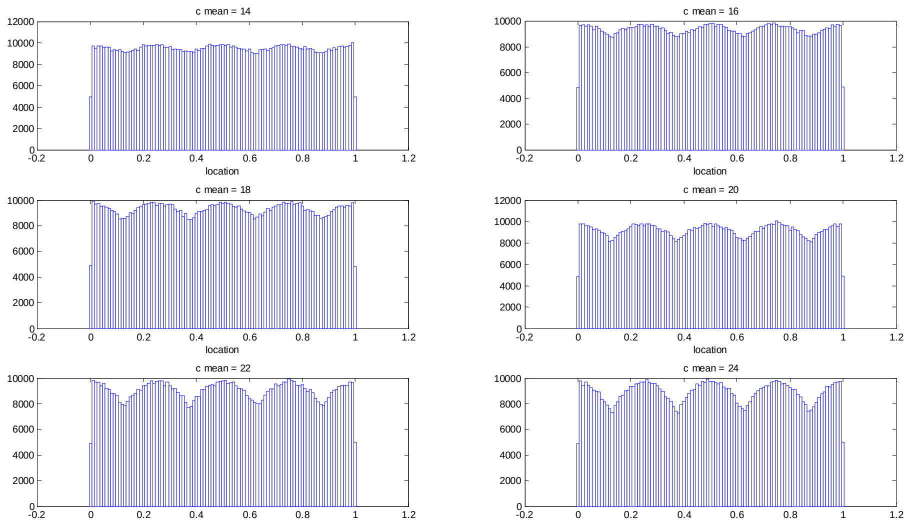
3.2.1 消費者剩餘的變化

c 的平均數逐漸調高，CS 的分佈也逐漸向左邊移動；意謂整體而言消費者的 CS 是隨 A 增加而下降，反應出距離成本的增加，將減少整體消費者的效用水準，進而減少整體的 CS 值。



3.2.2 購買者的分佈情況

c 的平均數逐漸調高，購買的情況將逐漸減少；隨 c 平均數的提高，愈遠的人距離帶來的成本更高，減少購買的情況，並且購買的人較集中於廠商周遭。

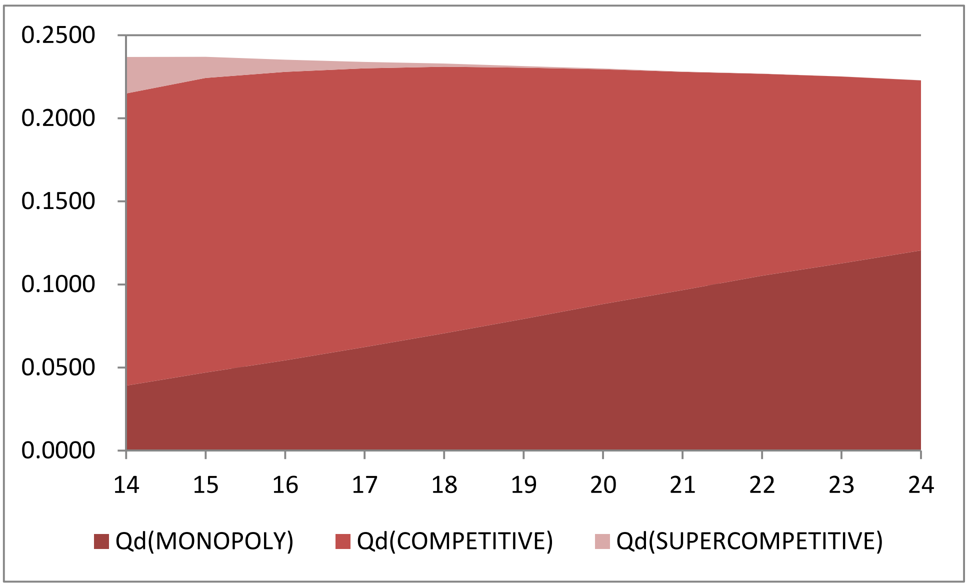


3.2.3 各類需求的變化

c 值愈高將降低消費者的效用，其影響包括：

(1)隨 c 值的提高，距離帶給效用的減損將增加，因此廠商總需求量減少。

(2)隨著 c 值提高，距離帶來的影響變大，距離消費者較遠的廠商，發生負效用的情況將增加，因此的情況增加，COMPETITIVE 與 SUPERCOMPETITIVE 的需求量將減少。

