

## **How customer word of mouth affects the benefits of new product exclusivity to distributors**

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May 2010

**Acknowledgment:** We benefited from comments by Jacob Goldenberg, Barak Libai, Eitan Muller, Upender Subramanian, and seminar participants at Duke University, the University of Pennsylvania, and the University of Texas at Austin. This research was partially supported by the Kmart International Center for Marketing and Retailing and the Davidson Center at the Hebrew University of Jerusalem

# **How customer word of mouth affects the benefits of new product exclusivity to distributors**

## **Abstract**

Marketing executives often face the decision whether and for how long to grant exclusivity to distributors of their new products. Using an agent based model, we assess how word of mouth among customers and the competition among structurally equivalent distributors with partially-overlapping customer bases influence the profitability of granting exclusivity for new products. Our results show that the presence of communication spillovers among customers of different distributors can make exclusivity undesirable for the distributors and the industry overall. This reversal of the conventional wisdom occurs because, though exclusivity protects the favored distributor from market share losses to competitors, it also precludes him from benefiting from the positive word of mouth generated by customers of other distributors. The effect is magnified by both the level of cross-distributor communication among customers and the level of structural equivalence among distributors. The forces at work and the result we obtain apply not only to exclusivity in distribution but also to selling to original equipment manufacturers (OEMs).

**Keywords:** product exclusivity, distribution channels, social networks, word of mouth, structural equivalence, new product diffusion, agent based models.

## **1 Introduction**

When the marketing executives of Comverse Technology launched their innovative voice-based verification product in Japan several years ago, they had an intriguing interaction with NTT DOCOMO (NTT for short), one of their potential distributors. As a means of attracting NTT, Comverse offered it to be the exclusive distributor of its new product in Japan. NTT agreed to represent the company, but rejected the exclusivity offer. Moreover, it insisted that Comverse would sell the product through other distributors besides NTT.

NTT's response was surprising since it runs counter the conventional wisdom among both practitioners and researchers. While granting exclusivity or not can involve difficult trade-offs for manufacturers, distributors are typically thought to always favor exclusivity (e.g., Coughlan et al. 2006). One reason for this strong preference is that the exclusive distributor differentiates itself from its competitors by offering a unique product and so can earn higher profits. Indeed, studies show that the value of exclusivity to a distributor increases with the level of competition and decreases with the level of differentiation (e.g., Chen, Iyer and Padmanabhan 2002; Soberman 2009). The second reason why distributors favor exclusivity is their need to protect transaction specific investments. Exclusivity not only enables distributors to recoup these investments faster but also protects them from rent extraction by the supplier and from free-riding fellow distributors (e.g., Coughlan et al. 2006; Dutta, Heide and Bergen 1999).

These standard arguments of reducing competition and protecting transaction specific investments applied to NTT as well. What, then, could explain the company's decision to insist on non-exclusive distribution? As NTT managers told us, they were less concerned about protecting themselves against the negative effects of competition and opportunism than about capitalizing on a positive externality of competition. Specifically, NTT considered that even

though accepting exclusivity would protect them against rivals and boost their power vis-a-vis Comverse, the product's great innovativeness made it even more important to establish its credibility and legitimacy as fast and as widely as possible. Having NTT—or any other firm—be the sole distributor would have curtailed the amount of word of mouth (WOM) and peer-based legitimation in the market, and in NTT's estimation this outweighed the standard benefits of exclusivity. The thought process of NTT points to a market factor which has not been considered yet in research in channel design: the word of mouth dynamics among customers in the market.

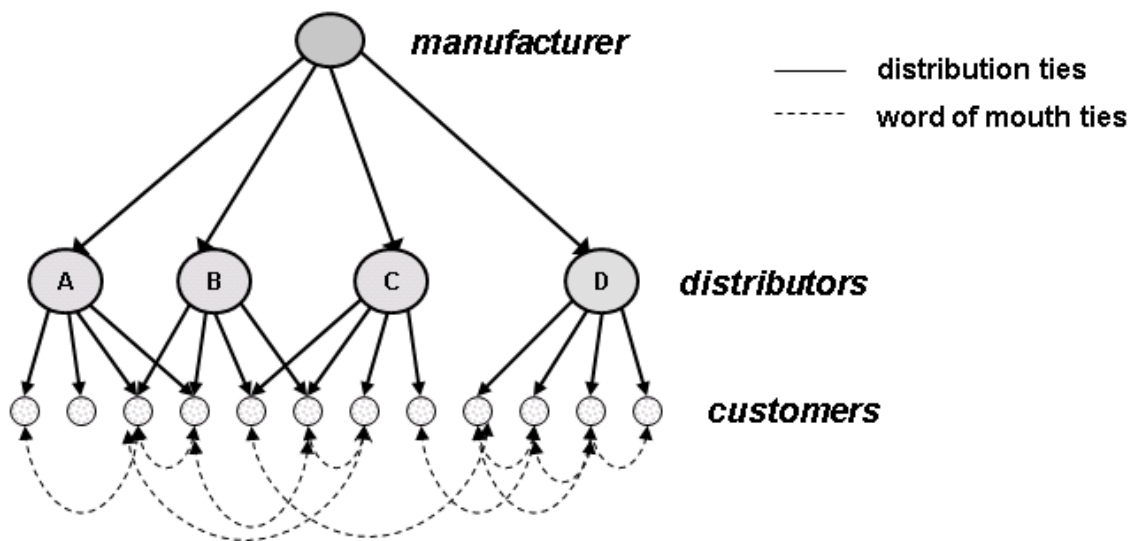
The question of how WOM affects the appeal of product exclusivity to distributors is relevant across a broad range of settings. One is the apparel industry, where wider distribution can help generate more social contagion among customers boosting demand (growing the pie) but can also generate more competition among distributors (sharing the pie). The travails of Liz Claiborne illustrate how difficult it can be to grasp the trade-offs involved in product exclusivity and to formulate an effective strategy (Siggelkow 2001). Getting the distribution right so as to effectively manage cross-distributor synergies in demand played a critical role in Snapple's comeback as well (Deighton 2002). The Apple iPad, as a counter-example, generated a lot buzz yet was distributed through exclusive retailers in France (FNAC), Germany (Media Markt) and the UK (DSGi), besides Apple's own stores (Financial Times 2010).

In order to understand how customer word of mouth can be incorporated into exclusivity considerations, consider the market structure described in Figure 1. The market is served by several distributors with partially overlapping customer bases which can be based on geography, vertical industry sectors, or service contracts with distributors. A distributor can have customers sheltered from competition as well as customers for which it competes with other distributors. The higher the overlap in the customer base of two distributors, the more interchangeable or

“structurally equivalent” their positions are in the distributor-customer network, and the more intensely they compete (Burt 1982, 1987).

Customers in the market communicate with each other through word of mouth. Customers may interact not only with customers connected to the same distributor(s) as they are, but also with customers of distributors they have no direct dealings with (Libai, Muller and Peres 2009).

**Figure 1:** A channel structure with customer word of mouth



Now consider how a new product diffuses into such a market. Since word of mouth operates not only within but also across distributors’ customer bases, a potential adopter can decide to buy the product after talking to fellow customers but purchase it from another distributor than the latter did. If a distributor has exclusivity, it does not compete with other distributors for customer purchases, but neither does it enjoy the word-of-mouth spillover which could have been generated by adopters of the other distributors. Thus, distributors’ revenues are influenced by two opposing forces – the competition stemming from the overlap in customer bases (distribution network structure) and the cross-distributor WOM influence stemming from

the ties among customers (WOM network structure). The interplay between these two forces determines the value of exclusivity.

The goal of this paper is to delve deeper into this interplay. We study how the value of exclusivity to a distributor of a new product is affected by two forces operating in the market: cross-distributor WOM among customers and cross-distributor competition stemming from structural equivalence among distributors with overlapping customer portfolios. To focus on these mechanisms of interest, we study a setting with a single manufacturer and without price competition. Inspired by the NTT episode, we examine the value of exclusivity from the distributor point of view.

