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Slotting allowances are lump-sum payments by manufacturers to retailers for stocking new products. The economic rationale for slotting allowances is controversial. Supporters argue that slotting allowances are efficiency enhancing; critics argue that they are anticompetitive. However, there is no empirical research on this issue because of the difficulty in obtaining data about these transactions. Using data on all new products that were offered to one retailer for a period of nine months, the authors empirically investigate support for the alternative rationales for slotting allowances. The analysis indicates that, in general, there is more support for the efficiency theories than for the anticompetitive theories. The authors find that slotting allowances (1) efficiently allocate scarce retail shelf space, (2) help balance the risk of new product failure between manufacturers and retailers, (3) help manufacturers signal private information about potential success of new products, and (4) widen retail distribution for manufacturers by mitigating retail competition. The authors find little support for the anticompetitive rationales in the data. The empirical support for the efficiency rationales suggests that the Federal Trade Commission was correct in being circumspect about banning slotting allowances outright.

# Do Slotting Allowances Enhance Efficiency or Hinder Competition?

Slotting allowances are lump-sum payments by manufacturers to retailers for stocking new products. Over the past two decades, they have gained increasing prominence and have emerged as a major share of new product development costs.[1] According to Deloitte & Touche (1990), slotting allowances account for more than 16% of a new product's introductory costs, whereas research and development and market analysis expenditures account for approximately 14%.[2] Although substantial amounts of money are involved, slotting allowances are extremely controversial, and there is little consensus among practitioners, regulators, and researchers as to the true role of slotting allowances in facilitating new product introductions (Bloom, Gundlach, and Cannon 2000; Wilkie, Desrochers, and Gundlach 2002). Whereas some theorists and practitioners have suggested that slotting allowances are anticompetitive, others have argued that slotting allowances enhance efficiency of market outcomes.

The controversial role of slotting allowances is evident in the contrasting positions taken by two regulatory authorities. The Bureau of Alcohol, Tobacco, Firearms and Explosives banned slotting allowances in the alcohol trade in 1995 (Gundlach and Bloom 1998). In contrast, the Federal Trade Commission (FTC), which regulates the grocery industry, refuses to provide guidelines because slotting allowances can have both efficiency and anticompetitive effects. The FTC (2001) believes that further investigation is needed. The U.S. Senate's Committee for Small Business and Entrepreneurship funded a full-scale public investiga-

[1]The date of origin of slotting allowances is ambiguous. According to *Supermarket News* (1984), slotting allowances per se did not exist before 1984. In a report based on surveys of manufacturers and retailers, Smith (1989) notes slotting allowances starting around 1982.

[2]The magnitude of slotting allowance for a stockkeeping unit (SKU) varies from $75 to $300 for a store (FTC 2001, p. 11), from $3,000 to $40,000 for a regional chain (Desiraju 2001; Fields and Fullmer 2000), and from $1.4 million to $2 million for a national introduction (Thompson 2000; Vosburgh 2001).

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tion of slotting allowances by the FTC, but the report was inconclusive, citing difficulties in obtaining information from either manufacturers or retailers about slotting allowances.

The major efficiency arguments cited in favor of slotting allowances are that (1) they efficiently allocate scarce retailer shelf space to the most valuable (profitable) new products, (2) they allocate risk of new product failure in a balanced manner between manufacturers and retailers, (3) they signal private information that manufacturers may have about the potential success of the new product to the retailer, and (4) manufacturers use them to induce retailers to accept the product and increase distribution by mitigating the effects of retail competition. The main anticompetitive explanations for slotting allowances are that they are (1) a means for retailers to mitigate retail competition to increase their own profits by facilitating retail collusion and (2) the result of retailers exercising retail power, which adversely affects smaller manufacturers and reduces consumer access to these products. The retail-power argument suggests that in many local markets, high retail concentration results in few retailers controlling retail shelf space, thus enabling them to demand slotting allowances.

Despite the abundance of theoretical rationales for slotting allowances, the extant empirical research on this topic is inconclusive. Two survey-based studies (Bloom, Gundlach, and Cannon 2000; Wilkie, Desrochers, and Gundlach 2002) show limited consensus between manufacturers and retailers on the reasons for the use of slotting allowances. As Bloom, Gundlach, and Cannon (2000) acknowledge, the problem may be due to the survey method not accurately reflecting reality, thus distorting opinions about slotting fees. This problem does not seem to disappear even when the respondents (retailers and manufacturers) were instructed to focus on the characteristics of specific transactions in which both the participants were involved and slotting allowances were offered (see Rao and Mahi 2003). Furthermore, survey-based studies yield limited insights into the rationales for observed market outcomes that involve slotting allowances.

Sullivan (1997) uses correlational analysis on objective time-series data at the market level (e.g., number of new products supplied by manufacturers, number of stockkeeping units [SKUs] kept at retailers, quantities sold by retailers, prices charged by manufacturers) and argues that the use of slotting allowances results in an equilibrium in which the number of products the manufacturer offers equals the number of products the retailer demands. However, the aggregate-level data cannot distinguish among competing predictions offered in the theoretical literature.

Given the state of empirical research in this area, a study that uses observational data on new product introductions and the associated terms of trade (including slotting allowances) could be insightful in resolving contradictions in manufacturers' and retailers' opinions. In this article, we use a unique data set with objective information about new product offers and retailer evaluations of the manufacturers and products offered for all new products (more than 1000) during a period of nine months. We believe that our detailed data set on more than 1000 products offers a rare opportunity for an empirical investigation of the rationales for slotting allowances.[3]

Although the analysis of a large number of offers to one retailer restricts generalizability, it helps us address econometric difficulties in an analysis of pooled (a small number of) observations across multiple retailers. We can control for the retailer end of the transaction dyad and determine how slotting allowances vary across different manufacturers. This strategy is critical to the development of appropriate tests of game theoretic predictions. Although Rao and Mahi (2003, p. 265) reject signaling theories on the basis of their analysis of data across multiple manufacturers and retailers, they caution that "slotting allowances paid for each transaction in our data may in fact be entirely consistent with a signaling story.… Hence each data point may be a consequence of particular levels of information asymmetry that are specific to that transaction. Only dyadic data would allow us to assess whether signaling is in fact occurring." It is plausible that some of Rao and Mahi's counterintuitive empirical results arise as a result of this inability to control at least one end of the transaction dyad.

The FTC (2003, p. 62, fn. 209) report on slotting allowances states, "While there is some research examining slotting allowances using highly aggregate data, see e.g., Sullivan (1997), to our knowledge no one has formally examined how highly disaggregated data like that collected in this study could be used to differentiate among the theories." We hope that the current research serves as a first step to investigate support for the alternative theoretical rationales.

We provide a brief overview of the efficiency-enhancing rationales (EER) and anticompetitive rationales (ACR) in the next section. We then present the data that we use, give a brief descriptive analysis, and explain our testing approach. Before concluding, we develop the empirical tests of the different rationales and describe the empirical results.

## *RATIONALES FOR SLOTTING ALLOWANCES AND EMPIRICAL TESTING STRATEGY*

Next, we discuss the arguments for the alternative rationales for slotting allowances and the extant empirical evidence in support of or against these rationales. A summary of the arguments and the empirical evidence appears in Table 1. We also briefly discuss our empirical testing strategy for each rationale. After discussing the available data, we provide more details about the operationalization of the tests in the "Data and Operationalization of the Empirical Tests" section.