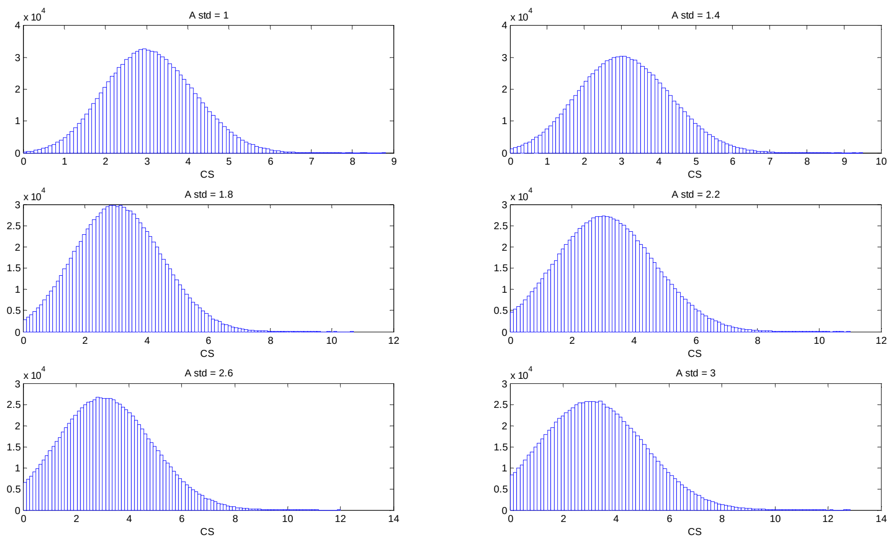


3.3 Adjust A's standard deviation ($\sigma_A = 1$ to 3)

A 的標準差將影響 A 分佈的情況，藉由逐漸調高 A 的標準差，觀察其影響。

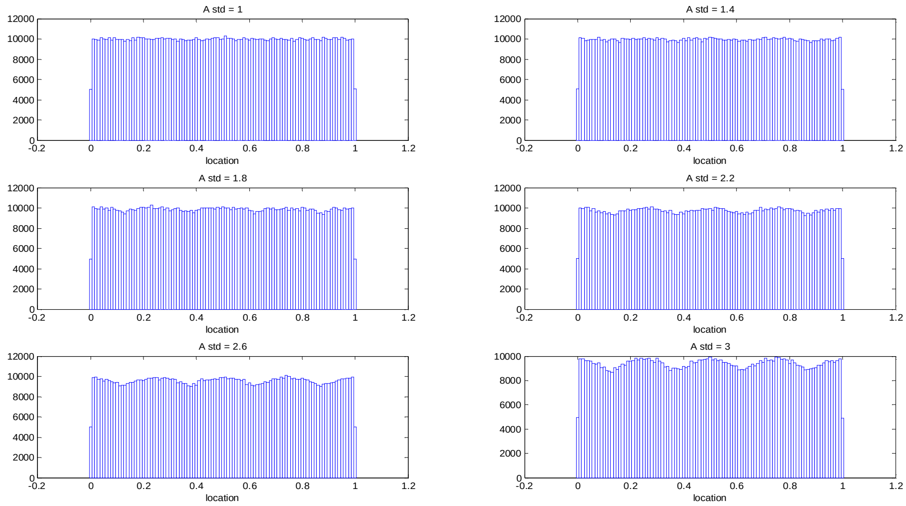
3.3.1 消費者剩餘的變化

A 標準差愈高，意謂偏好的變異將愈大，CS 的分佈也愈大，且眾數也隨之降低。



3.3.2 購買者的分佈情況

A 標準差低時，A 值較集中於平均數附近，消費者多會向廠商購買。但隨標準差愈大，出現低 A 值的機率增加，進而減少購買的情況，分佈也愈集中於廠商周遭。

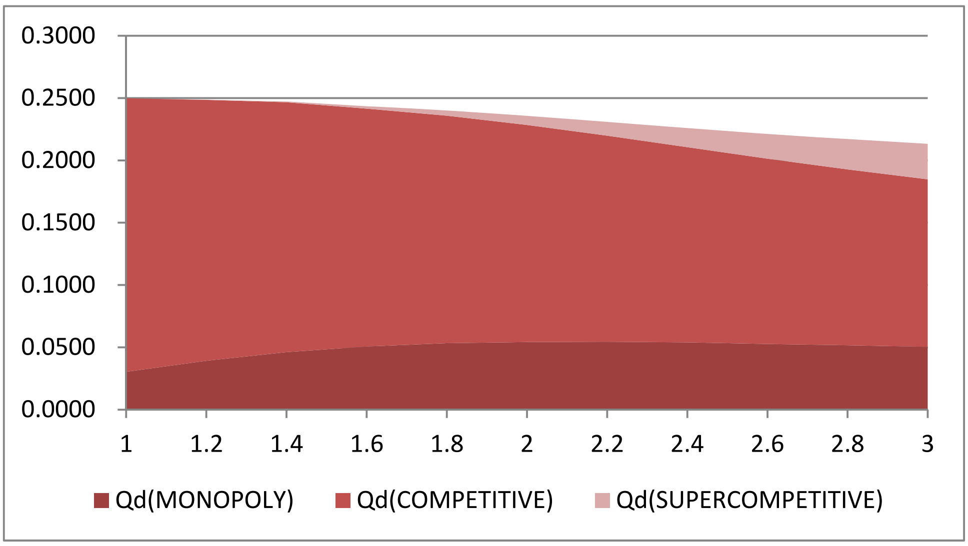


3.3.3 各類需求的變化

A 的標準差愈高，則 A 值的分佈也愈大，其影響包括：

(1)隨 A 標準差的提高，發生較低的 A 值之機率也會增加，故廠商總需求量減少。

(2)隨 A 標準差的提高，高 A 值的機率增加，故 SUPERCOMPETITIVE 的需求量增加。隨著標準差擴大，發生 COMPETITIVE 的情況也明顯減少；由於靠近平均數的情況變得較少。此外，隨標準差的擴大，發生將先增後減，可能來自於此標準差下，所發生的 A 值將恰好能發生較多的，但變異持續擴大有一部份變成效用小於零，進而降低的情況。