The phenomenon we study involves endogenous feedback in a two-mode distribution network consisting of both distributors and customers interlocking with a one-mode WOM network of customers, and where the pattern of active distributor-customer ties changes as a function of the channel decision. The intricate effects of endogeneous feedback on optimal timing decisions in less-than-fully connected networks are very hard to identify analytically even in simpler cases involving only a one-mode network of customers (Joshi, Reibstein and Zhang 2009). Therefore, rather than building an analytical model, we build an agent-based model to describe such a market and examine the profit impact of various channel structures, exclusivity conditions, and word-of-mouth patterns. We measure the profitability for each distributor as the discounted value of their customers' adoptions.

Our main results, obtained using parameter values taken from new product diffusion studies, are the following:

- In the absence of cross-distributor WOM, the profitability of a distributor who received exclusivity increases with the duration of exclusivity. The effect is stronger for higher levels of overlap in customer bases. This is consistent with the standard view on product exclusivity.

- In the absence of exclusivity, cross-distributor WOM has a positive impact on the profitability of all parties. This is consistent with recent results on competitive diffusion.
- The joint presence of cross-distributor WOM and exclusivity, however, can lead to a reversal of the received view. Under a large number of scenarios, being granted exclusivity has a *negative* impact on the distributor's profitability. This effect is magnified under higher cross-distributor WOM and higher overlap in customer bases among distributors.
- For the scenarios we tested, we found that exclusivity harms the profits of other distributors as well, resulting in lower industry profits overall.
- The profit share of the exclusivity recipient increases with exclusivity. This effect is moderated by the level of cross-distributor influence. However, increases in profit share do not compensate for decreases in industry profits.

The rest of this paper is organized as follows: We first relate our work to various strands of relevant theory and research (Section 2). Next, we describe a market model incorporating network considerations into the distribution channel, the agent based model implementing it, and the simulation design used to assess the impact of the cross-distributor influence on the appeal of exclusivity (Section 3). We then present our results (Section 4), and discuss our work's implications and limitations, including opportunities for future research (Section 5).

## 2 Related research

Our work builds on several streams of theory and research that have developed mostly independently. We describe them briefly and identify both the insights we draw from each and our relative contribution.

*Exclusivity in channels* – Distribution intensity is an important issue in channel design. Exclusivity—the use of a single reseller in an area or for a product—has been discussed mostly from the manufacturer's point of view. On the one hand, exclusivity provides the manufacturer better control and coordination (Frazier and Lassar 1996) and signals commitment to its reseller

(Fein and Anderson 1997). On the other hand, it increases the distributor's power and limits the product's availability (Trivedi 1998).

While manufacturers see both pros and cons in exclusivity, distributors are usually thought to favor exclusivity without reservation (Coughlan et al. 2006) as it protects them from competition and from harmful opportunism by suppliers and fellow distributors. Prior research on channel exclusivity has focused on the manufacturer-distributor dyad and on exclusivity as a channel coordination device (e.g., Dutta et al. 1999; Soberman 2009). Factors outside the dyad, and especially the communication dynamics among customers, have not been taken into account.

*Channels as networks* – Framing the channel as a network is one way to incorporate extra-dyadic considerations (Van den Bulte 2010). Antia and Frazier (2001) explore the influence of distributors' network on the level of enforcement by the manufacturer after contract violations by its distributors. They find that the network centrality of the distributor and the density of ties among his contacts influence the level of enforcement undertaken by the manufacturer. Wuyts et al. (2004) take the full manufacturer-distributor-customer triad into account. Analyzing preferences of industrial buyers of complex products for particular channel structures, they find that customers prefer buying from distributors who are known to have intensive, cooperative ties with their customers, and have ties to multiple vendors. These studies focus mostly on the vertical relationships, i.e., the interactions among manufacturers, distributors, and customers along the distribution chain. They do not incorporate aspects of the horizontal dynamics of the customer network, such as word of mouth, which is the focus of this paper.

*Positive externalities from competition* – Looking beyond the vertical dyad is especially important in the case of new products. The need for quick and efficient penetration implies that competitive protection should, sometimes, be sacrificed. In open source projects, for instance,



competitors share code in order to benefit from complementary applications, leverage demand of end users by providing a variety of applications, and fight strong proprietary vendors.

Competitors also collaborate on common standards in order to facilitate penetration of a new technology, a common practice in telecommunications (e.g., Leiponen 2008). Firms may benefit from each other's experience—either directly or through using common suppliers—and so slide down the learning curve faster together (Dockner and Jørgensen 1988).

Externalities are also created through spillover in marketing efforts. Research on early industry life cycle dynamics suggests that competitors benefit from each other through their investments in distribution infrastructure or through their mere presence legitimating the new category and assuaging customers' concern about the risk of opportunistic behavior in the absence of alternative sources of supply (e.g., Agarwal and Bayus 2002; Debruyne and Reibstein 2005; Geroski and Vlassopoulos 1991).

Our focus in this paper is on another externality: word of mouth spreading across geographical and commercial boundaries. Gatignon, Anderson and Lojas (2007) have found that sales of a new product in one channel can accelerate that in another channel. More amply documented is how diffusion in one country can accelerate the diffusion in other countries (Peres, Mahajan and Muller 2010). Research on software piracy indicates that spillover between the legal and pirate versions can promote the penetration of the new product (Givon, Mahajan and Muller 1995). Word of mouth can also spill over across brands, allowing later entrants to enjoy a faster takeoff (Libai, Muller and Peres 2009).

*Competition in social networks* – The intensity of competition between two actors in a network varies with their structural equivalence, i.e., the extent to which they have ties to the same set of other actors. The greater the overlap in their portfolio of contacts, the more

substitutable they are in the network and the higher the competition for status or business derived from their contacts (Burt 1982, 1987). Since exclusivity provides protection from competition, its appeal to the beneficiary should increase with the extent to which the beneficiary is structurally equivalent to other distributors in the two-mode network of distributor-customer ties.

The amount of overlap, or encroachment, in the customer base can vary across distributors. Figure 1 illustrates this. The rightmost distributor (D) has zero overlap and all of its customers are “proprietary.” The other distributors’ customer bases overlap, but do so to different extents. Distributors A and C overlap only with B, whereas the latter is encroached by both A and C. So, B is more exposed to competition than A and C are. In network-analytical terms, A and C are perfectly structurally inequivalent with each other and imperfectly structurally equivalent with B (e.g., Borgatti and Everett 1992).

Research into the effects of structural equivalence has been hampered by the fact that the competitive effect operating between equivalent actors is hard to distinguish from the effect of information, attitude, or resource flow via a common contact (Burt 1987). This problem does not apply to our setting, since the equivalence among distributors stems from commercial distributor-customer ties whereas the WOM process operates over customer-customer ties. As a result, the structural equivalence among two distributors need not be related to whether their common contacts share WOM.

*Contribution* – We deal with the question of exclusivity in channels from the distributors’ point of view, viewing the channel as a network, and focusing on the role of WOM in the horizontal customer-customer network that interlocks with the vertical distributor-customer network. Specifically, we investigate how the structural equivalence of distributors with partially overlapping customer bases interacts with the WOM dynamics to impact the profitability of

exclusivity. Our contribution is to incorporate the issue of customer WOM into the context of vertical marketing systems. We focus on WOM in distribution channels, but the framework applies also to other vertical structures, such as the network of a technology supplier, its immediate original equipment manufacturer (OEM) customers, and final users (e.g., Intel providing processors built into Dell and HP computers sold to corporations).

