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The countervailing power hypothesis in the dominant firm-competitive fringe model[☆]

Charalambos Christou[a], Konstantinos G. Papadopoulos[b,*]

[a] Department of Economics, University of Macedonia, Egnatia 156, 54006, Thessaloniki, Greece

[b] Department of Economics, Aristotle University of Thessaloniki, PO Box 170, 54124, Greece

HIGHLIGHTS

- Correcting for payoffs and outside options in Chen (2003), new results emerge.
- Countervailing power is neutral in the linear dominant firm-competitive fringe model.
- Neutrality result is independent of the fringe size.
- The profits of the dominant retailer never decrease with a rise of his buyer power.

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ABSTRACT

In the dominant firm-competitive fringe model, where firms purchase input from a common supplier via two-part tariff contracts, we demonstrate that countervailing power may be neutral. Unlike Chen (2003), more countervailing power may not lead to lower consumer prices.

1. Introduction

A line of research in vertical relations in industrial organization aims to identify market structures and trade contracts under which an increase of buyer power is consumer welfare enhancing.[1] In this line, Chen (2003) claimed that an increase in the amount of buyer power possessed by a dominant retailer can lead to a fall in retail prices for consumers, thus providing a rigorous theoretical foundation for Galbraith's (1952) argument on countervailing power. The result is shown in a standard textbook model of price leadership, the dominant firm-competitive fringe model, where all firms purchase an intermediate good from a common supplier via two-part tariff contracts. A distinctive feature of that model is that an increase in the level of bargaining power of the large retailer leads to a lower wholesale price only for fringe retailers, which stands in the opposite direction to the literature which is supportive of the so-called waterbed effect.[2]

In this article, we demonstrate that countervailing power in the dominant firm-competitive fringe model is neutral; it does

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* Corresponding author. Tel.: +30 2310997120.
E-mail addresses: christou@uom.gr (C. Christou), kpap@econ.auth.gr (K.G. Papadopoulos).

1 See Inderst and Mazzarotto (2009).

2 See for instance Inderst and Valletti (2011).

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not affect equilibrium prices and quantities. Our result emerges from a recalculation of Chen's original model by formulating the bargaining problem consistently with the Nash axiomatic approach and correcting the specification of players' outside options.

2. The model

In this section, we briefly present Chen's (2003) model, henceforth the *original model*, and the necessary notation.

In the upstream level there exists a unique supplier denoted by s who produces and sells an intermediate good to $(1+n)$ retailers, one dominant retailer and a competitive fringe consisting of n retailers. The number of firms is fixed and there is no entry. In the downstream level, retailers sell the product to consumers whose demand, $D(p)$, is assumed to be linear, $D = a - bp$, where p is the retail price.[3]

Retailers transform one unit of the intermediary good to one unit of the final product, but they differ with respect to retail cost. The dominant retailer has constant marginal retailing cost, c, whereas each fringe retailer faces increasing marginal cost, in particular linear, $MC(q_f) = dq_f,\ d > 0$, where q_f denotes the quantity of output produced by the typical fringe retailer. The supplier's cost for producing the intermediate good is normalized to zero.

The dominant retailer bargains with the supplier over the input price and unilaterally sets the consumer price. Fringe firms are price-takers both in the input and the final good market. The timing of the game is the following:

At $t = 1$, the supplier makes a take-it-or-leave-it offer to each one of the fringe retailers. The offer is a two-part tariff contract, that is, a pair (w_f, F_f) consisting of a fee F_f and a wholesale price w_f for each unit of the intermediate good. It is assumed that the supplier can commit to his offers.

At $t = 2$, the supplier and the dominant retailer bargain over a two-part tariff (w_d, F_d) given an exogenous level of bargaining power $\gamma \in (0, 1)$ of the dominant retailer.

At $t = 3$, the dominant retailer sets the consumer price p taking as given the supply function of the fringe. Once p is set, each one of the fringe retailers chooses how much quantity of the input good q_f to buy at w_f and sell at price p after incurring the retailing cost.

The core result of Chen's article is that at equilibrium $\partial w_f/\partial\gamma < 0$, i.e. an exogenous increase in the dominant retailer's countervailing power, lowers the wholesale price that the supplier offers to fringe retailers. At lower cost, fringe retailers shift their supply curve to the right and consequently retail prices fall.