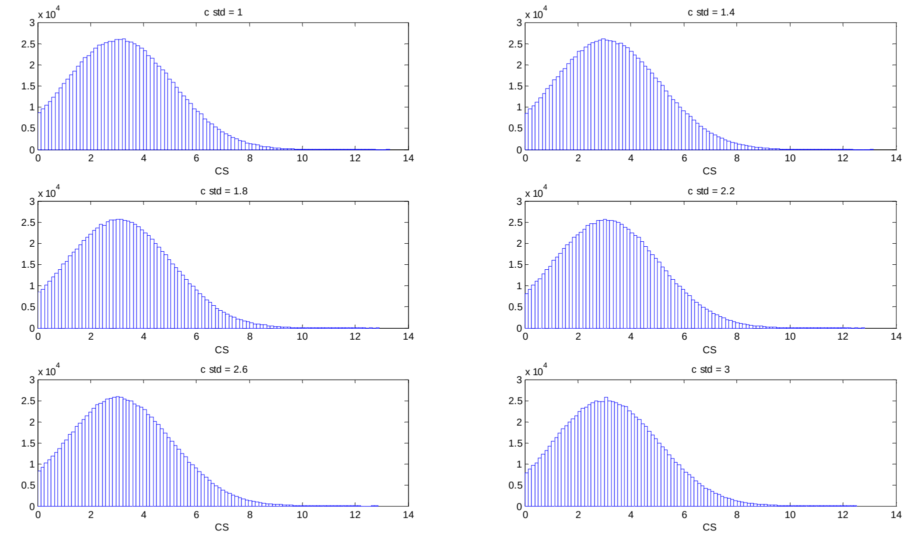


3.4 Adjust c's standard deviation ($\sigma_c = 12$ to 22)

c 的標準差將影響 c 分佈的情況，藉由逐漸調高 c 的標準差，觀察其影響。

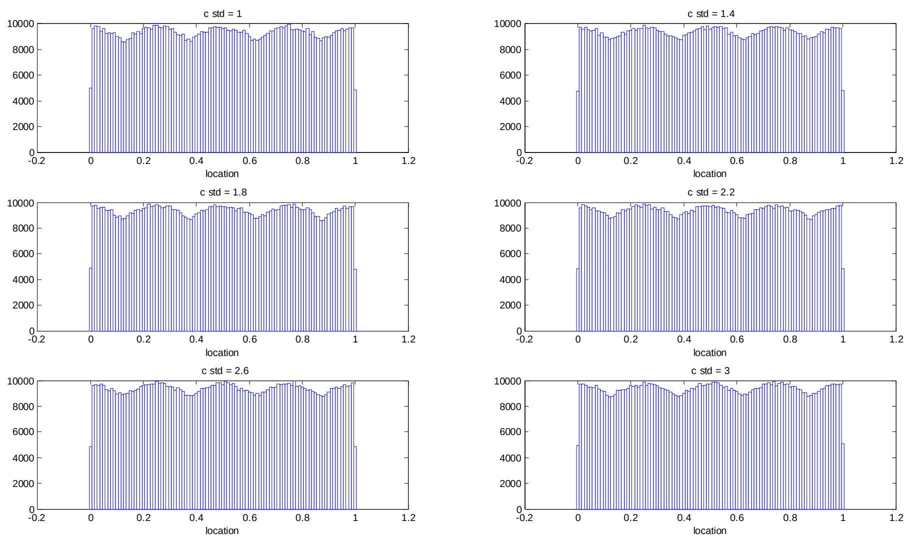
3.4.1 消費者剩餘的變化

c 標準差的調整，對於 CS 的分佈較無明顯的影響，但右尾的部分有稍微的增加。



3.4.2 購買者的分佈情況

c 標準差的調整，對於購買者的分佈無明顯的影響。

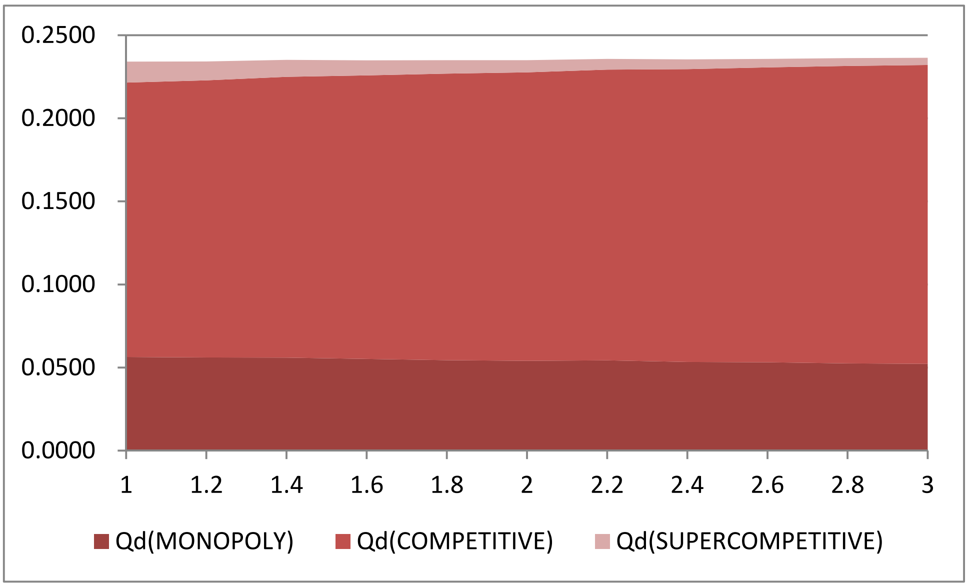


3.4.3 各類需求的變化

c 的標準差愈高，則 c 值的分佈也愈大，其影響包括：

(1)隨 c 標準差的提高，低 c 值的機率增加，故 COMPETITIVE 的需求量增加，並且導致 SUPERCOMPETITIVE 有減少的趨勢。此外，隨 c 標準差的提高，有類似上一個情況，呈現略為增加再逐漸減少。