### **3 Modeling channels with customers word of mouth**

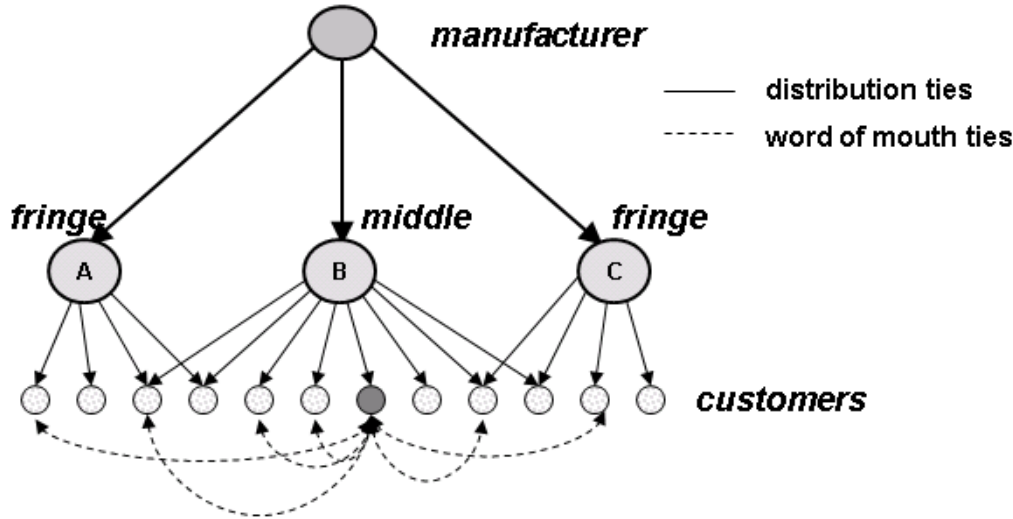
We focus on how the overlap among distributors' customer bases interacts with the word of mouth dynamics during the adoption of a new product. In this section, we first describe the market structure of the distribution channel and the customer word of mouth, and then describe the agent based model used to simulate the processes in this social structure.

#### ***3.1 The structure of the distribution channel***

We use the structure shown in Figure 2. The distribution channel is composed of a single manufacturer introducing a new product to the market. The product is marketed through distributors, who collectively provide full market coverage. There are no direct sales by the manufacturer. The customers are allocated to the distributors in such a way that each customer can purchase from either one or two distributors. That is, some customers have a choice set of one distributor, while others can choose among two distributors. Similar to the setting in Jones and Ritz (1991), customers can buy the new product only if one of the distributors they are connected to offers it. In this set-up, a distributor has both “proprietary” customers who cannot buy the product elsewhere and “shared” customers who have the choice to buy the product from another distributor. Note, the presence of a distributor-customer tie indicates only that if the distributor offers the product, it is in the choice set of the customer and hence that a transaction is

possible, not that a transaction actually took place. We do not allow for disadoption, purchase from two distributors, or repeat purchases of the focal product.

**Figure 2:** Distribution ties (solid lines), and word of mouth ties (dashed lines) of a focal customer (solid circle)



Our allocation of customers to distributors allows us to investigate differences in overlap between distributors. The two fringe distributors in Figure 2 (A and C) overlap only with the middle distributor B but do not overlap with each other, whereas the middle distributor B overlaps with both. Thus, we can investigate to what extent the relative lack of proprietary customers boosts the value of exclusivity to different distributors in one and the same network. Note, the terms “fringe” and “middle” relate only to the pattern of customer base overlap and need not correspond to location in physical space.

The distributors are passive and do not strategically engage in marketing action. All they do is make the product available. The lack of price as a decision variable is consistent with the case of a monopolist manufacturer who sets retail prices unilaterally. To avoid confusing structural equivalence with social cohesion effects, we do not assume any communication ties among distributors. The only communication ties in the model are the WOM ties among customers.

### **3.2 *Exclusivity***

Exclusivity to a distributor is operationalized as the availability of the product through only that distributor, and is temporary. If, for example, the middle distributor gets exclusivity for 5 periods, it means that it is the only provider for the first 5 periods the product is in the market. As soon as the exclusivity expires, on the sixth period, the two other distributors start offering the product as well. During the exclusivity period, only customers allocated to the exclusive distributor can adopt the product. We assess the profitability of exclusivity by comparing the profits generated by the distributors under various exclusivity, channel, and WOM conditions.

### **3.3 *The structure of the customer network***

Our customer network is composed of 900 actors. Each customer is connected to six other randomly chosen customers. That number of WOM contacts is consistent with the average in the *TalkTrack* survey by the Keller Fay group of American consumers ages 13–69 that reports on word-of-mouth activity as well as social network size (Keller 2007). Using models with a different number of ties, or with the full distribution of ties supplied to us by Keller Fay, did not change the qualitative results and had a very small impact on the quantitative results.

The WOM ties are allocated randomly and independently of the distributor-customer ties. That is, the presence of a WOM tie between two customers is independent of who their distributor(s) is (are). This is consistent with the idea that WOM ties among customers represent social ties formed outside commercial contexts. While the pattern of WOM ties is unrelated to the sender's or recipient's distributor ties, we do allow the effectiveness of those ties to vary within and across distributors' customer bases, as explained below. For simplification, WOM

ties are taken to be symmetric. The WOM network (dashed lines) for a sample focal unit is illustrated in Figure 2.

### **3.4 *Agent based modeling***

Having determined the network structure, we next simulate the introduction of a new product and the adoption dynamic in the system. We do so using agent based modeling, as it allows us to take into account the dynamic nature of WOM, the interlocking of the vertical distributor-customer network with the horizontal customer-customer network, and to investigate both a “whether” and “when” decision. Agent based modeling simulates aggregate consequences based on local interactions among individual members of a population. Social scientists use it to investigate various dynamic social processes, including social contagion, collective action, and economic activity in general (e.g., Axelrod 1984; Macy and Willer 2002; Schelling 1978). Agent-based models are also increasingly being used in marketing, particularly to examine issues related to new product growth (e.g., Garber et al. 2004; Libai, Muller and Peres 2005; Watts and Dodds 2007). Although agent-based models are frequently used to describe complex relationships between firms and various stakeholders, they are rarely if ever used to explore channel problems, for which the most common research methods remain survey research and game theoretic modeling. The latter, however, do not allow us to answer our research question.

### **3.5 *Adoption dynamics of consumers***

The system starts with zero adoptions and runs for 30 consecutive discrete-time periods. Customers are in one of four states: “0” for not having adopted; “A” for having adopted from distributor A; “B” for having adopted from distributor B; and “C” for having adopted from distributor C. In each period, each potential adopter decides whether to adopt the product from

one of the distributors offering the product to which he or she is connected. If, for example, customer  $i$  has not adopted yet and is allocated to both A and B, but only A offers the product because of exclusivity,  $i$ 's choice set for that time period will be only  $\{0, A\}$ . Thus, the customer can remain a non-adopter or adopt from A. If the customer does not adopt and the exclusivity terminates in a subsequent period, the customer will choose between states 0, A and B.

As in classical diffusion modeling, the transition from potential adopter to adopter depends on two factors: (1) time-invariant external influence by sales force, advertising, or other marketing efforts, and (2) internal influence by WOM from prior adopters. Internal influence can be of two types: within-distributor and cross-distributor. Within-distributor influence increases the tendency to adopt from a certain distributor as a result of communication with an adopter of the same distributor. Cross-distributor effect influence increases the tendency to adopt from a certain distributor as a result of communication with an adopter of another distributor. Both within and across effects operate simultaneously. For instance, if a potential adopter connected only to distributor B has ties both to an adopter of distributor A and to an adopter of distributor B, he will receive within-distributor influence from the distributor B customer as well as cross-distributor influence from the distributor A customer.

### ***3.6 Adoption probabilities***

Agent based models for the adoption of a single product from a single vendor have operationalized the shift of an individual  $i$  at time  $t$  from non-adopter to adopter using a competing risk approach where each prior adopter connected to  $i$  can independently convince  $i$  to adopt. Thus, the discrete-time hazard of  $i$  adopting is one minus the probability that all these adopters, as well as the external influence, fail to convert him:  $p_i(t) = 1 - (1 - \delta)(1 - q)^{N_i(t)}$ , where

$N_i(t)$  is the number of customers connected to  $i$  who adopted the product prior to time  $t$ ,  $\delta$  is the parameter of external influence, and  $q$  is the parameter of internal influence. As Goldenberg, Lowengart and Shapira (2009) show, this competing-risk formulation converges mathematically to the Bass model as the discrete time interval reduces to zero. Libai, Muller and Peres (2010), extend this framework to describe adoption in a competitive scenario. However, their internal influence was competitor-specific, and did not allow for spillover across competitors. Here, we extend the formulation to allow for cross-distributor influences.