### *EER*

*EER1: Efficient allocation of scarce shelf space*. A typical supermarket carries approximately 35,000 SKUs (Food Marketing Institute 2003a), and the number of new products introduced by manufacturers range from approximately 10,000 to 16,000 SKUs (Food Marketing Institute 2003b). Given the limits to expanding shelf space, introducing a new product invariably requires retailers to drop an existing product. Furthermore, because of the growth of private labels with higher margins than national brands (Cappo

[3]The 2001 FTC report discusses the difficulty in obtaining data on slotting allowances and in obtaining cooperation from large manufacturers and retailers. As a result of such difficulties, Congress provided the FTC a budget of $900,000 for an empirical study of slotting allowances (FTC 2001). In November 2003, near the time when we completed the first version of this article, the FTC completed a new report with detailed data about slotting allowances that it had collected from retailers. However, the study does not test the alternative theoretical rationales for slotting allowances.

Table 1
SUMMARY OF RATIONALES AND EXTANT EMPIRICAL FINDINGS

| *Rationale* | *Logic and Source of Rationale* | *Empirical Findings* |
|---|---|---|
| | *A. Efficiency-Enhancing Rationale* | |
| EER1: Help retailers efficiently allocate shelf space. | Slotting allowances serve as a pricing scheme to ration out the scarce resource (Desai 2000; Lariviere and Padmanabhan 1997; Sullivan 1997). | Yes: Wilkie, Desrochers, and Gundlach (2002) and Bloom, Gundlach, and Cannon (2000) use surveys of manufacturers and retailers, and Sullivan (1997) uses time-series data to find that new product proliferation, which creates shelf-space scarcity, is a reason for slotting allowances.<br>No: Bloom, Gundlach, and Cannon (2000) find no support for opportunity-cost rationale in retailer surveys. Wilkie, Desrochers, and Gundlach (2002) find no support for the private-label rationale in manufacturer and retailer surveys. |
| EER2: Balance risk between the manufacturer and the retailer. | Because of the high risk of new product failure, the retailer bears a disproportionate risk. Slotting allowances insure the retailer against the failure of accepted product. | Yes: Bloom, Gundlach, and Cannon (2000) find support among both manufacturers and retailers.<br>No: None. |
| EER3: Manufacturers signal private information to the retailer. | Slotting allowances communicate a manufacturer's private information about potential success to the retailer (Desai 2000; Lariviere and Padmanabhan 1997). | Yes: None.<br>No: Bloom, Gundlach, and Cannon (2000) and Rao and Mahi (2003) find no support among either manufacturers or retailers for this rationale. |
| EER4: Manufacturers mitigate retail competition to enhance retailer participation. | Retail competition can reduce profits to a level that may not help them recover the opportunity costs. Manufacturers offer slotting allowances and higher wholesale prices to reduce retailer competition, enabling the retailer to participate (Desai 2000). | Yes: None.<br>No: None. |
| | *B: Anticompetitive Rationale* | |
| ACR1: Retailers demand slotting allowances to mitigate retail competition. | Retailers facing competition demand slotting allowances and accept higher wholesale prices to mitigate retail competition and facilitate collusion (Shaffer 1991). | Yes: None.<br>No: None.<br>Note: Prior research that has claimed support for this theory tests a prediction that is not unique to this argument (see the discussion in text). |
| ACR2: Exercise of retail power. | Increased retail power enables retailers to extract slotting allowances from manufacturers (Chu 1992). | Yes: Bloom, Gundlach, and Cannon (2000) and Rao and Mahi (2003) find that manufacturers believe that this is true.<br>Note: There are some questions about the premise of increased retail power (Farris and Ailawadi 1992; Messinger and Narasimhan 1995). |

2003), shelf space is a scarce resource with high opportunity costs. Sullivan (1997) shows that slotting allowances arise endogenously when the costs to develop new products fall, leading to greater supply, but consumer demand (and, thus, retailer demand) for variety does not rise as much. She calls this the "demand–supply hypothesis." Lariviere and Padmanabhan (1997) and Desai (2000) include opportunity costs of shelf space in their models and demonstrate that slotting allowances arise when the opportunity costs of shelf space are high and manufacturers have greater information about the likelihood of product success. They both find that retailers will not accept the product in the presence of high opportunity costs without slotting allowances.

Sullivan (1997) uses time-series data on new product introductions and variables (e.g., the number of SKUs, shelf space, revenues per SKU) to find support for the hypothesis that slotting allowances serve to allocate shelf space efficiently. However, results from surveys of manufacturers and retailers have been mixed. Whereas manufacturers and retailers agree that the number of new products introduced is a key force in the widespread use of slotting fees, Bloom, Gundlach, and Cannon (2000) find that retailers do not believe that slotting fees are related to the opportunity costs of shelf space. Furthermore, Wilkie, Desrochers, and Gundlach (2002) find no support for the growth of private-label brands as a rationale for the growth of slotting allowances. In these survey-based studies, it appears that retailers do not want to accept their role in the emergence of slotting allowances but want to blame manufacturers.

The opportunity-costs-of-shelf-space rationale is distinct from an operating-cost rationale that has been offered in the literature. The operating-cost rationale is that retailers use

slotting allowances to cover new product introduction costs (e.g., cost of entering changes in the inventory and accounting systems, setting "slots" in the warehouse). The current use of slotting allowances goes beyond the original purpose of recovering the true costs the retailer incurs for introducing the product. Manufacturers do not believe that operating costs are a major reason for slotting allowances, though retailers claim otherwise. Furthermore, slotting allowances vary across most new products, rendering the operating-cost argument less reasonable.

Rao and Mahi (2003) test the operating-cost rationale and find the "surprising" result that slotting allowances are negatively related to retailer operating costs. However, the surprise is easy to explain (as the authors themselves do) when it is recognized that their study analyzes data across multiple retailers. Retailers that are more efficient tend to have lower operating costs in the industry and also are likely to be the larger retailers, which have greater opportunity costs of shelf space. Thus, the negative relationship between slotting allowances and operating costs may imply a positive relationship between slotting allowances and opportunity costs.

A relevant model to test this rationale is to estimate the relationship between the probability of offering slotting allowances and the opportunity costs of shelf space. A positive relationship implies support for the rationale.

*EER2: Balance new product failure risk between the manufacturer and the retailer*. There is a general consensus that new product failure rates are very high. The estimates of failure rates vary from more than 50% (Sachdev 2001) to approximately 80%–90% (FTC 2001). With a more restrictive definition of new products (excluding seasonal products, existing product copies, and new package sizes), the estimate is approximately 25% (Food Marketing Institute 2003b). The bottom line is that new product failure risk is a major concern for both manufacturers and retailers.

Survey opinions of both manufacturers and retailers (Bloom, Gundlach, and Cannon 2000) support the notion that new product failure risk is an important explanation for the use of slotting allowances. The risk arises from two sources for retailers: a direct operating cost per store on new products that fail (estimated at $956,800; Food Marketing Institute 2002) and costs of unsold inventory of failed products. In addition, there are the opportunity costs of lost potential revenue from more profitable products. The FTC commissioner Deborah K. Owen states that slotting allowances "provide a form of insurance for the retailer … [and] reduce, and perhaps eliminate, risk—or at least transfer some of it to the producer—by charging a fee that essentially provides indemnification from the loss of profits that would arise if the new product fails to sell well" (*Federal Register* 1995, p. 703).