(2)但是隨 c 標準差的提高，廠商總需求量變化不是很明顯。

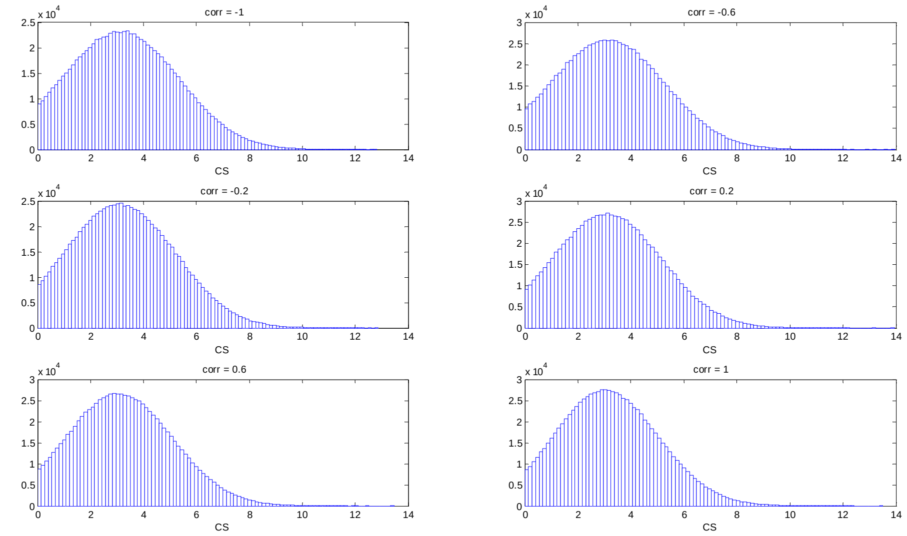


3.5 Adjust correlation (corr(A,c) = -1 to 1)

A 與 c 的相關係數將影響 A 與 c 出現的情況，藉由逐漸調高相關係數，觀察其影響。

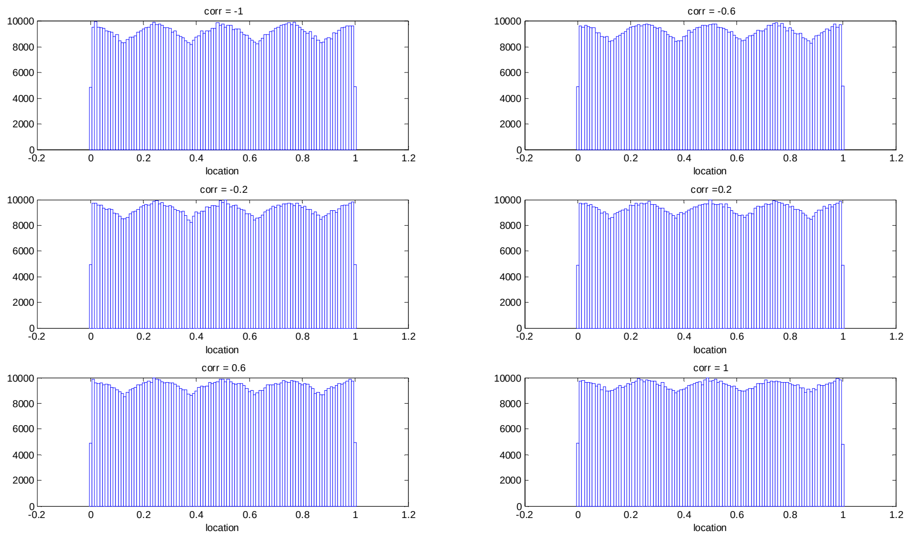
3.5.1 消費者剩餘的變化

隨著相關係數由-1 增加到 1，CS 的分佈將愈集中，意謂 A 與 c 愈是正相關，則 CS 的眾數也愈高；反之，則愈低。



3.5.2 購買者的分佈情況

購買者從較集中於廠商周遭，隨著相關係數增加，也變得較分散，購買者也隨之增加。



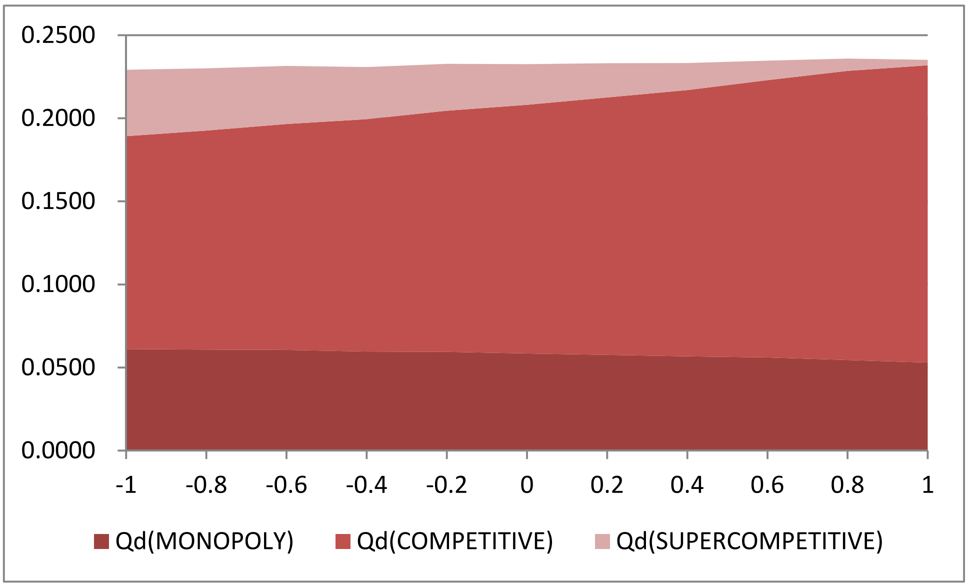
3.5.3 各類需求的變化

相關係數愈高，其影響包括：

(1)負相關較高時，SUPERCOMPETITIVE 將增加與 COMPETITIVE 將減少；愈是負相關意謂容易出現 A 高 c 低與 A 低 c 高，其中 A 高 c 低容易產生出 SUPERCOMPETITIVE 的情況。

(2)正相關較高時，SUPERCOMPETITIVE 將減少與 COMPETITIVE 將增加；愈是正相關意謂容易出現 A、c 皆高與 A、c 皆低，A 與 c 有抵消的效果，因此提高了 COMPETITIVE 的情況，也降低發生

SUPERCOMPETITIVE 的情況。



3.6 c 對 CS 影響的模擬

根據確定性模型分析得知 $\frac{\partial CS}{\partial c}=\frac{1}{8c}\sqrt{\frac{F}{c}}(-5c+t)>0 \quad \text{if } t>5c$，反應出 c 對 CS 影響，將取決 t 與 c 的比率。

t/c 分別為 7.8125，5 與 3.4722；t/c 是給定 t 值，提高 c 數值，並且經由模擬各種 σ_A 與 σ_c，分析是否與確定性模型有所差異。模擬結果在 Appendix 表中，從表中資料可看出 t/c 為 5 時，獲得的 CS 為最大，此仍與確定性模型結果相同。

4. 結論與建議

平均數的模擬，A 平均數增加對消費者效用有正向影響，消費者剩餘分佈將向右平移，因此，A 平均數增加向廠商購買的人數增加；其中，Q_j^d(SUPERCOMPETITIVE) 將增加， Q_j^d(COMPETITIVE)與Q_j^d(MNOPOLY)將減少。c 平均數增加對消費者效用有負向影響，消費者剩餘分佈將向左平移，因此，c 平均數增加向廠商購買的人數將減少；其中，Q_j^d(SUPERCOMPETITIVE) 將減少， Q_j^d(COMPETITIVE)呈先增後減與 Q_j^d(MNOPOLY)將增加。

標準差的模擬，標準差愈大使 A、c 的分佈愈廣，進而影響消費者的效用。A 標準差增加時，消費者剩餘分佈愈廣。A 愈分散出現低 A 值也愈多，因此，隨 A 標準差的增加，購買人數將減少。此外，愈分散的 A 將減少 Q_j^d(COMPETITIVE)，和增加 Q_j^d(MNOPOLY)與Q_j^d(SUPERCOMPETITIVE)。相同地，c 標準差增加時，消費者剩餘分佈愈廣，隨 c 標準差增加，c 分佈愈大，此時 Q_j^d(COMPETITIVE)增加與

Q_j^d(SUPERCOMPETITIVE)減少，Q_j^d(MNOPOLY)則無明顯的變化。

相關係數的模擬，相關性愈是正相關係則 A 與 c 同向的情況將增加，從而使消費者剩餘的分佈更加集中，與增加Q_j^d(COMPETITIVE)。反之，若愈是負相關係則 A 與 c 反向的情況將增加，從而使消費者剩餘的分佈更加分散，與增加Q_j^d(MNOPOLY)與 Q_j^d(SUPERCOMPETITIVE)。