In each time period, every potential adopter  $i$  considers adopting from any of the distributors in his choice set, that is, distributors that are connected to him and that are offering the product. In our case, the choice set is composed of zero, one, or two distributors. Obviously, if the choice set is empty, the customer cannot adopt. If the choice set is composed of only a single distributor, say distributor A, either because of exclusivity or because  $i$  is a proprietary customer of this distributor, then the adoption probability at time  $t$  equals:

$$(1) \quad p_i^A(t) = 1 - (1 - \delta_A) \cdot (1 - q_A)^{N_i^A(t)} \cdot (1 - q_{AB})^{N_i^B(t)} \cdot (1 - q_{AC})^{N_i^C(t)}$$

where  $\delta_A$  is distributor A's internal influence parameter,  $q_A$  is his within-distributor internal influence parameter,  $q_{AB}$  ( $q_{AC}$ ) is the cross-distributor from B (C) to A, and  $N_i^k(t)$  denotes the number of customers connected to  $i$  who have adopted the product from distributor  $k$  before time  $t$ . If distributor A has exclusivity, then  $N_i^B(t)$  and  $N_i^C(t)$  are zero for all the exclusivity periods. If distributor A has no exclusivity but the customer is proprietary, then the latter can adopt only from distributor A, but his adoption probability will be influenced by the cross-distributor word of mouth from the adopters of other distributors connected to him as described by Eq. (1). If the customer is not proprietary and there is no exclusivity, he can buy from multiple distributors. In



our model, a customer may be allocated to a maximum of two distributors. Assume that they are A and B. The probability to be convinced to adopt from A remains as given in Eq. (1). Similarly, the probability of being convinced to adopt from B is:

$$(2) \quad p_i^B(t) = 1 - (1 - \delta_B) \cdot (1 - q_B)^{N_i^B(t)} \cdot (1 - q_{BA})^{N_i^A(t)} \cdot (1 - q_{BC})^{N_i^C(t)}$$

There now are three possible paths to adoption. The first is that customer  $i$  is convinced about adopting from distributor A only. The probability of this happening is  $p_i^A(1 - p_i^B)$ . The second is that customer  $i$  is convinced about distributor B only. The probability of this is  $p_i^B(1 - p_i^A)$ . The third possibility is that the customer is persuaded to adopt from A as well as from B, but buys from only one of the two. The probability of this happening is  $p_i^A p_i^B$ , and the customer adopts from A rather than B according to the ratio of the probabilities,  $\alpha_{iA} = \frac{p_i^A}{p_i^A + p_i^B}$ . Therefore, the probabilities of  $i$  adopting from distributor A, from distributor B, or not adopting from either are given by (see Libai, Muller and Peres 2010):

$$P_i(\text{adopt A}) = p_i^A(1 - p_i^B) + \alpha_A p_i^B p_i^A$$

$$P_i(\text{adopt B}) = p_i^B(1 - p_i^A) + \alpha_B p_i^B p_i^A$$

$$P_i(\text{adopt none}) = (1 - p_i^A)(1 - p_i^B)$$

$$\text{where } \alpha_{iA} = \frac{p_i^A}{p_i^A + p_i^B}, \alpha_{iB} = 1 - \alpha_{iA}$$

The same procedure is applied when the choice set is A and C, or B and C. In the simulation, the adoption events were generated by drawing, for each customer in each period, a random number

from a uniform distribution between 0 and 1 and comparing it to the adoption probabilities  $P_i(\text{adopt A})$  and  $P_i(\text{adopt B})$ .

### 3.7 *Parameterization*

*Standard diffusion parameters* - We deal with the case of identical distributors, so  $\delta$  and  $q$  are identical for all the three distributors. We vary the values of  $\delta$  and  $q$  within ranges based prior diffusion research, after adaptation to individual level (Goldenberg, Libai and Muller 2001).

*Cross distributor WOM parameter* – The parameters which represent the cross distributor word of mouth influence are  $q_{AB}$ ,  $q_{AC}$ ,  $q_{BC}$  etc. For simplicity, we set their values to be equal among pairs of distributors, and use a single cross-distributor parameter denoted as  $q_{cd}$ . Libai, Muller and Peres (2009) estimated the cross-brand equivalent of  $q_{cd}$  for mobile telephone brands in Western Europe, and found that in most cases the cross-brand effect was smaller than the within-brand effect, suggesting  $q_{cd} \leq q$ . We vary the values of  $q_{cd}$  according to the range of ratio  $q_{cd}/q$  reported by Libai Muller and Peres (2009).

*Overlap* – This variable represents the extent to which distributors overlap in their customer bases. No overlap means that all the customers are proprietary, so distributors do not compete. High overlap means that the distributors share a large fraction of their customers. Assume a structure with zero overlap. In such a market, each distributor has 300 proprietary (locked-in) customers. As overlap increases, distributors share their customers with other. There are two basic ways to operationalize this encroachment. The first is to have the number of locked-in customers of the two fringe distributors, A and C remain 300 and give them additional customers shared with the middle distributor B. We call the resulting customer allocation *middle encroachment*. The middle distributor B keeps a total number of 300 customers, but as overlap

increases, it shares more and more of these customers with the fringe. The allocation for each overlap level is described in Table 1A. With such encroachment, the relative status of the middle distributor worsens with overlap much more than that of the fringe distributors, since they keep their 300 proprietary customers whereas the middle does not.

**Table 1:** Proprietary and shared units for several levels of overlap

A. For “middle encroachment” allocation structure

<i>Overlap</i>	<i>A (fringe)</i>		<i>B (middle)</i>		<i>C (fringe)</i>	
	<i>total customers</i>	<i>proprietary</i>	<i>total customers</i>	<i>proprietary</i>	<i>total customers</i>	<i>proprietary</i>
0	300	300	300	300	300	300
10%	334	300	300	233	333	300
20%	375	300	300	150	375	300
30%	428	300	300	43	429	300

B. For “equal customers” allocation structure

<i>Overlap</i>	<i>A (fringe)</i>		<i>B (middle)</i>		<i>C (fringe)</i>	
	<i>total customers</i>	<i>proprietary</i>	<i>total customers</i>	<i>proprietary</i>	<i>total customers</i>	<i>proprietary</i>
0	300	300	300	300	300	300
10%	321	289	322	258	321	289
30%	375	263	375	150	375	263
50%	450	225	450	0	450	225

The alternative operationalization of encroachment, which we call *equal customers*, is to have shared customers come from all three distributors rather than only the middle so that all three distributors have an equal number of customers. This structure, described in Table 1B, is more symmetric since all three distributors have an equal number of customers. However, it still

keeps some level of asymmetry between the middle and the two fringe distributors since the middle is encroached by both fringes whereas the fringes are encroached only by a single competitor. Since each operationalization of customer base overlap illuminates different aspect of the process, we use both in the analysis.

*Exclusivity* – We operationalize exclusivity by giving a monopoly to one of the distributors for a certain number of periods. When exclusivity is terminated, the other two enter the market. We compare cases where exclusivity is given to the middle distributor B and to the fringe distributor A, and test several time lengths of exclusivity. We do not repeat the analysis for C, since A and C have indistinguishable network positions (the labels “A” and “C” are interchangeable).

*Overall design* – Table 2 provides the values for all the parameters we manipulate. We conduct a full factorial experiment. Altogether, we run 10,000 combinations, each with 10 replicates to account for random fluctuations. Each run starts with zero adoption.