Some retailers charge failure fees and require buyback guarantees from manufacturers to refund the cost of unsold inventory to ameliorate these risks. However, such requirements are not necessarily honored, especially by smaller manufacturers.[4] This suggests that the risks from small manufacturers are greater than those from large manufacturers, which are more likely to be long-term players. The greater risk might imply that slotting allowances are demanded more from smaller firms. The challenge in empirical testing is to distinguish the risk-based explanation from a retail-power-based explanation, which suggests that smaller manufacturers need to pay more slotting allowances because of their relatively low power with respect to the retailer.

Furthermore, large and small manufacturers may exhibit different levels of risk aversion when paying for slotting allowances. Large manufacturers with deep pockets can withstand a new product failure more easily than smaller manufacturers. Given this, small manufacturers will be far more risk averse to pay up-front slotting allowances and may require a higher degree of confidence in success of their products than larger manufacturers before "betting the bank."[5]

Thus, an appropriate empirical model to test this rationale is to specify the probability of offering slotting allowances for a new product as a function of the success potential of the new product. Because uncertainty about the outcome (and, thus, risk) is greatest when the success potential is intermediate, support for the risk-balancing rationale should imply an inverted U-shaped relationship between the variables. Because the effects of risk vary by the size of the manufacturer, the model should allow for differences in the relationship for large and small manufacturers.

*EER3: Signaling manufacturers' private information about new product success to the retailer*. In most new product introductions, it is fair to suggest that manufacturers have private information about the potential success of a new product. Lariviere and Padmanabhan (1997) and Desai (2000) argue that slotting allowances serve as signals by which manufacturers can credibly communicate positive private information to the retailer. Essentially, the argument is that only manufacturers that have positive private information about the potential success of the product will pay slotting allowances, whereas others with negative private information will not pay slotting allowances. Survey-based research has found little support for the signaling theory (Bloom, Gundlach, and Cannon 2000, p. 101; Rao and Mahi 2003).

In an empirical test of a signaling theory, observable and unobservable aspects of product success should be distinguished. Practitioners tend to claim that slotting allowances do not affect retailers' buying decisions; retailers accept excellent products with high brand equity without slotting allowances. However, this misses the point about signaling. Products that the retailer rates highly are likely to be accepted without slotting allowances; products that the retailer rates poorly are likely to be rejected, regardless of whether slotting allowances are offered. It is when there is a high degree of retailer uncertainty that slotting allowances can add value by communicating private information. Thus, any empirical analysis must account for the level of the retailer's uncertainty about product success.

Do slotting allowances serve as a signal to communicate a manufacturer's positive private information? We use two

[4]Wilkie, Desrochers, and Gundlach (2002, p. 282) quote a large wholesaler from their survey: "When a product fails, many small manufacturers are not around to clean up the residue, which is then discounted to salvage dealers/auctioneers."

[5]An FTC (2001, p. 23) workshop participant describes the problems of smaller manufacturers in obtaining finances for paying slotting allowances: "[B]anks do not finance marketing in any way, shape or form. They finance machinery, automobiles. They don't even like to finance your office building."

approaches based on the relationship between slotting allowances and (1) provision of test market results (EER3a) and (2) manufacturer advertising (EER3b).

Many researchers believe that test markets can serve as substitutes for slotting allowances because they can help manufacturers communicate the potential success of a new product without using slotting allowances as a signal. For example, in Wilkie, Desrochers, and Gundlach's (2002, p. 282) study, a large wholesaler notes, "Slotting fees are the result of no test markets. It is a charge for testing the item's sales potential for a manufacturer. The higher the risk of failure, the higher the charge." The Food Marketing Institute (2002, p. 2) expresses a similar view, stating, "Through slotting fees, manufacturers are, in effect, having the retailer conduct a live market trial instead of paying for test market research."

An alternative viewpoint is that test market results reported by manufacturers cannot credibly communicate private information about the potential success of a new product. Chu (1992) suggests several reasons for this: Manufacturers can (1) selectively report only positive test market studies out of multiple studies conducted, (2) choose test market locations where their brand equity is strong to make the results appear more favorable than they truly are, and (3) adjust the marketing mix in response to test markets to improve results, and therefore they may believe the potential for success, but this is not truly verifiable.

An empirical test of whether slotting allowances signal private information inherent in the test market results should consider the credibility of test market information. If test market results contain private information for manufacturers but are not credible to the retailer because of the potential for manufacturer misrepresentation, slotting allowances will be used as a signal to complement test markets, and the probability of offering slotting allowances should be greater in the presence of test market information. However, if test market information is credible to the retailer, there is no need to signal private information. In this case, slotting allowances are substitutes for test markets, and the probability of offering slotting allowances should be lower in the presence of test markets. If there is evidence of complementarity between slotting allowances and the provision of test markets when test market information is not credible, we treat it as support for the signaling rationale.

Regarding advertising, Desai (2000) argues that manufacturers can use either slotting allowances or advertising to signal potential new product success. However, if advertising is effective in raising demand, manufacturers would prefer to use it as a signal. Thus, slotting allowances and advertising will be substitutes if advertising is effective. On average, we expect that large manufacturers are more likely to be effective in their advertising than small manufacturers and that manufacturers with higher ratings of new product success by the retailer are more effective than manufacturers with lower ratings.[6] Thus, we hypothesize that slotting allowances and advertising are better substitutes for large manufacturers than for small manufacturers and for products with higher ratings.

[6]Thus, we allow for the possibility that a small manufacturer with a high retailer rating can have enough brand equity among consumers to make its consumer advertising effective and credible.

Furthermore, at the stage of retailer product acceptance, manufacturers commit to a level of advertising. However, they may not deliver on that commitment, and therefore there is some doubt about the signal's credibility. Again, it could be argued that larger firms' commitments are more credible because of their repeated interactions and the potential long-term negative impact on their reputations due to reneging on their commitments. Conversely, smaller firms may be less credible because they are potentially more likely to renege on their commitments, and therefore there is a problem of manufacturer moral hazard. As Desai and Srinivasan (1995) demonstrate, it is more difficult to detect signaling effects in the presence of moral hazard. This suggests that even if smaller firms are able to use slotting allowances to signal when their advertising is more effective, it might be difficult to detect empirically such evidence of signaling by small firms.

On the basis of Desai's (2000) findings, we treat substitution between advertising (when it is likely to be effective) and slotting allowances as evidence in support of the signaling rationale. On average, we expect larger firms and firms with new products that are rated as highly likely to be successful to have more effective advertising.

*EER4: Manufacturers attempt to mitigate retail competition to enhance retailer participation*. If retail competition reduces the profits of downstream retailers to a level lower than that of their opportunity costs, retailers will not accept the product. Desai (2000) suggests that manufacturers offer slotting allowances and raise wholesale prices to induce retailers to raise their retail prices, thus mitigating retail competition. Kuskov and Pazgel (2005) show a similar result. Although retail prices rise, slotting allowances are efficiency enhancing (and not anticompetitive) in this scenario because slotting allowances enhance distribution coverage. A corollary prediction is that manufacturers need to mitigate retail competition to induce retail participation only when the market potential is low. As market potential increases, retailers will participate despite retail competition, and the likelihood of slotting allowances should fall. Thus, a test of this rationale has two components: The likelihood of slotting allowances should increase as (1) the number of competing stores that have accepted the product increases and (2) the market potential decreases.[7]

Another plausible argument is that when a competing retailer accepts the new product, it can be informative to the focal retailer that the new product is likely to be successful, and therefore the need for slotting allowances as a signal is reduced (the "information-provision" hypothesis). If this hypothesis is true, there should be a negative relationship between slotting allowances and the number of competing stores.