本研究從確定性模型架構出發，討論一個最簡單的狀況，亦即所有消費者的願意支付價格以及品牌偏好是確定的，廠商則處於 Bertrand 的競爭型態。在這個例子中，模型將探究運輸成本、願意支付價格以及品牌偏好對於下游及上游廠商價差所造成的影響。本文以賣方勢力的文獻為基礎，除研究固定參數的假設下，買方勢力對於市場的影響外，也進一步將參數改成隨機型態，藉由模擬的方式瞭解不確定狀態下的市場情形。模擬分析得到兩個較為明確的結論：首先，不確定性下平均數的改變，其較類似確定性模型的比較靜態分析；例如，隨著消費者偏好平均數的增加，廠商的需求量增加，此與確定性模型分析，有著類似的分析結果。其次，在標準差與相關係數的變化方面，由於涉及變數的分佈狀況，其影響性並不等同於確定參數的結果。此為分析異質消費者的分佈差異，進而對廠商與消費者的影響，這是確定性模型無法補捉到的情況。因此，藉由模擬的方式獲得較為細緻的結果，是本研究第二部份採用不確定模型的主要目的。

模擬過程中為確保精確性，樣本數設為 1,000,000，多數的結果與理論值差距很小，但需求彈性方面則出現較大的誤差，雖多次嘗試降低需求彈性的誤差情況，但囿於硬體設備，儘可能提高模擬的樣本數下，仍有改善的空間。此外，Borenstein (1985)採取差別取價分析廠商與消費者行為，與目前採取單一訂價有所差異，也是本研究在未來進一步要研究的方向。

References

Borenstein, S. 1985. “Price Discrimination in Free-Entry Markets,” *RAND Journal of Economics*, 16, 3: 380-397.

Chen, Z. and R. Lent., 1992. “Supply Analysis in an Oligopsony Model,” *American Journal of Agricultural Economics*, 74, 4: 973-9.

Durham, C.A. and R.J. Sexton, 1992. “Oligopsony Potential in Agriculture: Residual Supply Estimation in California’s Processing Tomato Market,” *American Journal of Agricultural Economics*, 74, 4: 962-972.

Gohin, A. and H. Guyomard, 2000. “Measuring the Market Power for Food Retail Activities: French Evidence,” *Journal of Agricultural Economics*, 51(2):181-195.

Hamilton, S. and D. Sunding, 1997. “The Effect of Farm Supply Shifts on Concentration and Market Power in the Food Processing Sector,” *American Journal of Agricultural Economics*, 79, 2: 524-31.

Hyde, C. and J. Perloff, 1994. **“**Can Monopsony Power Be Estimated?” *American Journal of Agricultural Economics*, 76, 5, 1151-1155.

Just, R. and W. Chern. 1980. “Tomatoes, Technology, and Oligopsony,” *The Bell Journal of Economics*, 11, 2: 584-602.

Raper, K.C., H.A. Love, and C.R. Shumway, 2000. “Determining Market Power Exertion Between Buyers and Sellers,” *Journal of Applied Econometrics*, 15:225-252.

Rogers, R.T., and R.J. Sexton, 1994. “Assessing the Importance of Oligopsony Power in Agricultural Markets,” *American Journal of Agricultural Economics*, 76:1143-1150.

Salop, S., 1979. “Monopolistic Competition with Outside Goods,” *The Bell Journal of Economics*, 10: 141-56.

Schroeter, J., A. Azzam, and M. Zhang. 2000. “Measuring Market Power in Bilateral Oligopoly: The Wholesale Market for Beef,” *Southern Economic Journal*, 66, 3: 526-547.

Sexton, R., 1990. “Imperfect Competition in Agricultural Markets and the Role of Cooperatives: A Spatial Analysis,” *American Journal of Agricultural Economics*, 72, 3: 709-720.

Wann, J. and R. Sexton. 1992. “Imperfect Competition in Multiproduct Food Industries with Application to Pear Processing,” *American Journal of Agricultural Economics*, 74, 4: 980-990.

Appendix t/c ratio

橫軸與縱軸分別為σ_c與σ_A，corr 皆為 0.8。我們也過模擬相關係數從-1 到 1，其結果也以 t/c=5 的 CS 為最高，故不再贅述。

t/c=7.8125	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
1	3.0889	3.0894	3.0905	3.0876	3.0885	3.0877	3.0879	3.0884	3.0874	3.0880	3.0887
1.2	3.0908	3.0905	3.0911	3.0907	3.0897	3.0911	3.0902	3.0907	3.0902	3.0907	3.0896
1.4	3.0958	3.0943	3.0938	3.0970	3.0928	3.0954	3.0931	3.0963	3.0956	3.0935	3.0959
1.6	3.1041	3.1031	3.1043	3.1025	3.1009	3.1038	3.1015	3.1056	3.1030	3.1051	3.1079
1.8	3.1159	3.1154	3.1181	3.1166	3.1139	3.1174	3.1180	3.1181	3.1156	3.1149	3.1189
2	3.1344	3.1362	3.1355	3.1330	3.1383	3.1379	3.1372	3.1375	3.1354	3.1335	3.1359
2.2	3.1636	3.1586	3.1621	3.1589	3.1591	3.1649	3.1593	3.1603	3.1572	3.1640	3.1586
2.4	3.1909	3.1892	3.1828	3.1880	3.1883	3.1853	3.1901	3.1881	3.1901	3.1896	3.1893
2.6	3.2227	3.2192	3.2196	3.2227	3.2211	3.2211	3.2206	3.2201	3.2235	3.2196	3.2229
2.8	3.2595	3.2570	3.2613	3.2624	3.2599	3.2575	3.2594	3.2578	3.2625	3.2594	3.2559
3	3.3053	3.2988	3.2980	3.2987	3.3005	3.2955	3.2984	3.2964	3.3014	3.3016	3.3015

t/c=5	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
1	3.4006	3.4007	3.3990	3.3990	3.4002	3.4004	3.3975	3.4003	3.4023	3.4013	3.3993
1.2	3.3999	3.4016	3.4028	3.4013	3.4031	3.4008	3.4042	3.4022	3.4019	3.4020	3.4042
1.4	3.4056	3.4056	3.4046	3.4028	3.4050	3.4049	3.4064	3.4033	3.4052	3.4058	3.4068
1.6	3.4158	3.4127	3.4127	3.4154	3.4132	3.4114	3.4095	3.4137	3.4138	3.4118	3.4148
1.8	3.4225	3.4240	3.4222	3.4218	3.4203	3.4253	3.4218	3.4254	3.4219	3.4231	3.4240
2	3.4388	3.4368	3.4380	3.4394	3.4365	3.4374	3.4365	3.4389	3.4412	3.4350	3.4412
2.2	3.4610	3.4550	3.4613	3.4580	3.4581	3.4606	3.4641	3.4569	3.4584	3.4588	3.4587

