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Vertical Contracts Between Manufacturers and Retailers: Inference With Limited Data—The Case of Yogurt

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Sofia Villas-Boas

Rarely do firms sell their products directly to final consumers, instead selling through intermediary firms along a vertical supply chain. Vertical contracts between upstream firms (such as manufacturers) and downstream firms (such as retailers) involve negotiations about wholesale prices and other contractual terms that researchers and policy makers do not observe. This paper introduces a framework for determining which vertical contract best fits the data for certain retailers and manufacturers. In particular, we analyze the yogurt market in the United States.

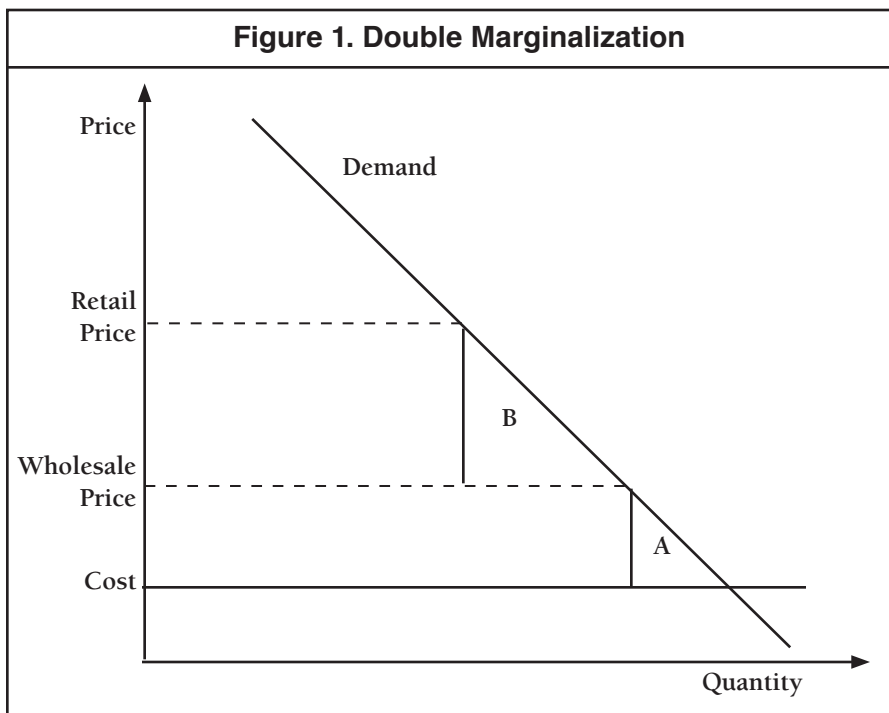
Manufacturers rarely supply final consumers. Instead, most industries are vertically separated. We refer to firms in these markets as upstream (for example, the manufacturers) and downstream firms (the retailers). In these settings, downstream firms are the customers of the upstream firms. Downstream firms do not simply consume the product they purchase from upstream firms, but make further decisions regarding the product, such as the determination of final price, the promotional effort and the placement of products on store shelves.

Since the downstream decisions may affect the upstream profits, upstream firms care about the activities of the downstream firms. The first motivation for studying vertical relationships is that they determine the total profit to be divided among firms and its distribution. Vertical contracts also have policy relevance

since they determine the benefit to consumers (consumers' surplus). Second, vertical contracts may promote efficiency because they lead to departure from a simple uniform pricing scheme that results in "double marginalization." Double marginalization occurs when the upstream and downstream markets are not perfectly competitive, and the product is traded with a uniform wholesale price. If a monopoly manufacturer supplies a good to a monopoly retailer and charges the retailer a monopolistic price, the result is double marginalization pricing. Figure 1 provides an illustration. Both the wholesaler and the retailer mark up price above their full costs, causing efficiency or "deadweight" losses equal to the triangles A and B in Figure 1.

If there is one thing worse than a monopolist, it is two successive monopolists. Monopolists charge their customers a markup above cost. In cases of double marginalization, we have markups on top of markups. The interesting thing is, not only is double marginalization bad for consumers, but actually the firms themselves may end up with lower profits.

The case where there was a monopoly in the downstream market was just described. But in fact, the problem still exists if there are multiple firms. All that is needed is that the downstream firms have some market power for this to be a problem. As a consequence, the sum of profits for the manufacturer and retailer may be less than it could have been if they could have "vertically" coordinated their decisions.



The Question

The question asked in this paper is: Does the contracting between manufacturers and retailers in the supermarket industry follow the double marginalization model or something more efficient?

Vertical contracts are especially difficult to examine empirically due to limited data availability. Wholesale price data are typically unavailable, and retailers' and manufacturers' marginal costs are difficult to measure separately. Even with these data limitations, this article demonstrates how one can draw inferences about vertical contracts.

There are other reasons to analyze vertical contracts. They may impair competition through their horizontal effects on the upstream (manufacturer) and downstream (retail) markets by increasing the possibility for coordination (increasing market power) or by excluding rivals and hence diminishing product variety and choices. In general, U.S. antitrust authorities have not paid attention to vertical contracts unless foreclosure became an issue, and most vertical arrangements are treated as *per se* legal. Foreclosure occurs when a vertical contract closes off some or all of a market to competitors thereby permitting the exercise of market power. Finally, the vertical structure in a particular market can significantly affect downstream prices and price dynamics and condition the assessment of merger activities in the upstream and downstream markets.

Methodology

First, demand is estimated using a store-level scanner data-set for quantity and price of the products in the market. Then the estimates are used to compute price-cost margins for retailers and manufacturers under different vertical supply models, without observing wholesale prices. Then estimated price-cost margins are compared with the price-cost margins estimated using components of marginal costs to assess the fit of these different vertical models and identify the best among the competing possible contracts.