### *ACR*

*ACR1: Retailers attempt to mitigate retail competition to increase retail profits*. Shaffer (1991) argues that slotting

[7]As the number of competing stores that have accepted the product increases, the effectiveness of slotting allowances to mitigate retail competition through higher retailer prices may fall. Thus, there may be an inverted U-shaped relationship between the probability of slotting allowances and the number of competing stores that have accepted the product. We thank an anonymous *JMR* reviewer for suggesting that we consider this possibility.

allowances are a facilitating practice by which retailers attempt to collude with and mitigate retail competition. This is because in the presence of slotting allowances, wholesale prices can be higher, which in turn commits retailers to less aggressive retail pricing.

On the basis of Shaffer's (1991) prediction, Bloom, Gundlach, and Cannon (2000) estimate the correlation between slotting allowances and retail prices to test the "mitigation-of-retail-competition" rationale. They find that both manufacturers and retailers agree that slotting allowances raise retail prices, and thus they conclude that this supports the anticompetitive retail-competition-mitigation rationale. However, this is not sufficient evidence for Shaffer's mitigation-of-retail-competition rationale, because almost all equilibrium models of slotting allowances, including Lariviere and Padmanabhan's (1997) and Desai's (2000) signaling models, predict that slotting allowances are accompanied by higher retail prices. Furthermore, as we discussed in EER4, manufacturers may also attempt to mitigate retail competition to enhance retailer participation. In short, there is no empirical evidence for or against Shaffer's anticompetitive rationale in the extant literature.

In contrast to Desai's (2000) work, in which the manufacturer sets the terms of trade, Shaffer's (1991) model applies when manufacturers have limited power and the retailer sets the terms of trade.[8] According to both Desai and Shaffer, the probability of slotting allowances should increase when a competing store accepts the product in order to mitigate retail competition. However, the key distinction lies in the relationship between slotting allowances and market potential. The relationship between market potential and slotting allowances is not explicitly derived in Shaffer's model. Thus, we develop a simple model that is similar in spirit to Shaffer's model in that the retailer sets the terms of trade, but slotting allowances are linked to market potential. We show this model in the Appendix and find that in this setting, slotting allowances increase with market potential and the extent of retail competition. This prediction about the relationship between slotting allowances and market potential is the opposite of the prediction in EER4, that is, when the manufacturer sets the terms of trade. Thus, a test of this rationale has two components: The likelihood of slotting allowances should increase as (1) the number of competing stores that have accepted the product increases and (2) the market potential increases.

*ACR2: Exercise of retail power*. The rise in retail power has been widely suggested as a rationale for the use of slotting allowances. Because of the wave of mergers in the supermarket industry, buying power is highly concentrated in the hands of chain-level buyers. The top five firms' share of sales has increased from 20% of sales in 1993 to 42% in 2000 (Swenson 2000). Furthermore, the four-firm retail concentration in the top 100 markets averaged 72% in 1998 (Kaufman 2000).

Chu (1992) argues that retailer power is a primary reason for slotting allowances. He develops a screening model by which retailers charge slotting allowances and extract all the manufacturer's profits as a result of their power. This implies that as the market potential for the product increases, the powerful retailer will increase slotting allowances. Bloom, Gundlach, and Cannon (2000) find that manufacturers believe that this is a primary reason for the increased use of slotting allowances; retailers rate it much lower but still believe that it has an important impact. Rao and Mahi (2003) also find support for the retail-power argument. Nevertheless, in empirical analyses of retailer profitability over time, Messinger and Narasimhan (1995) and Farris and Ailawadi (1992) find little evidence that power has shifted in the grocery channel.

Chu's (1992) model can be empirically tested by estimating the relationship between the probability of slotting allowances and the retailer's perception of the market potential for the product. Chu predicts a positive relationship; that is, as market potential increases, the likelihood of slotting allowances should increase.

## *DATA AND OPERATIONALIZATION OF THE EMPIRICAL TESTS*

### *Data*

We use data on all new product offers by manufacturers to a large supermarket chain over a nine-month period from June 1986 to February 1987.[9] Because we have data on all new product offers, we do not have any endogenous selection problems associated with using data on only accepted products.

We have two types of primary data from the retail chain: (1) objective data on the product and information, such as the extent of promotional support (extent of advertising), market research (test market data), terms of trade (slotting allowance), and the acceptance/rejection decision of the retailer, and (2) a one-page questionnaire that assessed the retail buyer's judgments of product/manufacturer attributes (e.g., extent of shelf space needed for the product, likelihood of product success based on prior experience with manufacturer/industry reputation). Note that we do not have data on the magnitude of slotting allowance; we know only whether slotting allowances are provided with a particular product offer. We also have information on which of these offered products the retailer accepted. We supplement these data with information on manufacturer revenues in 1987 from the *Ward's Business Directory of Largest U.S. Companies*. To be included in this resource, companies must either be publicly traded or, if private, have a minimum of $11 million in sales. The firms in our data set are well represented in this directory.

[8]Shaffer's (1991) model is formulated such that the manufacturer sets the terms of trade, but the manufacturers are in a perfectly competitive market and therefore have limited power to set the terms of trade. That model can be recast easily such that the retailer sets the terms of trade. In this case, it is optimal for the retailer to set the contractual wholesale price at higher-than-marginal cost (to help mitigate retail competition) but also demand a slotting allowance to transfer surplus from the manufacturers to the retailer. We thank Greg Shaffer for suggesting that we explore this alternative explanation.

[9]The supermarket chain has approximately 100 stores and covers a large trading area in the northeastern United States. Manufacturers frequently use the headquarters' region of this chain for test marketing because of its representative consumer profile. Furthermore, it is highly unlikely that any food manufacturer would bypass this retailer in the introduction of a new product. Thus, although our data apply to one company, we believe the representativeness of the retailer permits us to generalize, albeit cautiously, to other large regional retailers.

*Descriptive Analysis*

During the nine-month period of data collection, manufacturers introduced and retail buyers of the supermarket chain considered 2186 products. Of these, only 1021 observations were usable because of missing data problems. We used statistical tests based on differences between means and frequencies (two-sample t-tests and $\chi^2$ tests) on each of the variables between the total sample of 2186 products and the subsample of 1021 products and concluded that the selected subsample was not systematically different from the total sample of 2186 products.

The 1021 products covered 21 different categories, and 143 products (14%) received slotting allowances. The three largest categories in terms of product introductions were (1) frozen foods; (2) canned products, such as fruits, vegetables, juice, and drinks; and (3) dairy and refrigerated foods. Ignoring categories with a small number of product introductions, we found that the frequency of slotting allowances was particularly high in canned products (fruits, vegetables, juice, and drinks = 24%; household supplies = 20%; and health and beauty aids = 20%).

Table 2 shows the means for several variables we classified on the basis of whether slotting allowances were offered or not. The averages show some preliminary support for the hypotheses of opportunity costs and retail competition mitigation. However, it is more difficult to observe support for the signaling theories from these average numbers because it is necessary to account for interactions among variables. The retailer accepted approximately 31% of the products (30% of products with slotting allowances and 32% without slotting allowances).