3. Equilibria and comparisons

We argue that the bargaining outcome of the subgame at the second stage of the original model is based on two crucial assumptions. In particular, at $t = 2$, when the supplier bargains with the dominant retailer it is assumed that (i) their joint profits do not include the surplus the supplier earns from his transaction with the fringe retailers and (ii) the supplier's outside option in case of a negotiation breakdown is considered to be zero. In line with the Nash axiomatic approach, we suggest the following specification of payoff functions and outside options. First, with respect to (i), the surplus of the fringe retailers which is captured by the supplier is affected by the bargaining outcome, so we require that it should be part of the negotiation as well. Second, regarding (ii), in the original model the supplier is able to commit to the contract with the fringe retailers. For that reason we assume that if negotiations with the dominant retailer fail, the supplier will honor the contract that is signed at $t = 1$ with the fringe retailers. Plausibly, since fringe retailers behave as price takers by assumption, they will supply the final good at the competitive market clearing price, thus generating a positive disagreement payoff for the supplier. This non-negligible outside option of the supplier is absent from the bargaining process in the original model.

In the sequel we calculate the original model, taking into account points (i) and (ii) in the second stage of the game. We proceed by backward induction.

At $t = 3$, each fringe retailer chooses how much to sell to consumers given the retail price p set by the dominant retailer and the (F_f, w_f) contract offered to him by the supplier. The fringe retailer's problem is

$$\max_{q_f} \pi_f = \left(p - w_f - \frac{dq_f}{2}\right) q_f - F_f$$

which gives the supply function of each fringe firm, $q_f^* = MC^{-1}(p - w_f) \equiv s(p - w_f) = (p - w_f)/d$. The dominant retailer faces a residual demand equal to $D(p) - ns(p - w_f)$ and chooses the retail price p in order to

$$\max_{p} \pi_d = (p - c - w_d)[D(p) - ns(p - w_f)] - F_d.$$

The profit maximizing retail price is

$$p^*(w_d, w_f) = \frac{ad + nw_f + (bd + n)(c + w_d)}{2(bd + n)}.$$

At $t = 2$, the supplier and the dominant retailer bargain over the (F_d, w_d) contract. Let π_s be the profits of the supplier and γ the degree of bargaining power of the dominant retailer with $0 < \gamma < 1$. Then the bargaining problem is

$$B_d^s = \{[\pi_s, \pi_d] \mid F_d \geq 0,\ w_d \geq 0\},$$

with (O_s, O_d) the disagreement payoffs (outside options) for the supplier and the dominant retailer respectively.

In the original model, the payoff functions and the disagreement payoffs are

$$\begin{aligned} &\pi_s(F_d, w_d) = F_d + w_d[D(p) - ns(p - w_f)], \\ &\pi_d(F_d, w_d) = (p - c - w_d)[D(p) - ns(p - w_f)] - F_d, \\ &(O_s, O_d) = (0, 0) \end{aligned} \tag{1}$$

and the outcome of bargaining is a solution to the Nash programme that maximizes the product $[\pi_s(F_d, w_d)]^{(1-\gamma)}[\pi_d(F_d, w_d)]^{\gamma}$, with respect to F_d and w_d, or

$$\begin{aligned} &F_d = (1 - \gamma)\Pi_D, \\ &w_d = 0, \end{aligned}$$

where $\Pi_D = (p - c)[D(p) - ns(p - w_f)]$ is the joint profit generated from the transaction between the supplier and the dominant retailer. However the definition of supplier's profit (1) does not include the surplus the supplier rips from the fringe retailers, even though the fringe surplus is affected by the bargaining outcome. Moreover, in case of negotiations breakdown, the dominant retailer does not serve the market and since the supplier is committed to the contract with the fringe retailers, the competitive price p_o prevails in the retail level. It is determined by the demand-equal-supply condition $D(p_o) = ns(p_o - w_f)$. Taking into account these considerations, the payoff functions and disagreement payoffs are:

$$\begin{aligned} \bar{\pi}_s(F_d, w_d) &= F_d + w_d[D(p) - ns(p - w_f)] \\ &\quad + n[F_f + w_f s(p - w_f)], \\ (\bar{O}_s, O_d) &= (n(F_f + w_f s(p_o - w_f)), 0) \end{aligned}$$

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3 In order to make our result as clear as possible and directly comparable to that of Chen, we focus on the linear version of the model as it is included as a special case in his article.