Note on Incentives in the Channel of Distribution

John R. Hauser

One of the central ideas in understanding the channel of distribution is the differential power and the conflict that can arise because each of the channel partners seeks to maximize its own profitability. For example, large retailers such as Wal-Mart, dictate many practices to manufacturers, in part, because they control a large fraction of retail sales. Manufacturers, such as Black and Decker, must consider whether or not a new power tool is profitable for Home Depot. If the Black-and-Decker tool does not provide incremental profit to Home Depot, perhaps because it will cannibalize the sales of a Skil power tool, then Home Depot may either choose not to carry the Black-and-Decker tool or ask for a "slotting allowance" in order to carry that tool.

In class we explore channel power and conflict by discussing the relationship between a Canadian candy manufacturer, Neilson, and a Mexican candy distributor, Sabritas. This note is not intended to tell the story of Neilson and Sabritas – that story will be told in class. However, in order to understand

the story we must rely on a concept that was introduced in the Fall economics core – a concept called "double marginalization." If you are fully comfortable with that concept, then you need read no further. If, on the other hand, you would like to review that concept from a marketing perspective, then this note seeks to provide background. I will first attempt to provide an intuitive explanation. For those who prefer to see the actual math, I've provided an optional appendix.

Intuitive Explanation

We first simplify the channel for illustration and assume that there is only one candy manufacturer and one distributor. This is definitely not the case in Mexico. Indeed, a key learning about channels will be how they handle the discrepancy of assortment – that is, the economies that result because Sabritas handles candies from Nielson, Hershey, Nestle, and many local manufacturers. We abstract from this real situation because it is easier to illustrate double marginalization in an (artificially) simple channel.

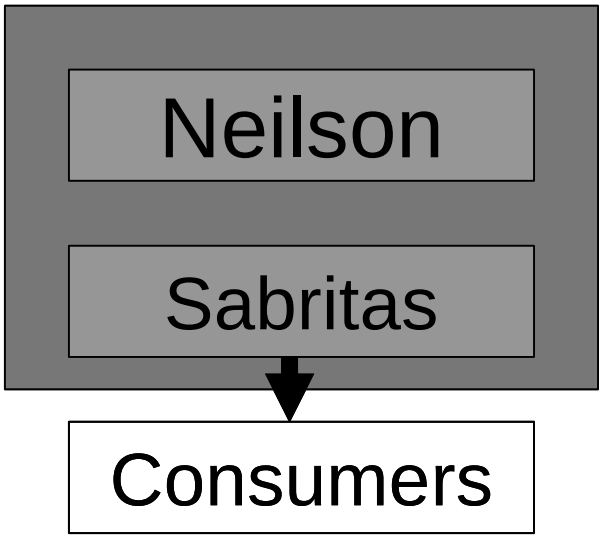

Figure 1. Jointly Owned Channel of Distribution

Consider first the case where both Sabritas and Neilson are owned by the same entity (perhaps Pepsico). I've illustrated this case in Figure 1. The

single box indicates joint ownership. In this case, standard economic reasoning applies and the optimal price will be the price where marginal revenue equals marginal cost. That is, the marginal revenue from serving the "marginal" customer exactly balances the marginal cost of serving that customer. This will be the baseline to which we will compare an uncoordinated channel. In this coordinated case, both costs and benefits are shared by the single owner. That owner sets both the wholesale and the retail price in order to maximize channel profits.

Consider now a situation where Neilson is owned by Cadbury and Sabritas by Pepsico. I've illustrated this example in Figure 2. If Neilson and Sabritas could legally collude, they could get the coordinated profit and split it by negotiation. However, we assume they cannot collude.

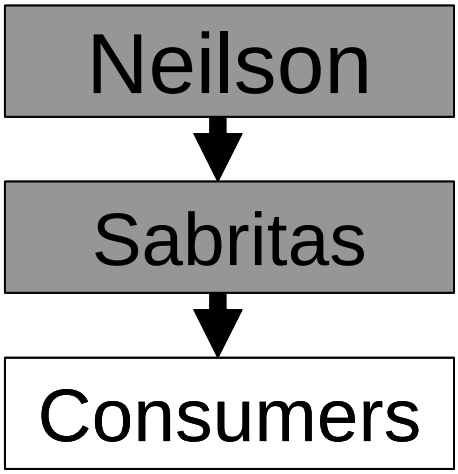

Figure 2. Separately Owned Channel of Distribution

Let's consider how they will set their prices. First, consider Neilson. Suppose that unilaterally Neilson raises its price. Two things will happen. Neilson will get more revenue per unit sales – and it will keep all of that revenue. However, the higher price will mean fewer sales. Indeed, Neilson will raise its price until Neilson's marginal revenue equals marginal cost. We would like to argue intuitively that the price is higher in Figure 2 than in Figure 1.