We divided firms introducing products into large and small manufacturers to study differences in slotting allowance offers between the two groups. We used a cutoff of $1 billion in 1987 revenues to classify firms into large versus small firms.[10] There were 32 large manufacturers, and they introduced 308 of the 1021 products in our data. We also tested the robustness of our results, with cutoffs ranging from $800 million to $1.2 billion.

It is important to recognize that the retailer does not provide high ratings to even well-known large manufacturers for all products they introduce. Similarly, small manufacturers do not necessarily get low ratings. The range of ratings (on a scale ranging from 1 ["low"] to 10 ["high"]) for products from an illustrative sample of large manufacturers is as follows: Del Monte = 4–7, General Foods = 2–7, Kraft = 4–8, Procter & Gamble = 3–7, and Quaker Oats = 4–8. Seneca Foods, a small regional manufacturer, receives relatively high ratings (5–7) for the three products it introduced.

*Operationalization of the Empirical Tests*

We use logistic regression of the dependent variable (whether or not slotting allowances are offered for the new product) on different sets of predictor variables to test the six rationales (EER1, EER2, EER3, EER4, ACR1, and ACR2). We summarize the predictor variables used for the tests in Table 3. Next, we explain our reasoning behind these operationalizations.

*EER1: Efficient allocation of scarce shelf space*. The two proxy measures for opportunity costs of shelf space are (1) the presence or absence of private labels in the category (because the higher margins for private labels in the category can increase the opportunity costs) and (2) the buyer's rating of shelf space (on a ten-point scale) needed for the product.[11] The buyer's rating of shelf space takes into account the constraints the retailer faces in the category and therefore serves as a category independent measure.

*EER2: Balance new product failure risk between the manufacturer and the retailer*. We use the retailer's rating of the manufacturer in launching a successful product in the category as a measure of new product risk. The rating is based on the retailer's prior experience with the manufacturer, the manufacturer's general industry reputation, or both, and we measured it on a ten-point scale (10 = a high rating).

We use Rating and Rating$^2$ as explanatory variables in the logistic regression to test for the inverted U-shaped relationship between the probability of slotting allowances and ratings. Furthermore, the inverted U-shaped relationship between slotting allowance probability and ratings should peak at a higher rating for small manufacturers than for large manufacturers. To test this, we include the variables Large and Large × Rating in the logistic regression in addition to Rating and Rating$^2$. We have no specific hypothesis about the coefficient on Large (i.e., whether larger manufacturers would offer slotting allowances with greater probability), but Large × Rating should have a negative coefficient if the peak of the U-shaped curve for small manufacturers is shifted to the right of large manufacturers.

*EER3: Signaling manufacturers' private information about new product success to the retailer*. For EER3a (test markets as complements to slotting allowances to communicate private information), because the need for slotting allowances as a signal can differ across large and small firms and can also vary with ratings, we include the following variables to test the effects of test markets: (1) Test Mar-

[10]On the basis of this classification, the large manufacturers are American Cyanamid, Beatrice, Borden, Campbell, Carnation, Castle & Cooke, Clorox, Coca-Cola, Colgate-Palmolive, Dannon, Del Monte, General Foods, General Mills, Hormel, H.J. Heinz, Hershey, James River Corporation, Kellogg, Kraft, Land O'Lakes, Lever Brothers, Lipton, M&M/Mars, McCormick, Nabisco, Nestlé, Pillsbury, Procter & Gamble, Quaker Oats, Ralston Purina, Scott Paper, and Tyson Foods.

Table 2
MEANS/PERCENTAGES BY SLOTTING ALLOWANCE

| | *Slotting Allowance* | |
|---|---|---|
| | *Offered* | *Not Offered* |
| Shelf space | 5.22 | 4.99 |
| Private label (yes/no) | .85 | .75 |
| Manufacturer's reputation rating | 5.67 | 5.77 |
| Test market (yes/no) | .35 | .17 |
| Advertising (yes/no) | .23 | .18 |
| Competing stores (yes/no) | .52 | .33 |
| Large manufacturers (%) | 83 | 17 |
| Small manufacturers (%) | 87 | 13 |
| Retailer acceptance (%) | 30 | 32 |

[11]We follow previous research by Bloom, Gundlach, and Cannon (2000) and Wilkie, Desrochers, and Gundlach (2002) in using private labels as a proxy for opportunity costs. However, private labels can also give the retailer greater bargaining power than the manufacturers. This may be due to retailer power. Other tests of retailer power show little evidence for the retailer-power argument, so we interpret this result as being in support of the opportunity-cost hypothesis.

Table 3
OPERATIONALIZATION OF THE EMPIRICAL TESTS

| *Rationale* | *Construct* | *Operationalization* |
|---|---|---|
| EER1: Efficient allocation of scarce shelf space | Opportunity costs of shelf space | 1. The presence/absence of private labels in the category<br>2. Buyer's rating of shelf space (on a 1–10 scale) needed for the product |
| EER2: Balance new product failure risk | New product risk | 1. Retailer's rating of the manufacturer's reputation<br>2. Square of the rating |
| | Differential risk between large and small manufacturers | 3. Size of the manufacturer (dummy)<br>4. Interaction between size and rating |
| EER3a: Communicate manufacturers' private information: test markets as complements to slotting allowances | Test market | 1. Provision of test market results (dummy) |
| | Credibility of test markets | 2. Size of the manufacturer (dummy)<br>3. Interaction between test market and size<br>4. Interaction among test market, size, and rating |
| EER3b: Communicate manufacturers' private information: advertising as a substitute signal for slotting allowances | Advertising | 1. Advertising support for the new product (dummy) |
| | Effectiveness of advertising | 2. Size of the manufacturer (dummy)<br>3. Interaction between advertising and size<br>4. Interaction among advertising, size, and rating |
| EER4: Manufacturers mitigate retail competition to enhance retailer participation | Retail competition | 1. Whether competing stores stock the new product (dummy) or number of competing stores |
| | Factors moderating the need to mitigate retail competition | 2. Size of the manufacturer (dummy)<br>3. Interaction between competing stores and size<br>4. Interaction among competing stores, size, and rating |
| ACR1: Retailers demand slotting allowances to mitigate retail competition | Same as EER4 | |
| ACR2: Exercise of retail power | Market potential | 1. Retailer's rating of the manufacturer's reputation<br>2. Square of the rating |
| | Differential power between large and small manufacturers | 3. Size of the manufacturer (dummy)<br>4. Interaction between size and rating |

ket, (2) Test Market × Rating, (3) Large × Test Market, and (4) Large × Test Market × Rating. If the net effect of Test Market and Test Market × Rating variables is positive in the regression, we infer that slotting allowances serve as a signal for small manufacturers at that level of rating. If the net effect of all four variables at a given level of rating is positive, we infer that slotting allowances serve as a signal for large manufacturers at that level of rating.