**Table 2:** Parameter ranges

Parameter	Range
$\delta$ (external influence)	0.001, 0.005, 0.01, 0.015, 0.02
$q$ (within-distributor influence)	0.04, 0.08, 0.1, 0.12, 0.16
$q_{cd}$ (cross-distributor influence)	0, 0.02, 0.04, 0.08, 0.1, 0.12, 0.16, with $q_{cd} \leq q$
Overlap	For “middle encroachment” structure: 0%, 10%, 20%, 30% For “equal customers” structure: 0%, 10%, 30%, 50%
Time length of exclusivity (periods)	0, 2, 4, 6, 8
Distributor who gets exclusivity	A (fringe), B (middle)
Allocation structure	Middle encroachment, Equal customers

We measure the profitability of a distributor as the present value of the cash flow from all adoptions, each contributing a margin of \$1, over all the time periods with a discount rate of 10%. This \$1 margin can stem from a one-time purchase for a durable good, or be the lifetime value at the time of adoption of a cash flow stream including follow-up sales. Each simulation was run for 30 periods. Given the range of parameter values, 30 periods allow for almost complete diffusion in most cases, and ensure we do not truncate the NPV.

## 4 Results

We start with replicating two effects documented in the literature. The first is that absent cross-distributor WOM, a distributor is better off having exclusivity than not having it (e.g., Coughlan et al. 2006). The second is that absent exclusivity, cross-distributor WOM improves the profits of all distributors (Libai, Muller and Peres 2009). Having documented that our design replicates these baseline results, we then move to the novel idea that cross-distributor WOM impacts the profitability of exclusivity. We present the new result and its robustness to diffusion parameters, exclusivity duration, and customer allocation structure. Finally, we delve deeper into the mechanisms driving this result by separating the effects on total industry profits and distributors' profit share.

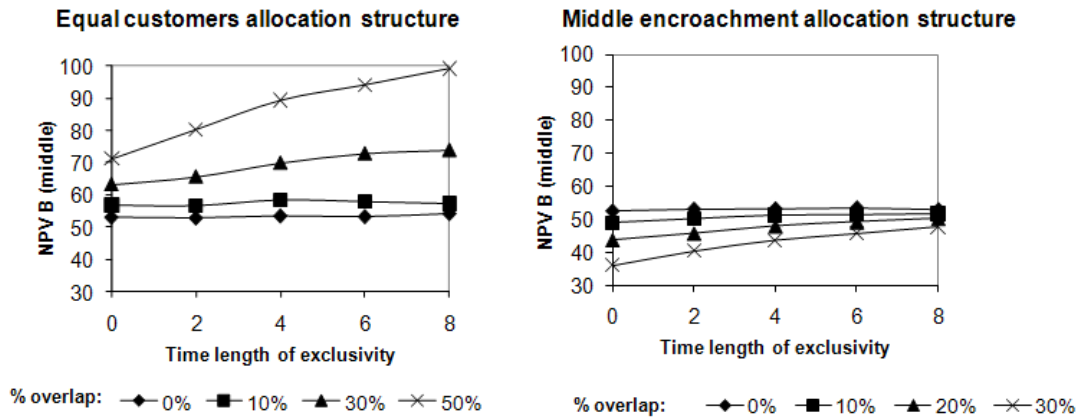
### 4.1 *The effect of exclusivity without cross-distributor influence*

As a validity check of our model, we first verify that it replicates the received view that, without cross-distributor WOM, exclusivity benefits its recipient. Figure 3 displays the profitability of the middle distributor as a function of time length of its exclusivity when the cross distributor parameter  $q_{cd}$  is zero. The left panel pertains to the “equal customers” allocation

structure, and the right panel to the “middle encroachment” structure. Each point in the graph is an average over the 250 runs for all values of  $\delta$  and  $q$ .

Without cross-distributor influence, getting exclusivity increases the profitability of the middle distributor. The profit impact depends on the level of customer base overlap. Exclusivity has no effect under zero overlap, as indicated by the flat line, since the distributor is a monopolist for its customers. As overlap increases, distributors feel a higher competitive intensity, and exclusivity helps to protect their profits, as indicated by the positive slopes. The same pattern is observed when the exclusivity is given to a fringe distributor (not reported here). Thus, our model replicates the received view in the channel literature.

**Figure 3:** NPV of the middle distributor B without cross-distributor influence ( $q_{cd} = 0$ ) for several levels of overlap and durations of exclusivity, averaged over  $\delta$  and  $q$



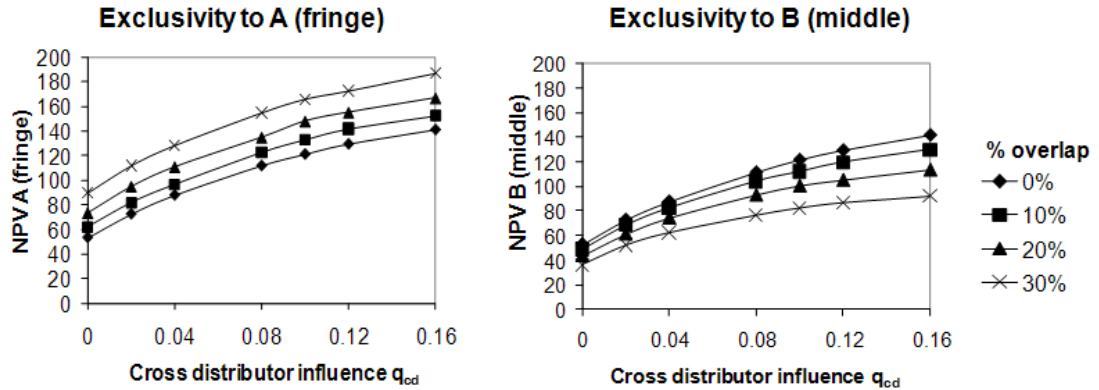
Note the difference between the left and right panels in Figure 3. In the “equal customers” scenario (left panel), the high overlap curves are higher than the low overlap curve, whereas in the “middle encroachment” scenario (right panel), the order is reversed. The reason is that in the “middle encroachment” structure, the middle distributor’s status worsens with overlap: he keeps his total number of customers while losing proprietary customers that he now shares with the fringes (see Table 1A). As a result, the middle distributor’s profitability decreases with overlap.

In contrast, under the “equal customers” structure all distributors lose proprietary customers and gain shared customers, resulting in more reachable customers for each. Consequently, higher overlap results in higher profits to the exclusive distributor. This does not change the positive effect of exclusivity – it affects only the relative position of the overlap curves.

#### 4.2 The effect of cross-distributor interaction without exclusivity

As a second validity check of our model, we verify that it also replicates the analog result of Libai, Muller and Peres (2009) that, absent exclusivity, cross-distributor WOM benefits the discounted profits of all competing distributors. Figure 4 presents the NPV of the fringe distributor A (left panel) and the middle distributor B (right panel) as a function of the cross-distributor WOM parameter  $q_{cd}$ , for zero exclusivity in the “middle encroachment” structure. As the positive slopes indicate, the profitability of all the distributors increases with  $q_{cd}$ . The same pattern is observed for the “equal customers” allocation structure.

**Figure 4:** NPV of distributor A (fringe) and distributor B (middle) without exclusivity and for several levels of overlap, as a function of  $q_{cd}$ , averaged over  $\delta$  and  $q$



Note, an “order reversal” similar to what we observed in Figure 3 between customer allocation structures, appears in Figure 4 between the middle and the fringe in the “middle encroachment” allocation structure. The reason is that, in that structure, the middle distributor’s

status worsens with overlap whereas that of the fringe ones improves. As a result, the former's profits decrease with overlap, whereas the latter's increase. The positive effect of cross-distributor WOM, however, applies to both distributors, as indicated by the positive slopes in both panels.