We do this by comparing the two situations. In Figure 1, if the joint owner raises the wholesale price (Neilson's price) it gains the benefit of Neil-

son's higher margins, but it incurs the cost of reduced demand for both Neilson and Sabritas. Recall that, at the marginal consumer, the gain exactly balances the cost. In Figure 2 all costs and benefits are the same, but not the manner in which costs are benefits are shared is different that it was in Figure 1.

Suppose now that the prices are set as they would have been set in Figure 1 – joint ownership. Suppose now that Neilson raises its price. The increased price means that Neilson gains the benefit of its higher margins, but Neilson only incurs the cost of reduced wholesale demand (wholesale margin x wholesale sales). Neilson does not share the burden of reduced demand that is borne by Sabritas (retail margin x retail sales where retail sales = wholesale sales). This means that, at the joint-ownership price, the gain to Neilson will be greater than its loss (it does not need to account for Sabritas' loss). Thus, at the price that maximized profit in Figure 1, Neilson (in Figure 2) will want to raise its price unilaterally. We argue similarly that Sabritas will want to raise the retail price. (We show the exact math later in this note.) For these intuitive reasons, the price in the uncoordinated channel (Figure 2) will be higher than the price in the coordinated channel.

The same reasoning applies to service and to quality. Neilson will want to lower quality unilaterally because it gets all of the benefit of the reduced cost (lower quality → lower costs), but shares the loss of revenue (lower quality → fewer sales) with Sabritas. Sabritas will want to lower service unilaterally because it gets all of the benefit of the reduced service (lower service → lower costs), but shares the loss of revenue (lower service → fewer sales) with Neilson.

This result can be proven for more complex channels and for more complex situations, but the basic insight remains. The balance of (joint) marginal cost and (joint) marginal revenue is upset when the channel members are not jointly owned. Relative to the margins that were optimal for a coordinated channel, margins are higher (and sales lower) in an uncoordinated channel. The mathematics for service and for product quality are very similar to the mathematics that are used to derive the price equations. If we were to work through

the mathematics we would get the following results.

We summarize the basic results as follows:

- The manufacturer has unilateral incentives to raise margin.
- The retailer has unilateral incentives to raise its margin.
- The manufacturer has unilateral incentive to decrease product quality.
- The retailer has unilateral incentives to decrease retail service.
- These actions result in lower profit than could be obtained had the channel been coordinated.

Coordination Mechanisms

There are many ways to address the issue of double marginalization. Clearly, if it were feasible joint ownership would give both firms the incentive to achieve the levels appropriate for a coordinated channel. However, joint ownership may not be able to address the discrepancy of assortment. Does Black and Decker really want to own Home Depot or Home Depot really want to own Black and Decker? Should Sabritas purchase all candy companies whose products are sold in Mexico?

Another solution might be for both channel partners to share channel profits. This would happen if Home Depot were to agree to share its retail profit on power tools with Black and Decker and Black and Decker were to agree to share its wholesale profit on power tools with Home Depot. Not only do such profit sharing arrangements require both firms to overcome the challenges imposed by the complex accounting and monitoring, but they could be viewed as anti-competitive.

Contacts can certainly work and there are many, many contracts in channel relationships. However, these contracts become complex and each

member has incentives to cheat on those issues that cannot be monitored.

Finally, some firms use quantity discounts as an (sometimes imperfect) means to share profit. There are laws in many countries that affect quantity discounts, for example, the US requires that, if a manufacturer offers a quantity discount to one retailer, it must offer a like quantity discount to all retailers. (This can get complex).

However, in theory, quantity discounts provide a means to modify the marginal revenue for each channel member. If the retailer lowers its price it sells more goods, but a quantity discount also provides a lower (average) wholesale price. The quantity discount means that the manufacturer foregoes a profit opportunity and, instead, shares the revenue with the retailer. The proper quantity discount will realign marginal cost and marginal revenue and, in theory, the channel can reach the coordinated-channel price.[1]

The mathematics of these and other coordinating mechanisms are beyond the scope of 15.810. I mention them here to help you think about ways to address the problem of double marginalization.

OPTIONAL

Based on past experience, a few 15.810 students express interest in the mathematics of the channel coordination. This material is <u>not</u> necessary for a basic, qualitative understanding of channel coordination and the inherent channel conflicts. It is sufficient that you understand the qualitative discussions that are covered in this note and in class. However, for those students interested in the basic mathematics, I provide these derivations.