For EER3b (advertising as a substitute signal for slotting allowances), because the effectiveness of advertising as a signal may vary with the ratings and the size of manufacturers, we include the following variables as predictor variables for the test: (1) Advertising, (2) Advertising × Rating, (3) Large × Advertising, and (4) Large × Advertising × Rating, where Advertising is a variable that indicates whether the manufacturer offers to advertise for the product.[12] If the net effect of Advertising and Advertising × Rating variables are negative (positive) at a given level of rating, slotting allowances and advertising are substitutes (complements) for small manufacturers at that level of rating. Similarly, if the net effect of all four variables at a given level of rating is negative (positive), it implies that slotting allowances and advertising are substitutes (complements) for large manufacturers at that level of rating. On the basis of Desai's (2000) work, we treat evidence of substitution between advertising and slotting allowances as evidence in favor of the signaling theory.

*EER4: Manufacturers attempt to mitigate retail competition to enhance retailer participation*. We treat whether a competing store has accepted the product as a proxy for retail competition, and we treat the rating of the vendors as a measure of market potential because rating is related to the likelihood of success for the product. As we explained previously, the relationship between slotting allowances and potential in the presence of retail competition depends on whether manufacturers or retailers set the terms of trade. This can be different for small versus large manufacturers. Therefore, we include the following variables as predictor variables in the regression: (1) Competing Stores, (2) Competing Stores × Rating, (3) Large × Competing Stores, and (4) Large × Competing Stores × Rating. Competing Stores

[12]In a previous version of the article, we showed that our results are robust whether we use the actual gross rating points that the manufacturers promised or simply an indicator to show whether the manufacturers promised advertising gross rating points. For the sake of brevity, we report only results with the indicator variable in this version because they are easier to interpret.

is a variable that indicates whether a competing retailer has also accepted the product.[13] If the net effect of Competing Stores and Competing Stores × Rating variables is positive (negative) at a given level of rating, it suggests support for retail competition mitigation (information provision) among small manufacturers. Similarly, if the net effect of all four variables is positive (negative) at a given level of rating, it suggests support for retail competition mitigation (information provision) among large manufacturers. If we find support for retail competition mitigation, we then examine the relationship between probability of slotting allowances and ratings. If this is negative, we treat it as support for Desai's (2000) retailer-participation argument. If it is positive, it suggests support for Shaffer's (1991) ACR1 rationale.

*ACR1: Retailers attempt to mitigate retail competition to increase retail profits*. We use the same set of variables we used in EER4 to test this rationale. For the details of how we detect support for this rationale, see the preceding discussion of EER4.

*ACR2: Exercise of retail power*. Chu's (1992) screening model predicts that slotting allowances will be greater as market potential increases. As in EER4, we treat retailer rating as a proxy for market potential. Support for Chu implies that the probability of slotting allowances increases with ratings.

### *RESULTS OF TESTS OF RATIONALES*

In Table 4, we report the results of logistic regressions with presence/absence of slotting allowances as the dependent variable and the appropriate variables of interest for each rationale as the explanatory variables. The first set of columns with headings EER1, EER2, EER3a, EER3b, and EER4 report the regression results with just the variables that are related to the tests of the corresponding rationales. The test for ACR1 is the same as that for EER4, and the test for ACR2 is the same as that for EER2. In the All column, we report the results of the regression with all the variables simultaneously included. Because the correlations between the different variables are fairly small, we do not expect the coefficients in the separate regressions to differ much from the simultaneous regression. To account for any category-level differences, we also report the results of a regression with all the variables in the All column, but we include category-level fixed effects. Inclusion of the category-level fixed effects increased R-square from .19 to .27, but the coefficients across the two regressions are similar. We explain the few differences in our subsequent discussions.

Because the retail buyers provide ratings of manufacturers at the same time they observe other characteristics associated with the product (whether test market results are shown, whether advertising is promised, and whether competing retailers have accepted), it is possible that these other variables endogenously determine the ratings. In the All (Endogeneity-Adjusted Rating) column, we include an endogeneity-adjusted rating measure in the regression to test the robustness of our conclusions.

[13]As with advertising, we find that our results are robust whether we use the actual number of competing retailers (or its square root to model a concave relationship) that have accepted the product or simply an indicator to show whether any competing retailer has accepted the product. We also included a squared term for the number of competing retailers to test for the hypothesized inverted U-shaped relationship between slotting allowances and competing stores.

*EER*

*EER1: Efficient allocation of scarce shelf space*. We find that opportunity costs of shelf space are significant at the 10% level, and private label is significant at the 1% level (Table 4, EER1 column). When all the variables are included (see the All column), both variables are significant at the 10% level. When the category-level fixed effects are included, we find that the shelf space is highly significant at the 1% level, and the magnitude of the shelf-space effect increases threefold, suggesting that shelf-space constraints vary by category and that accounting for it is important to obtain the true measure of its impact on the probability of slotting allowances. However, inclusion of category-level fixed effects makes the private-label effect insignificant. This is because the presence of private labels varies by category, and therefore category-level fixed effects absorb the effect of variation in private labels on slotting allowances. Overall, in contrast to the previously discussed findings of Bloom, Gundlach, and Cannon (2000), we conclude that the opportunity costs of shelf space and the presence of private labels in a category are drivers of slotting allowances.

*EER2: Balance new product failure risk between the manufacturer and the retailer*. The positive coefficient on Rating and the negative coefficient on Rating$^2$ in Table 4 (EER2a column) provide evidence in favor of the inverted U-shaped relationship we predicted for the risk-balancing rationale. The results are still similar even when we include all variables and when we include category-level fixed effects. Figure 1, Panel A, illustrates the inverted U-shaped curve graphically using the results from the All column.[14] The inverted U-shaped curve for the probability of slotting allowances peaks at approximately 5.4, around the region of maximum uncertainty. This suggests that balancing risk is indeed a rationale for slotting allowances.

We find significant difference between large and small manufacturers in the probabilities of offering slotting allowances (Table 4, EER2b column). As we predicted, the negative coefficient for Large × Rating indicates that the peak of the inverted U-shaped curve for small firms is to the right of large firms.[15] Figure 1, Panel B, which is based on the All column, is more revealing. The peak in slotting allowances for large manufacturers occurs at a rating of 4.2, which is much lower than that for small manufacturers (5.8). This provides support for the greater perceived risk of small manufacturers and their greater risk aversion to offering slotting allowances at low ratings, thus providing evidence that is consistent with the risk-balancing explanation.

*EER3: Signaling manufacturers' private information about new product success to retailer*. The estimates of Test Market and Test Market × Rating (Table 4, EER3a column) indicate that the provision of test market information increases the probability of observing slotting allowances for small manufacturers when their ratings are greater than 4. The results are similar in the All variable regression.

[14]The graphs are similar whether we use the results from the separate regressions or the All regression. To be consistent across all our results, we report graphs based on the All regression. When creating the graphs, we used the average values for the variables we did not include in the graph.