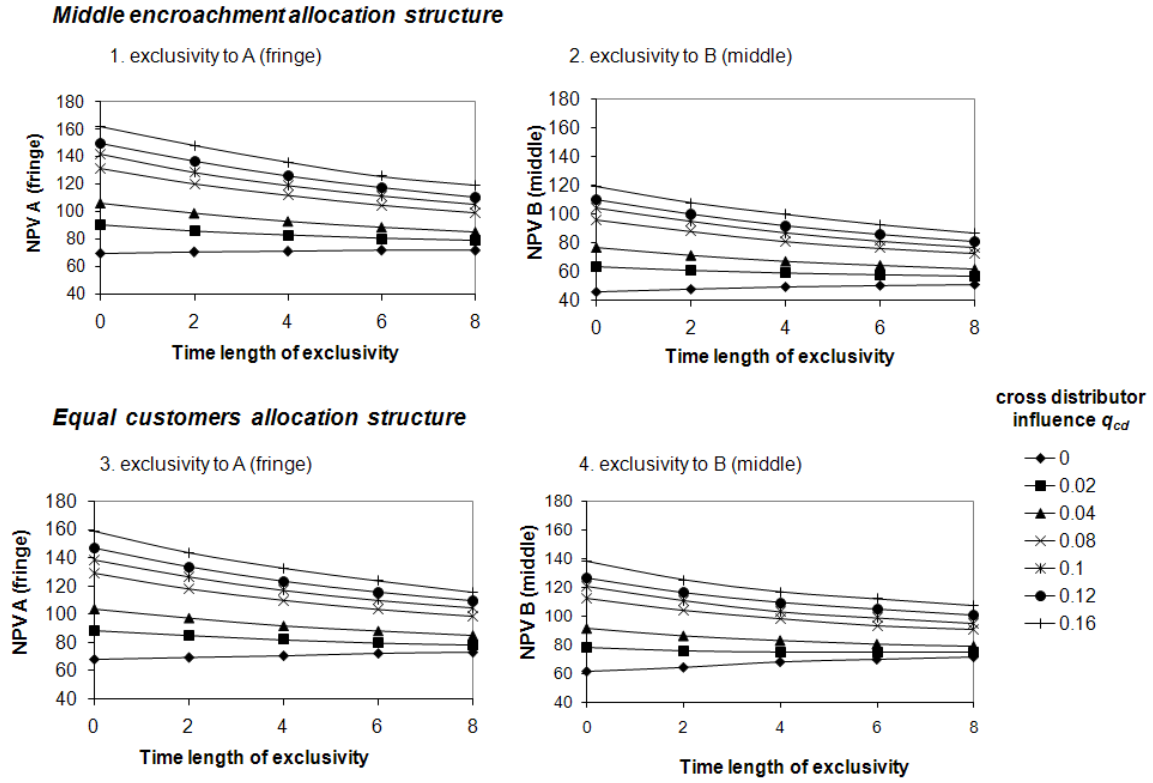
### 4.3 *The joint effect*

We now turn to the joint effect, which is of central interest: To what extent does the appeal of exclusivity depend on the level of cross distributor influence? Figure 5 shows the key result. Each panel presents the NPV of the exclusivity recipient as a function of the time length of exclusivity, for several levels of  $q_{cd}$ . Panels 1 and 2 describe the results for the middle encroachment allocation structures, when exclusivity is granted to the distributors A and B, respectively. Panels 3 and 4 present these results for the “equal customers” allocation structure. Each point in the graphs is an average over all values of  $\delta$ ,  $q$ , and the overlap levels.

In each of the panels of Figure 5, the bottom curve represents the effects of exclusivity for zero cross-distributor influence. The bottom curve of panels 2 and 4 are the averages of the curves in the right and left panels of Figure 3, respectively. The four bottom curves in Figure 5 have a positive slope: for  $q_{cd} = 0$ , exclusivity improves the performance of its recipient. However, when  $q_{cd} > 0$ , the effect reverses: in the presence of cross-distributor WOM, the performance of the exclusivity recipient decreases with the length of exclusivity. This means that the competitive protection provided by exclusivity is not enough to compensate for the loss of communication spillover it creates. A distributor will prefer to cope with competition rather lose the benefit of the cross-distributor WOM. This result is robust across the two allocation structures, and holds whether exclusivity is granted to the more exposed middle distributor or to a more protected fringe distributor.



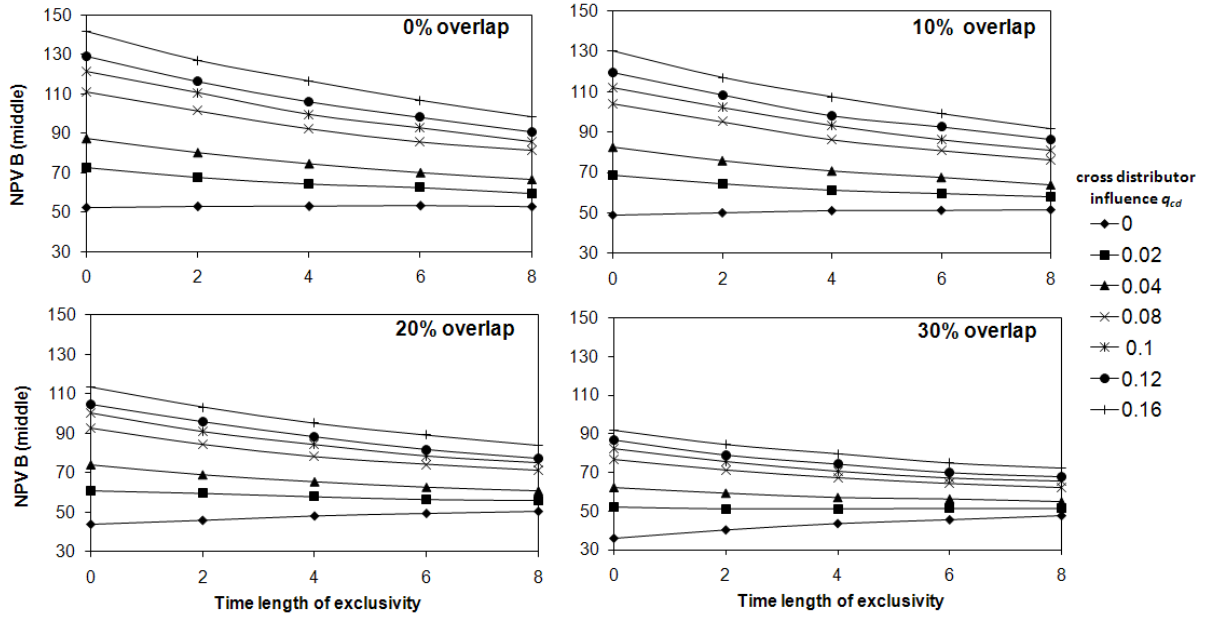
**Figure 5:** NPV of exclusivity recipient as a function of exclusivity, for several levels of  $q_{cd}$ , averaged over  $\delta$ ,  $q$ , and overlap levels.



The fan shape in each of the panels in Figure 5 indicates that both the sign and the size of the effect of exclusivity on profitability size depend on the level of  $q_{cd}$ . The fanning among the negative slopes indicates that the greater the cross-distributor WOM, the greater the loss from exclusivity. Also, the slopes change direction depending on the absence or presence of cross-distributor influence. Additional analyses in which we changed  $q_{cd}$  in very small increments indicate that the flip from positive to negative slope is not a phase transition from  $q_{cd} = 0$  to  $q_{cd} > 0$ . Rather, the effect is gradual –the slope is still positive for very small values of  $q_{cd}$  and gradually changes to negative as  $q_{cd}$  increases. Still, it is noteworthy that negative exclusivity effects are observed even at very low levels of cross-distributor WOM,  $q_{cd} = 0.02$ .

Figure 5 presents the results when averaging over  $\delta$ ,  $q$ , and overlap level. The key finding, however, holds for each and every combination of parameters in the full factorial experiment. Figure 6 illustrates the decomposition of Figure 5.1 for each overlap level. Clearly, the pattern holds at every level of overlap, but the profit-depressing effect of exclusivity decreases as the amount of overlap—and hence the need for protection through exclusivity—increases.