The Yogurt Market

The empirical focus is on the yogurt market in a large Midwestern city. Yogurt is one of the largest dairy categories in retail, and the "yogurt consumer" is an important consumer type for retailers. The yogurt category is the fourth largest in the dairy case. Yogurt is produced by a few leading national yogurt manufacturers: Dannon and General Mills together account

for almost 62 percent of total U.S. yogurt sales, private label brands from retail stores are in third place with 15 percent of the market. At the retail level, there are a small number of large retailers (or retail chains) competing directly with each other and who have jointly 75 percent of total sales in the whole metropolitan area. All other retailers not considered had individual shares less than five percent in 1992.

Given the above market structure, yogurt provides an interesting market to test whether double marginalization occurs, since the larger manufacturers as well as the retailers may have market power. The alternative models to be compared with double markup pricing are a vertically integrated model and a variety of strategic vertical supply scenarios, allowing for collusion, non-linear pricing and strategic behavior with respect to the private label products.

What We Find for Yogurt

The results do not provide support for models implying double marginalization. The supply model that fits the data best assumes that wholesale prices are close to cost and that the retailers have pricing power in the vertical chain. The estimates of the price-cost margins are consistent with the range of 30 percent or more attributed to perishables in previous studies.

This result is consistent with several scenarios that include non-linear pricing by manufacturers, via quantity discounts or two-part tariff contracts. In the optimal non-linear pricing contract, the manufacturer sets the marginal wholesale price close to the manufacturer's marginal cost for the retailer to have the right incentives when setting the retail prices. Then the manufacturer extracts revenue from the retailers via a fixed fee or by selling the non-marginal units at higher wholesale prices. The existence of quantity discounts is common practice in this industry.

Interpretations

Anecdotal evidence suggests that retail supermarkets do not often pay fixed fees to their manufacturers, and if they do, these fees are not close to the retail profits. Instead, there seem to be substantial fees paid by the manufacturers to the retailers (so-called slotting allowances). Non-existent fixed fees paid by the retailers to the manufacturers could be explained by the fact that there are multiple manufacturers in this market with whom the retailers can bargain more aggressively for a lower fixed fee by threatening to buy from another manufacturer.

This result is also consistent with high bargaining power of the retailers who are able to force the wholesale prices down to marginal cost. In fact, in the last few decades, arguments have been made that retailers have acquired greater bargaining power relative to manufacturers, suggesting a possible departure from the simple linear pricing model in the industry. Among the several reasons that have been pointed out by industry participants and by researchers is that private labels that compete directly with the national brands provide a new bargaining tool for retailers when negotiating with manufacturers. Retailers are able to sell products that carry the store brand at a lower price than national brands displayed on the same shelf. At a 1995 convention, Douglas Ivester, then-president and CEO of Coca Cola, called private labels “parasites” and said they were responsible for “eroding category profits.”

Another factor is the increased concentration at the retail level. Retail stores are merging to create national chains able to compete in the grocery business with discount stores like WalMart. As a result, retailers have market power, which they can use to bargain more aggressively with the manufacturers. An indication of retailer market power is the increase in competition for shelf space, implying that manufacturers have to pay retailers slotting allowances to get their products displayed.

Efficiency Gain

Why should anyone care about the efficiency gain from solving the vertical coordination problem associated with double marginalization? In the double marginalization case the final retail price ends up being higher than the price that would result from maximizing the profits of the channel as a whole (when there is vertical coordination). There is therefore an efficiency gain when departing (through vertical contracting) from the double marginalization case. For the market studied, the magnitude of the efficiency gain associated with the “best model” in comparison with the double monopoly model is roughly \$1,600 a week, which represents four percent of the sum of the three retailers’ revenues from yogurt sales. Extrapolating to a United-States/yearly basis (given the consumption patterns of a half serving a week, total population and the average price of a yogurt serving of \$0.45), then national yogurt retail revenues are about two billion dollars, and four percent of that is about ninety million dollars, a significant amount.

Extensions of the Methodology

Future research considers the fact that looking at just one category may be restrictive since manufacturers, retailers and consumers make their pricing and purchase decisions in the context of multiple categories. For the retailers analyzed, yogurt sales represent on average only two percent of total retail sales in contrast to the two largest dollar sales categories: soft drinks (17 percent) and cereal (12 percent). Given that consumers purchase a basket of goods during a shopping trip, a multiple category demand may be a more realistic framework to consider. In terms of pricing decisions, the fact that one manufacturer sells products in different product categories affects not only its pricing strategy but may possibly benefit its bargaining flexibility with the retailers. Also, retailers use strategic category pricing to drive consumers into the store and increase sales.

Finally, and to motivate future empirical research on vertical contracts, two questions are identified for which the methodology proposed in this paper can be applied. First, given the estimates of demand and a model of a pre- and post-vertical merger supply behavior, one can predict whether a potential vertical merger affects horizontal competition in the upstream and downstream markets involved. The second question is related to pass-through effects of foreign trade policy, given the estimates of demand in a certain country for a particular good that involves a vertical trading supply model across different countries: one can analyze the effect of an increase of a tariff or depreciation of the exchange rate on domestic or foreign margins. Trade policymakers are particularly interested in who absorbs most of the effects of a particular trade policy: foreign margins or domestic margins. That is in turn determined by the vertical relationships between domestic and foreign upstream or downstream firms. For example, if import prices do not rise as much as the dollar depreciation (i.e., the pass-through effect is less than one), then foreign profit margins are being diminished.

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