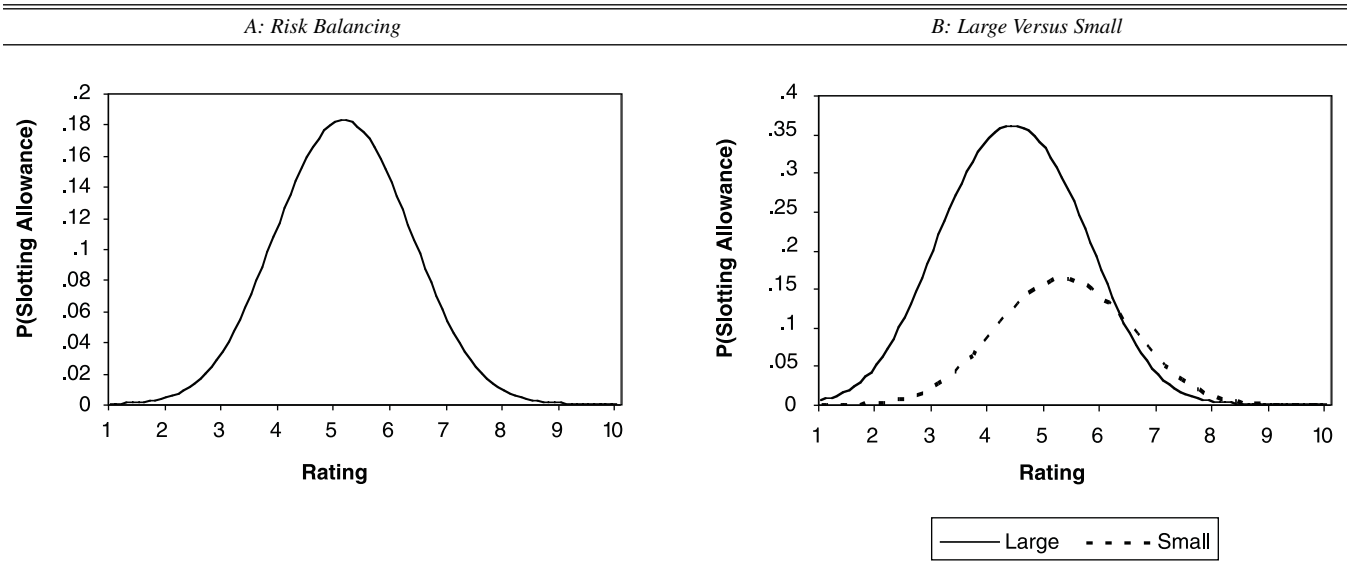
[15]Note that though this variable is insignificant in the All regression, the net effect of Large on the rating in that regression is captured simultaneously by several other interaction variables that we also included in the regression.

Table 4
RESULTS

| *Variable* | *EER1* | *EER2a* | *EER2b* | *EER3a* | *EER3b* | *EER4* | *All* | *All (Category-Level Fixed Effects)* | *All (Endogeneity-Adjusted Rating)* |
|---|---|---|---|---|---|---|---|---|---|
| Intercept | –2.70*** | –8.22*** | –10.17*** | –10.92*** | –10.61*** | –9.85*** | –13.56*** | –13.78*** | –13.91*** |
| | (.35) | (1.65) | (1.82) | (1.93) | (1.99) | (1.83) | (2.39) | (2.55) | (2.45) |
| Shelf space | .07* | | | | | | .10* | .22*** | .11* |
| | (.04) | | | | | | (.06) | (.10) | (.06) |
| Competing private label | .63*** | | | | | | .45* | .04 | .45* |
| | (.25) | | | | | | (.27) | (.30) | (.27) |
| Manufacturer rating | | 2.55*** | 3.01*** | 3.49*** | 2.97*** | 3.07*** | 4.13*** | 4.18*** | 4.15*** |
| | | (.60) | (.63) | (.69) | (.67) | (.65) | (.86) | (.90) | (.87) |
| Manufacturer rating$^2$ | | –.24*** | –.26*** | –.33*** | –.24*** | –.29*** | –.40*** | –.40*** | –.40*** |
| | | (.05) | (.05) | (.06) | (.06) | (.06) | (.08) | (.08) | (.08) |
| Large | | | 4.89*** | 3.03*** | 7.21*** | 2.96** | 1.68 | 3.67 | 2.03 |
| | | | (1.12) | (1.39) | (1.35) | (1.47) | (2.65) | (2.71) | (2.64) |
| Large × rating | | | –.79*** | –.37 | –1.16*** | –.38 | –.13 | –.44 | –.19 |
| | | | (.19) | (.24) | (.24) | (.26) | (.46) | (.47) | (.46) |
| Test market | | | | –2.76* | | | –5.28*** | –5.63*** | –2.64* |
| | | | | (1.55) | | | (1.73) | (1.91) | (1.40) |
| Large × test market | | | | 5.69** | | | 15.59*** | 14.68*** | 12.59*** |
| | | | | (2.62) | | | (4.08) | (4.23) | (3.84) |
| Test market × rating | | | | .73*** | | | 1.16*** | 1.19*** | 1.19*** |
| | | | | (.26) | | | (.29) | (.32) | (.28) |
| Large × test market × rating | | | | –1.31*** | | | –3.03*** | –2.91*** | –3.03*** |
| | | | | (.46) | | | (.72) | (.74) | (.72) |
| Advertising | | | | | 6.64*** | | 8.55*** | 9.72*** | 11.26*** |
| | | | | | (1.29) | | (1.87) | (2.16) | (1.92) |
| Large × advertising | | | | | –11.02*** | | –15.78*** | –17.03*** | –18.53*** |
| | | | | | (2.73) | | (3.37) | (3.69) | (3.54) |
| Advertising × rating | | | | | –1.04*** | | –1.47*** | –1.62*** | –1.83*** |
| | | | | | (.30) | | (.33) | (.38) | (.37) |
| Large × advertising × rating | | | | | 1.74*** | | 2.68*** | 2.92*** | 3.01*** |
| | | | | | (.47) | | (.58) | (.63) | (.62) |
| Competing stores | | | | | | –2.06 | –1.79 | –1.38 | .85 |
| | | | | | | (1.36) | (1.49) | (1.64) | (1.28) |
| Large × competing stores | | | | | | 4.14* | 5.94* | 5.21* | 3.79 |
| | | | | | | (2.32) | (3.31) | (3.11) | (3.11) |
| Competing stores × rating | | | | | | .53** | .47* | .45* | .41* |
| | | | | | | (.24) | (.26) | (.26) | (.24) |
| Large × competing stores × rating | | | | | | –.84** | –1.09* | –.98* | –1.06* |
| | | | | | | (.40) | (.56) | (.59) | (.56) |
| $\rho^2$ | .01 | .04 | .04 | .12 | .09 | .09 | .19 | .27 | .19 |

*$p < .1$.
**$p < .05$.
***$p < .01$.

Figure 1
RISK BALANCING




Thus, slotting allowances complement test markets rather than serve as substitutes, providing support for the signaling theory.

A graphical representation of these results (see Figure 2) indicates that the net effect of test markets on the observation of slotting allowances is negative for ratings greater than 5 for larger firms and is positive for ratings less than 5. If we consider ratings to proxy for credibility of the test market information, we observe that at low levels of credibility, large firms use slotting allowances as a signal of private information and complement test markets with slotting allowances. However, at high levels of credibility (manufacturer rating greater than 5), large firms substitute test markets for slotting allowances because there is not much of a need to signal.

In contrast, the net effect of test markets on slotting allowances for small firms is positive even at high levels of ratings. This is consistent with the argument that retailers do not perceive test market information offered by small firms as credible even at high levels of ratings, and therefore small firms use slotting allowances as a signal even at high levels of ratings.

Thus, our results reconcile the conventional wisdom that slotting allowances are a price that firms pay for not doing their own market research, versus the theory that slotting allowances signal private information. Only when retailers deem the market research information to be credible (as with large firms with high ratings) do we find that slotting allowances and test markets are substitutes. Otherwise, they play a signaling role.