t/c=5	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
2.4	3.4835	3.4875	3.4845	3.4824	3.4855	3.4834	3.4865	3.4833	3.4833	3.4796	3.4850
2.6	3.5118	3.5153	3.5128	3.5102	3.5130	3.5152	3.5188	3.5101	3.5113	3.5160	3.5138
2.8	3.5490	3.5459	3.5484	3.5444	3.5419	3.5446	3.5504	3.5442	3.5466	3.5462	3.5453
3	3.5838	3.5795	3.5824	3.5812	3.5828	3.5806	3.5825	3.5855	3.5884	3.5853	3.5802

t/c=3.4722	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
1	3.1929	3.1928	3.1927	3.1931	3.1950	3.1932	3.1938	3.1918	3.1911	3.1936	3.1919
1.2	3.1962	3.1945	3.1962	3.1977	3.1969	3.1943	3.1940	3.1961	3.1978	3.1938	3.1982
1.4	3.2058	3.2043	3.2026	3.2036	3.2047	3.2034	3.2031	3.2004	3.2049	3.2077	3.2040
1.6	3.2169	3.2129	3.2152	3.2137	3.2183	3.2147	3.2109	3.2152	3.2136	3.2150	3.2118
1.8	3.2305	3.2292	3.2306	3.2298	3.2307	3.2297	3.2293	3.2332	3.2269	3.2298	3.2313
2	3.2523	3.2506	3.2469	3.2495	3.2507	3.2485	3.2511	3.2495	3.2488	3.2506	3.2485
2.2	3.2748	3.2706	3.2739	3.2758	3.2726	3.2746	3.2729	3.2731	3.2745	3.2776	3.2763
2.4	3.3013	3.3005	3.2999	3.3065	3.3048	3.3037	3.3022	3.3027	3.3032	3.3029	3.3038
2.6	3.3393	3.3365	3.3372	3.3385	3.3406	3.3355	3.3381	3.3335	3.3355	3.3408	3.3336
2.8	3.3769	3.3729	3.3778	3.3731	3.3785	3.3725	3.3782	3.3738	3.3802	3.3721	3.3763
3	3.4154	3.4148	3.4143	3.4166	3.4179	3.4112	3.4173	3.4153	3.4121	3.4154	3.4147

出席國際學術會議心得報告

會議名稱: WEAI 87th Annual Conference

會議時間: 2012.6.29 - 2012.7.3

會議地點：San Francisco, CA, USA

國立政治大學經濟學系

助理教授

王信實

國科會補助專題研究計畫出席國際學術會議心得報告

日期：101 年 7 月 20 日

計 畫 編 號	NSC100－2410－H－004－007－		
計 畫 名 稱	買方市場勢力與水平異質產品生產者：隨機異質的偏好		
出國人員姓名	王信實	服務機構及職稱	政大經濟系助理教授
會 議 時 間	101 年 6 月 29 日至 101 年 7 月 3 日	會 議 地 點	San Francisco, CA, USA
會 議 名 稱	(中文) (英文) Western Economic Association International 87th Annual Meeting		
發 表 題 目	(中文)買方市場勢力與水平異質產品生產者：隨機異質的偏好 (英文) Buyer Power and Differentiated Producers: Stochastic and Heterogeneous Preferences		

一、參加會議經過

2012年WEAI會議從六月二十九日進行至七月三日，期間本人參與主辦單位所舉辦的各項活動，其中與本研究計畫及本人研究領域相關的論文及場次彙整如下：

場次名稱	場次發表之論文	本人參與身份
KEYNOTE ADDRESS:	**Introduction:** Lucian A. Bebchuk, Harvard Law School **Papers:** Oliver D. Hart, Harvard University *Rethinking Incomplete Contracts*	聽眾
IO: UPSTREAM-DOWNSTREAM MODELS	Juan A. Gelves, Midwestern State University *Incentives to License with a Mixed Firm* Kuo Feng Kao, Tamkang University *Technology Licensing in Vertically Related Markets: A Case of Vertically-Integrated Firm* Shinn-Shyr Wang, National Chengchi University *Buyer Power and Differentiated Producers: Stochastic and Heterogeneous Preferences*	發表人
TOPICS IN INDUSTRIAL ORGANIZATION I	Yutian Chen, California State University, Long Beach, and Ying-Ju Chen, University of California, Berkeley *Strategic Capacity Shortage: A New Rationale for Onshore Production* Hui-Ling Chung, National Dong Hwa University *Bundling, Quality Choice and Welfare Analysis* Viktoria Dalko, Harvard University, Ferenc Gyurcsany, Hungarian	評論人

場次名稱	場次發表之論文	本人參與身份
	Parliament, Lawrence R. Klein, University of Pennsylvania, Michael H. Wang, RICE Institute, and Xin Yan, RICE Institute *Cause of Return Reversal: Information Monopoly Hypothesis* Stephen F. Hamilton, California Polytechnic State University, San Luis Obispo, and Philippe Bontems, Toulouse School of Economics *Oligopoly Intermediation, Strategic Pre-Commitment and the Mode of Competition*	
TOPICS IN INDUSTRIAL ORGANIZATION I I	Thomas Blake, University of California, Davis *Pricing Inefficiencies in Large Corporations* Chyong Ling Judy Chen, Feng Chia University, and Ho-Don Yan, Feng Chia University *Transaction Cost Entrepreneurship and the Burgeoning of Chinese Portpartum Nursing Enterprises* Orie Shelef, University of California, Berkeley *Incentive Thresholds, Performance, and Risk Taking* Steven S. Wildman, Michigan State University, W. Wayne Fu, Nanyang Technological University, and Carol Yi-feng Ting, University of Macau *Search Advertising: Is There a Feedback Effect?*	主席

二、與會心得

WEAI 是重要的國際性經濟學會之一，每年六、七月舉辦的年會暨學術研討會往往吸引全球數千位經濟學者齊聚一堂，共同研討各項重要的經濟議題。WEAI 在今年所舉辦為期五天的會議中，便有超過 350 場的討論會。有機會參與這樣的盛會，都要歸功於國科會的補助，在此致上誠摯的感謝之意。

在這次的研討會中接觸到許多重要的研究成果，這些都是在台灣難有機會聽聞的。例如，大會邀請哈佛大學經濟系「契約理論」的專家——Oliver Hart 擔任年會的主講人，有幸親炙國際級大師的風範，並接受大師智慧的洗禮，對自身的研究有莫大的助益。