**Figure 6:** NPV of the middle distributor B as a function of its exclusivity, in a middle encroachment allocation structure for several levels of  $q_{cd}$  and overlap. Averaged over  $\delta$ ,  $q$ .



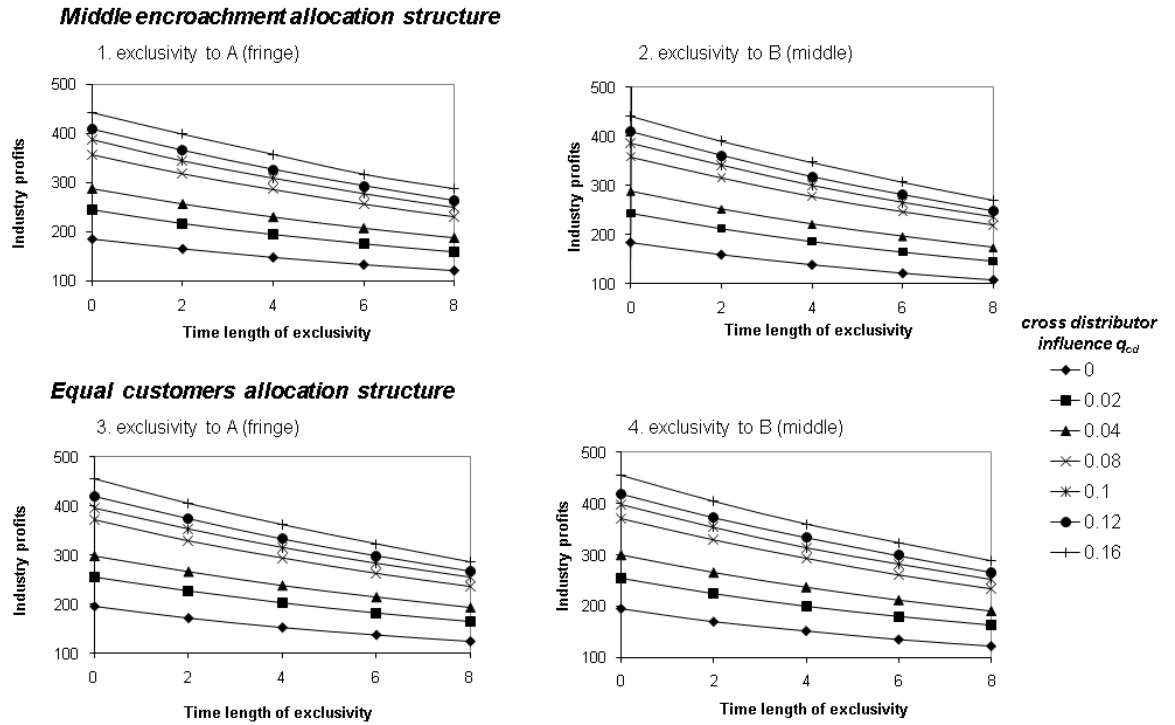
#### 4.4 Expanding and sharing the pie

Our analysis so far focused on the profitability of the exclusivity recipient. To better understand the mechanism through which exclusivity negatively impacts profits, we examine both how the total industry profits vary under different levels of exclusivity, and how the total profit pie is split among distributors.

#### 4.4.1 Effect on industry profits

Industry profits are the sum of the profits of the three distributors in our model since there are no manufacturer's profits. Figure 7 presents the industry profits as a function of exclusivity, for several levels of  $q_{cd}$ , for both the “middle encroachment” and the “equal customers” allocation structures. The negative slopes show that exclusivity reduces industry profits, regardless of the customer allocation structure and the identity of the exclusivity recipient.

**Figure 7:** Industry profits, for several allocation structures, exclusivity recipients and levels of  $q_{cd}$ , averaged over  $\delta$ ,  $q$ , and overlap levels.



Exclusivity has a direct effect on overall diffusion speed and industry profits by limiting the number of customers with access to the product. This explains the downward slope in the bottom curve in each of the panels in Figure 7 – industry profits decrease even for  $q_{cd} = 0$ . Of equal interest, however, is that the negative effect is larger when there is the potential for cross-distributor WOM, as indicated by the fanning slopes in each panel. Exclusivity reduces the

number of fellow customers who can spread positive WOM across distributors to zero. This slows down the diffusion process, which in turn limits the number of fellow customers who can spread positive WOM even within distributors who enjoy exclusivity. The total result is that exclusivity always depresses industry profits, but especially when it prevents potential cross-distributor WOM from actually materializing.

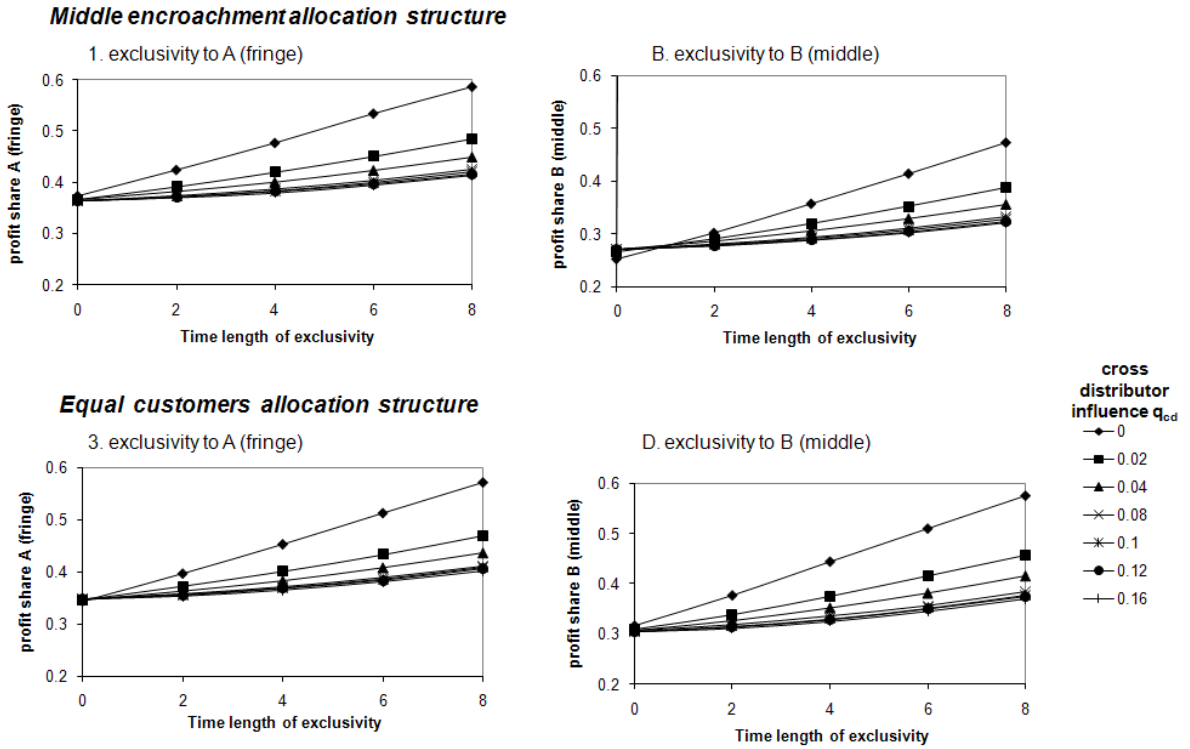
#### 4.4.2 Effect on profit share

Whereas exclusivity shrinks the overall profit pie, one expects the recipient to be less affected than his competitors who are excluded from the market. Figure 8 confirms that exclusivity improves the profit share of its recipients. For all allocation structures, and regardless of whether the middle or a fringe distributor received the exclusivity, the exclusivity recipient's profit share increases with the duration of exclusivity. Together with the main result presented in §4.3 that exclusivity depresses profits when  $q_{cd} > 0$ , this implies that the increase in profit share is not enough to compensate for the decrease in total industry profits. Hence, distributors who judge their financial performance against their competitors rather than against the correct counterfactual may mistakenly conclude that exclusivity boosts financial performance whereas in reality it depresses it (even when granted for free).