Assume that there is just one retailer and one manufacturer selling in a monopoly channel as shown in Figure 3. To prove the result, we set up the calculus of "margin cost = marginal revenue" for the coordinated channel (joint

[1] To set the quantity discount, in theory, one need only set up the equations for revenue and cost such that the optimal price [when marginal revenue = marginal cost] under an uncoordinated channel with quantity discounts gives the same optimal price as that obtained for a coordinated channel. This is usually a two-part tariff if there are two channel members.

maximum). We then examine what these joint conditions imply for the "marginal cost = marginal revenue" conditions faced separately by the manufacturer and the retailer.[2]

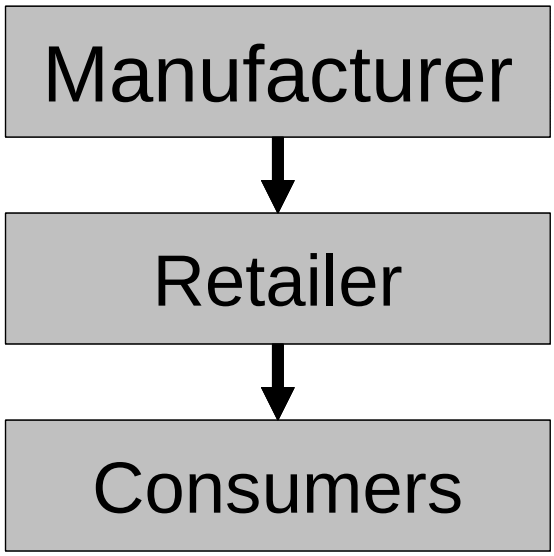

Figure 3. Simple Channel of Distribution (Notation)

We begin with the notation. Capital letters indicate the profit, margins, variable costs, and fixed costs for the manufacturer. Lower case letters indicate the corresponding variables for the retailer.

	Manufacturer	Retailer
Profit	Π	π
Margins	M	g
Quality Costs	Q	
Serviced Costs		s
Fixed Costs	F	f
Price		p

[2] This simple proof was first proposed by Abel P. Jeuland, and Steven M. Shugan, "Managing Channel Profits," *Marketing Science*, 2, 3 (Summer) 1983, 239-272. This article was one of the ten most cited articles in the history of *Marketing Science*.

Demand Equation $D(p)$

(Manufacturer) $\Pi = M \cdot D - F$ *note shared demand (D) with retailer*

(Retailer) $\pi = m \cdot D - f$ *note shared demand (D) with manufacture*

(Channel) $\Pi + \pi = (M + m) \cdot D - F - f$

(Price) $p = (m + s) + (Q + M)$

(Joint Maximum) $\partial(\Pi + \pi)/\partial G = \partial \Pi /\partial G + \partial \pi /\partial G = 0$

$\rightarrow \quad \partial \Pi /\partial G = -\partial \pi /\partial G$

but $\pi = m \cdot D - f$ implies

$$\partial\pi /\partial M = m \cdot \partial D/\partial M - \underset{=0}{\cancel{\partial f/\partial M}} = m \cdot (\partial D/\partial p) \cdot \underset{=1}{\cancel{(\partial p/\partial M)}}$$

$$= m \cdot (\partial D/\partial p) \cdot [(p/D) \cdot (D/p)]$$

$$= (m \cdot D/p) \cdot [(\partial D/D)/(\partial p/p)] \qquad \textit{(rearrange)}$$

$$= -(m \cdot D/p)(\text{price elasticity}) < 0 \qquad \textit{(elasticity > 0)}$$

This equation implies that, at the margins which were optimal for a co-ordinated channel ($\partial(\Pi + \pi)/\partial M = 0$), the following conditions hold for unilateral profit maximization.

$$\partial\pi/\partial M < 0 \quad \text{and} \quad \partial\Pi/\partial M > 0 \quad \text{(by joint maximum)}$$

This implies that the retailer will want the manufacturer to decrease its margins ($\partial\pi/\partial M < 0$). Unfortunately, the retailer can do nothing about it. The condition also implies that the manufacturer will want to increase its margins because it can earn more profit at a higher margin ($\partial\Pi/\partial M > 0$). The manufacturer thus has unilateral incentives to raise its margins (against the retailer's wishes.) This leads to conflict in the channel.

By symmetry, we can prove the following. (We do this by modifying the above proof with the following changes: switch Π for π, π for Π, M for m, and m for M.)

$$\partial\pi/\partial m > 0 \quad \text{and} \quad \partial\Pi/\partial m < 0$$

In words, relative to the margins that were optimal for a coordinated channel, in an uncoordinated channel, the retailer has unilateral incentives to raise its margin and the manufacturer wishes it could lower the retailer's margin. The proofs are similar for the manufacturer's margin, the manufacturer's quality, and the retailers service.

Like many of the topics covered in 15.810, these basic ideas have been applied and extended in many academic (and popular press) papers. If you understand the basic intuition, you are well on your way towards managing through this challenge.