此次參與WEAI年會，主要目的除了發表“Buyer Power and Differentiated Producers: Stochastic and Heterogeneous Preferences”這篇研究論文，將國內的學術研究成果介紹給國際認識之外，更重要的是，有機會聽取國際上目前已完成，或正在進行的許多產業組織領域的最新研究，這些資訊對於目前正在進行的研究，有很大的幫助。

除了在研討會中發表研究計畫的成果，本人也在其他場次擔任相關論文的評論人及主持人，希望透過此次國際學術研討會的交流，能夠讓本研究的成果更為完整，並且也為提升台灣學術研究的能量與能見度略盡棉薄之力。本人擔任評論人的論文，其作者為 Steve Hamilton 和

Philippe Bontems，這兩位都是多年老友，他們對於台灣的學術研究環境甚感興趣，紛紛表示若有機會，相當樂意到台灣進行學術交流。

此外，值得一提的是，本人在研討會的其他場次，聆聽William Thompson教授分析賭場產業，Thompson教授同時也是本研究計畫成果發表場次的主席，目前服務於美國內華達大學拉斯維加斯分校，是賭場研究的權威。會後本人針對台灣澎湖和馬祖的博奕公投向他請益，Thompson教授給了很多寶貴的意見，並表示如果有機會，他非常願意到台灣參訪，除了實際了解台灣賭場觀光的發展現況，也可以和我們分享拉斯維加斯的賭場經驗。

經歷這場國際研討會的洗禮，本人再次感受到參與國際學術交流的重要性。參與國際會議得以和世界各國學者互動，這是了解國際學術界關注的焦點，以及掌握最新研究趨勢最直接、最便捷的方式。綜合多次國際會議的交流經驗，本人深刻體會近年來學術研究的進展相當快速，講究學者間的團隊合作，過去單打獨鬥閉門研究的模式，早已不符合當前的學術環境。因此，在這次年會的活動中，本人和一些來自台灣或其他國家的老朋友和新朋友，除了分享各自正在進行以及未來打算進行的研究計畫之外，更相約下次的會議要攜手合作向大會提出組織 2 至 3 個專門場次的計畫，研討大家共同感興趣的議題。希望透過這樣的合作模式，對於台灣的國際學術交流盡一點心力。

三、發表論文全文或摘要

論文摘要如下：

本研究提出一個同時兼顧垂直及水平競爭的架構，此架構同時考慮買方及賣方雙向的市場勢力。上游廠商供給下游廠商均質產品，而下游廠商則把這種產品加工成水平異質產品。然而，上游市場並不是完全競爭的，因為上游各家廠商坐落於不同的區位，供應下游廠商的運輸成本並非為零。下游廠商（亦即加工者）同樣散落各地，因此會向距離它最近的上游廠商購買。這種空間特性賦予下游廠商買方的市場勢力，因為它們各自成為許多上游廠商唯一的買家。在下游市場中，每一家生產異質產品的廠商企圖吸引不同偏好的消費者（每一個消費者具有不同的「品牌偏好」)。這種水平差異正是模型中賣方市場勢力的來源。這個模型使我們得以將總的市場勢力（也就是「價差」）分解成來自於賣方以及買方市場勢力兩部分。

本研究首先討論一個最簡單的狀況，亦即所有消費者的願意支付價格以及品牌偏好是確定的，廠商則處於 Bertrand 的競爭型態。在這個例子中，模型將探究運輸成本、願意支付價格以及品牌偏好對於下游及上游廠商價差所造成的影響。本文以賣方勢力的文獻為基礎，除研究固定參數的假設下，買方勢力對於市場的影響外，也進一步將參數改成隨機型態，藉由模擬的方式瞭解不確定狀態下的市場情形。模擬分析得到兩個較為明確的結論：首先，不確定性下平均數的改變，其較類似確定性模型的比較靜態分析；例如，隨著消費者偏好平均數的增加，廠商的需求量增加，此與確定性模型分析，有著類似的分析結果。其次，在標準差與相關係數的變化方面，由於涉及變數的分佈狀況，其影響性並不等同於確定參數的結果。此為分析異質消費者的分佈差異，進而對廠商與消費者的影響，這是確定性模型無法補捉到的情況。因此，藉由

模擬的方式獲得較為細緻的結果，是本研究第二部份採用不確定模型的主要目的。

最後，本研究根據模擬的結果，比較各種不同情境下的福利水準。此分析之所以重要是因為福利水準經常無法直接從價差推演而來。舉例來說，因為產品差異所帶來的價差提升（並非因為付給上游廠商的價格降低），一般認為將會減少消費者的福利而增進加工者的利潤（因為較高的下游價格）。然而，消費者的福利很可能實際上是有增無減的，因為較高的產品差異會降低消費者的交通成本，而這個效果可能大到足以抵銷較高價格所帶來的影響。

四、建議

誠如在與會心得當中所述，國際交流和跨國合作進行研究對於台灣的學術發展，相當重要。然而，由於國內研究環境規模相對較小，在研究上不容易產生規模經濟。雖然，國科會鼓勵學者參與國際會議，讓國內和國際的學術研究得以接軌，但是參與國際會議屬於短期的交流，無法與各學者進行更深入的學術交流，或者進一步洽談合作內容。反觀臨近的中國大陸，已多次邀請國際知名學者到其大學校園或研究單位進行短期課程講授，這樣的做法不但使得中國的學者能就近和大師學習，更有機會和他們進行研究合作。過去我國學術成就有目共睹，也常有國內學者應邀至中國大陸進行短期教學，然而隨著中國大陸的學術成長，近來中國大陸的學術表現日漸亮眼，而相對的，我國學術成長似乎日漸趨緩。

有鑑於邀請國際學者到台灣講學，需要較高的經費，多數學校或研究單位難以負擔。故建議以國科會專案補助的方式，有計劃地邀請國際學術研究的知名學者赴台灣講學，或者進行短期的參訪，此舉不但能增加我國學者與國際學者密集交流的機會，也能讓台灣的研究生有機會接觸主流的研究方向，希望藉由外來刺激，提升我國的學術研究水準。此外，若從撙節經費的角度思考，或許可以考慮和中國大陸合作，一同邀請國際學者進行講學和交流，或者就近邀請正在中國大陸進行講學的國際學者到台灣做短期的交流，也不失為一個變通的辦法。

五、攜回資料名稱及內容

會議流程手冊

六、其他

附件為 WEAI 大會所寄送論文發表之接受函。

February 14, 2012

Shinn-Shyr Wang
Department of Economics
National Chengchi University
64, Sec. 2, Tz-nan Rd.
Taipei, 116 Taiwan

SOL 0/0

RE: Confirmation of Conference Program Participation

We are pleased to confirm your participation, as indicated below, on WEAI's 87th Annual Conference program. Please watch your email for important conference information, including preliminary scheduling and program updates. If you have to cancel your participation, 50% of your participation fee is refundable before March 1. After March 1 your participation fee is nonrefundable due to the high administrative cost of reorganizing the affected session and participants.