Another insight from Figure 8 is that the increase in profit *share* from exclusivity is *smaller* for high levels of  $q_{cd}$ . This is surprising, but is consistent with the notion advanced by Libai, Muller and Peres (2009) that late entrants benefit more from the cross-competitor communication spillover. When exclusivity terminates and the late entrants start offering the product, they can immediately enjoy the cross-distributor influence from the customers acquired by the first distributor during his exclusivity period. The first distributor who received the exclusivity, on the other hand, did not benefit from cross-distributor influence. Thus, the cross-

distributor WOM gives the non-exclusive distributors an initial WOM boost which the exclusive distributor does not receive. In short, exclusivity creates not only an advantageous protection against competition but also a disadvantageous asymmetry in the benefits from the WOM externality. The net effect is that the larger the foregone WOM effect is, the lower the boost in profit share that exclusivity provides.

**Figure 8:** Profit share of exclusivity recipient as a function of its exclusivity time length, for several levels of  $q_{cd}$ , averaged over  $\delta$ ,  $q$ , and overlap levels.



## 5 Discussion

We viewed a puzzling business decision by NTT DOCOMO managers from a network perspective and—building from these practitioners’ theory in use (Zaltman, LeMasters, and Heffring 1982)—investigated whether WOM dynamics among customers can impact the profitability of product exclusivity. We used an agent based model to simulate a market of a single manufacturer and three distributors competing for partially overlapping customer bases.

The structural equivalence among distributors and their need for competitive protection varied with the level of overlap in customer bases, whereas the positive impact of social contagion among customers varied with the amount of cross-distributor influence. The results of a full factorial simulation experiment incorporating various customer allocation structures, exclusivity scenarios, overlap levels, and cross-distributor influence levels, indicate that NTT's intuition was right. Communication dynamics among customers, and specifically communication spillover across distributors, can have a considerable impact on the profitability of exclusivity and reverse the common view that exclusivity is valuable.

Specifically, product exclusivity has a negative influence on profitability when cross-distributor influence exists, and the effect gets stronger with the increase of cross-distributor influence. This result holds for each and every combination of diffusion parameters, allocation structure, overlap in customer bases, and exclusivity recipient that we tested. Total industry profits decrease with exclusivity as well, because it limits the level of the overall internal dynamics in the market. In terms of profit share, exclusivity does boost the recipient's profit share but not enough to compensate for the shrinkage in overall industry profits.

### **5.1    *Implications for practice***

Our results clearly indicate that distributors should not always strive for product exclusivity, especially when cross-distributor WOM is likely to be at work among customers. That is a clear deviation from the received wisdom today. However, our results do not imply that distributors should always follow NTT DOCOMO and refuse exclusivity offers. The traditional motivations for exclusivity, reducing competition and protecting transaction-specific investments, still apply and can outweigh WOM considerations, especially when potential adopters perceive little functional, social or financial risk and for products not subject to technological network effects.

Also, exclusivity can soften price erosion. Finally, profit share considerations might sometimes matter more than absolute profits to distributors. Yet, as we have shown, the communication in the customers' social network must not be ignored. While in mature industries WOM might be less important than advertising, sales calls, and other external influences, social contagion is often an important driver of market growth for novel products and technologies, and should be considered in channel design decisions.

We found that, in the setting we analyzed, exclusivity depressed financial performance because the boost in profit share was not enough to compensate for the decrease in total industry profits. Hence, distributors who judge their financial performance against their competitors may mistakenly conclude that exclusivity boosts financial performance whereas in reality it depresses it. This implies that using competitor-oriented objectives when making decisions to accept exclusivity can negatively affect financial performance, consistent with broader claims by Armstrong and Collopy (1996) and Luo, Rindfleisch and Tse (2007).

Though we couched our arguments in terms of product exclusivity in distribution channels, the forces at work and the basic structure of a vertical network of commercial ties and a horizontal network of WOM ties also apply to companies selling key ingredients or licensing technology to original equipment manufacturers (OEMs). In that setting, the OEM may prefer foregoing exclusivity when having its competitors commercialize the technology creates a contagion-based externality boosting the overall speed of diffusion and industry profits to a greater extent than it depresses share of profits. The tension between competitive protection and word-of-mouth spillover exists not only in the decision to grant territorial exclusivity, but also in the decision to market channel-specific products, i.e., specific versions of a product or even sub-labels to be sold through specific distribution channels. Such versioning protects the channel

from competition, but might limit the word-of-mouth. The framework and tools presented here can be applied to gain insights also for this case.

## **5.2    *Implications for theory and research***

The interlocking of horizontal and vertical networks is an issue that has received very little attention in marketing—or any other discipline for that matter. Each type of ties has been the focus of separate research streams that have developed independently, with vertical ties being the focus in the channels literature and horizontal ties being the focus in the diffusion and social networks literatures. Similarly, word of mouth considerations have hardly been discussed in the context of channel design to date (Gatignon et al. 2007). Our results illuminate some of the complex interaction between the two in the context of new products. Exclusivity protects distributors with structurally equivalent positions in the vertical network but do so at the detriment of a positive externality stemming from social contagion in the horizontal network. Other rich patterns of interaction between vertical and horizontal ties exist in marketing, and these provide rich opportunities for research (Van den Bulte 2010).

The positive impact of competition on market size is a phenomenon that has received considerable attention, but mostly in the domains of technology standards, licensing, category building, and social legitimation dynamics (e.g., Agarwal and Bayus 2002; Roberts and Samuelson 1988). Our results document that such positive aspects of competition occur at the intersection of channel strategy and new product diffusion as well. There is a dearth of research at this intersection (Gatignon et al. 2007), and we hope our findings will motivate more investigations in the area.

An important feature of our design was that the competitive effect of structural equivalence between distributors with overlapping customer portfolios was distinct from the positive



externality of the WOM effect operating among customers. Focusing on vertical two-mode networks and horizontal networks jointly may be a promising research strategy to better distinguish between various social network mechanisms that are often hard to tease apart in a single type of network (e.g., Burt 1987; Van den Bulte and Lilien 2001). Future research may benefit from exploiting this distinction in other substantive marketing areas as well.

As with any model, ours provides a purposely selective representation of the actual complexities. For the distribution channel, the passivity of the distributors is worth emphasizing. The distributors did not set prices, did not determine service levels, did not get feedback from the market, and were not forward looking in the sense of forecasting the response of other distributors. It might be, however, that a distributor will accept exclusivity because he knows that if he does not, another distributor will, and therefore his relative situation will worsen. So, if the manufacturer makes the mistake of offering exclusivity, a rational distributor may be induced to take it even if he preferred that no such offer was extended to anyone. Another issue is that by setting prices, or levels of service, distributors might change the demand to compensate for the lack of exclusivity. Distributors whose entire customer base is proprietary set prices at the monopoly level, but if even part of their customer base is shared, they will set prices at a lower, competitive level (Fershtman and Muller 1993). Taking into account such a price change between the exclusivity and competitive phases is very likely to enhance the profits from exclusivity, but without affecting the key qualitative insight of our investigation. Another simplifying assumption is the lack of differentiation among distributors, which allowed us to focus on their network position. When distributors are vertically differentiated in the utility they provide to customers, manufacturers should ask not only whether to give exclusivity but also who to give it to (Subramanian 2009).

From the customer network perspective, some interesting extensions may come from introducing systematic heterogeneity into the customer network. If the customers of a specific distributor are more central in the network or more contagious, this is likely to impact the profitability of extending exclusivity to that distributor rather than another. Also, the extent to which the customers of a distributor are more internally clustered than those of another (which may happen in niche markets) is likely to affect the size of the cross-distributor externality and, hence, the profit impact of giving exclusivity value to one distributor rather than another (compare Üstüner and Godes 2006).

Our study clearly did not exhaust all research opportunities. Nevertheless, it shows that novel insights that go against the received wisdom can be gained from investigating how vertical and horizontal network structures interact to affect customer behavior and business outcomes.

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