Session chairs are expected to coordinate participants and papers before and during the conference. Paper presenters should email their paper to fellow session participants by June 1, 2012. Because of the shortage in volunteer discussants, all presenters can expect to serve as a discussant in the session in which they are presenting.

According to our records, you have volunteered for the following:

Paper Presenter in topic area code(s): L13 D43 M31 --
Shinn-Shyr Wang, National Chengchi University
Buyer Power and Differentiated Producers: Stochastic and Heterogeneous Preferences

Discussant in topic area code(s): L --

Chair in topic area code(s): L --

Your contact information will be listed as follows:

Shinn-Shyr Wang, National Chengchi University
E-mail: sswang@nccu.edu.tw
Day Phone: 886-2-2939-3091
Fax: 886-2-2939-0344

If any of the above information is incorrect or incomplete, please e-mail sessions@weai.org.

國科會補助計畫衍生研發成果推廣資料表

日期:2012/10/29

國科會補助計畫	計畫名稱: 買方市場勢力與水平異質產品生產者：隨機異質的偏好
	計畫主持人: 王信實
	計畫編號: 100-2410-H-004-007- 學門領域: 產業組織與政策

無研發成果推廣資料

100 年度專題研究計畫研究成果彙整表

<table>
<tr><td colspan="3">計畫主持人：王信實</td><td colspan="5">計畫編號：100-2410-H-004-007-</td></tr>
<tr><td colspan="8">計畫名稱：買方市場勢力與水平異質產品生產者：隨機異質的偏好</td></tr>
<tr><td colspan="3" rowspan="2">成果項目</td><td colspan="3">量化</td><td rowspan="2">單位</td><td rowspan="2">備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）</td></tr>
<tr><td>實際已達成數（被接受或已發表）</td><td>預期總達成數(含實際已達成數)</td><td>本計畫實際貢獻百分比</td></tr>
<tr><td rowspan="12">國內</td><td rowspan="4">論文著作</td><td>期刊論文</td><td>0</td><td>0</td><td>100%</td><td rowspan="3">篇</td><td></td></tr>
<tr><td>研究報告/技術報告</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td>研討會論文</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td>專書</td><td>0</td><td>0</td><td>100%</td><td></td><td></td></tr>
<tr><td rowspan="2">專利</td><td>申請中件數</td><td>0</td><td>0</td><td>100%</td><td rowspan="2">件</td><td></td></tr>
<tr><td>已獲得件數</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td rowspan="2">技術移轉</td><td>件數</td><td>0</td><td>0</td><td>100%</td><td>件</td><td></td></tr>
<tr><td>權利金</td><td>0</td><td>0</td><td>100%</td><td>千元</td><td></td></tr>
<tr><td rowspan="4">參與計畫人力（本國籍）</td><td>碩士生</td><td>1</td><td>1</td><td>100%</td><td rowspan="4">人次</td><td></td></tr>
<tr><td>博士生</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td>博士後研究員</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td>專任助理</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td rowspan="12">國外</td><td rowspan="4">論文著作</td><td>期刊論文</td><td>0</td><td>1</td><td>100%</td><td rowspan="3">篇</td><td></td></tr>
<tr><td>研究報告/技術報告</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td>研討會論文</td><td>1</td><td>1</td><td>100%</td><td></td></tr>
<tr><td>專書</td><td>0</td><td>0</td><td>100%</td><td>章/本</td><td></td></tr>
<tr><td rowspan="2">專利</td><td>申請中件數</td><td>0</td><td>0</td><td>100%</td><td rowspan="2">件</td><td></td></tr>
<tr><td>已獲得件數</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td rowspan="2">技術移轉</td><td>件數</td><td>0</td><td>0</td><td>100%</td><td>件</td><td></td></tr>
<tr><td>權利金</td><td>0</td><td>0</td><td>100%</td><td>千元</td><td></td></tr>
<tr><td rowspan="4">參與計畫人力（外國籍）</td><td>碩士生</td><td>0</td><td>0</td><td>100%</td><td rowspan="4">人次</td><td></td></tr>
<tr><td>博士生</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td>博士後研究員</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
<tr><td>專任助理</td><td>0</td><td>0</td><td>100%</td><td></td></tr>
</table>

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：□已發表 ■未發表之文稿 □撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：（以 100 字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）

本計畫研究的主題－買方勢力，相對於傳統的賣方勢力而言，雖然相關的文獻並不成比例，但近年來卻有逐漸增多的趨勢。這也反應當今產品垂直供應鏈中，下游廠商與日俱增的影響力，本研究所探討的食品加工業過去數十年整合與集中度上升即是個例子。

本研究嘗試提出一個簡單的模型，研究農民與加工業者的關係，這些產業的主要特點即是下游業者對上（原料市場）具有買方勢力，對下（加工品市場）則具有賣方勢力。這個模型使我們得以成功地將總的市場勢力分解成來自於賣方以及買方市場勢力兩部分。研究發現：(1) 加工市場較集中或農民運輸成本較高時，將愈不利於消費者的福祉；(2)隨消費者品牌偏好愈強，愈能鼓勵更多加工業者加入市場，並提供更多種類的加工產品。除研究固定參數的假設下，賣方勢力與買方勢力對於市場的影響外，本研究也進一步將參數改成隨機型態，藉由模擬的方式瞭解不確定狀態下的市場情形。因此本研究得以分析異質消費者的分佈差異，對廠商與消費者的影響，這是確定性模型無法補捉到的情況。而這個較為細緻的結果，是本研究的第二個貢獻。

本文研究不只著重於賣方市場勢力，更將重點放在當買方具有市場勢力時，廠商所具有的影響性，此研究不但彌補了文獻的不足，也與當前產業發展趨勢相契合。除考量目前的單一訂價外，未來更計畫將差別取價引入模型中，如此更能充份發揮此類模型的特性，進一步探討其他如高科技產業的買方市場勢力。