The estimates for Advertising and Advertising × Rating (Table 4, EER3b column) indicate that advertising decreases the probability of offering slotting allowances for small manufacturers as long as their ratings are high (greater than 7). The results based on estimates in the All column are similar. Thus, advertising and slotting allowances are substitutes for small firms only when the ratings are high. Our results are consistent with the signaling rationale only at very high levels of ratings for small manufacturers.

In contrast to smaller firms, larger firms substitute slotting allowances for advertising at low levels of ratings (see Figure 3). Thus, large firms use advertising as an alternative to slotting allowances, consistent with Desai's (2000) signaling theory prediction. At higher ratings (greater than 6), however, advertising and slotting allowances are complements, but the complementarity effect is very small and not significant. This result is consistent with our test market results in that at high levels of ratings, large firms do not need to use slotting allowances or advertising as a signal. Advertising is used, if at all, to build demand rather than to signal high demand, and therefore advertising and slotting allowances are no longer substitutes.

Why do we find evidence for signaling only at high ratings for small manufacturers, even though signaling is more critical at lower ratings? There are two plausible reasons for this. First, low ratings for the small manufacturer of this product may be correlated with low advertising effectiveness. Thus, as Desai (2000) suggests, advertising and slotting allowances are not effective substitutes as a signal. Second, there is the potential for manufacturer moral hazard with respect to advertising. When ratings are low, moral hazard concerns are likely to be higher (especially for small manufacturers), and as Desai and Srinivasan (1995) note, signaling distortions are lower, and therefore signaling is more difficult to detect. Given Desai and Srinivasan's theoretical arguments, it is particularly gratifying that we find evidence for signaling only at high ratings, even in the presence of moral hazard problems by small manufacturers. In summary, our results are consistent with the predictions from the signaling theory that advertising and slotting allowances are substitutes when advertising effectiveness is high.

*EER4: Manufacturers attempt to mitigate retail competition to enhance retailer participation*. We report the retail competition results in the EER4 column of Table 4. The

estimates are similar to the All column, in which we simultaneously control for the effects of the other variables. Based on the estimates in the All column and holding fixed the effects of the other variables, Figure 4 graphs how the presence of competing retailers differentially affects large and small retailers. Figure 4 also shows that the probability of slotting allowances is greater in the presence of retail competition for both large and small retailers. These results support the mitigation-of-retail-competition hypothesis, as opposed to the information-provision hypothesis.

Having found support for the mitigation-of-the-retail-competition hypothesis, we now test whether there is support for the procompetitive retailer-participation rationale (EER4) or the anticompetitive retailer-collusion rationale (ACR1). As we discussed previously, if the EER4 rationale is at work, the likelihood of slotting allowances should fall as ratings increase. In contrast, if the ACR1 rationale is at work, the likelihood of slotting allowances should rise as ratings increase. Figure 4 shows that for both large and small manufacturers, the likelihood of slotting allowances falls as ratings increase, suggesting support for the retail-participation rationale (EER3) that Desai (2000) offers.[16]

[16]We also included Competing Stores$^2$ in the regression to test for the inverted U-shaped relationship between the probability of slotting allowances and the number of competing retailers that have accepted the product. We did not find evidence for an inverted U-shaped relationship.

Figure 2
ROLE OF TEST MARKETS

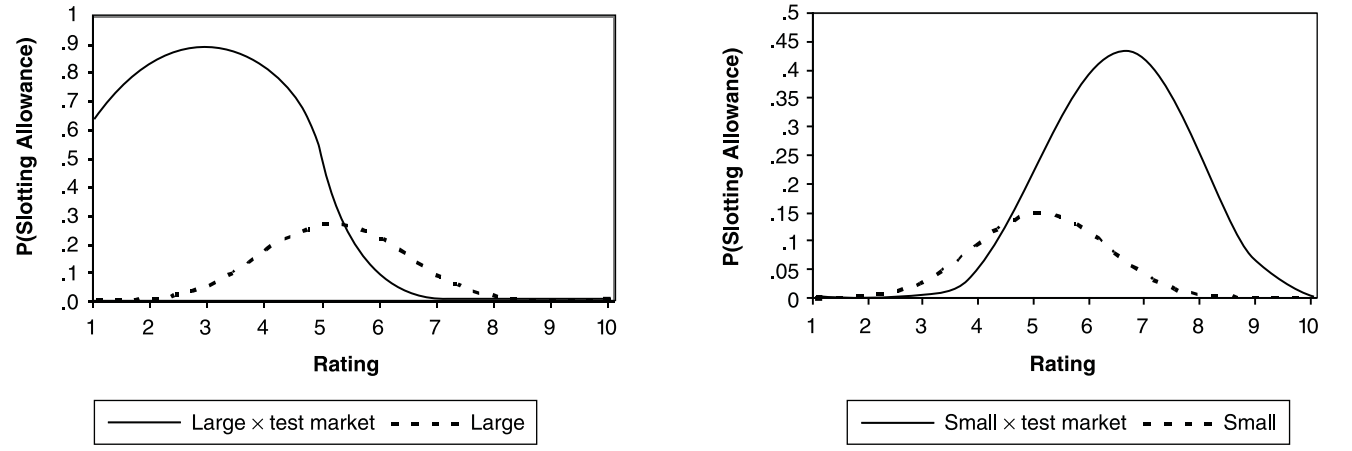



Figure 3
ROLE OF ADVERTISING

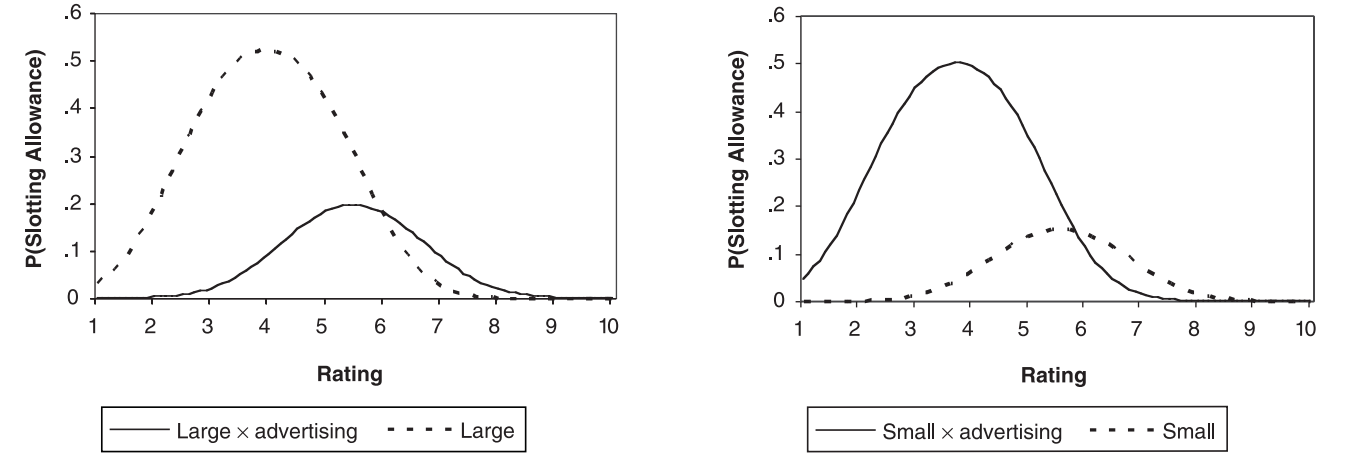
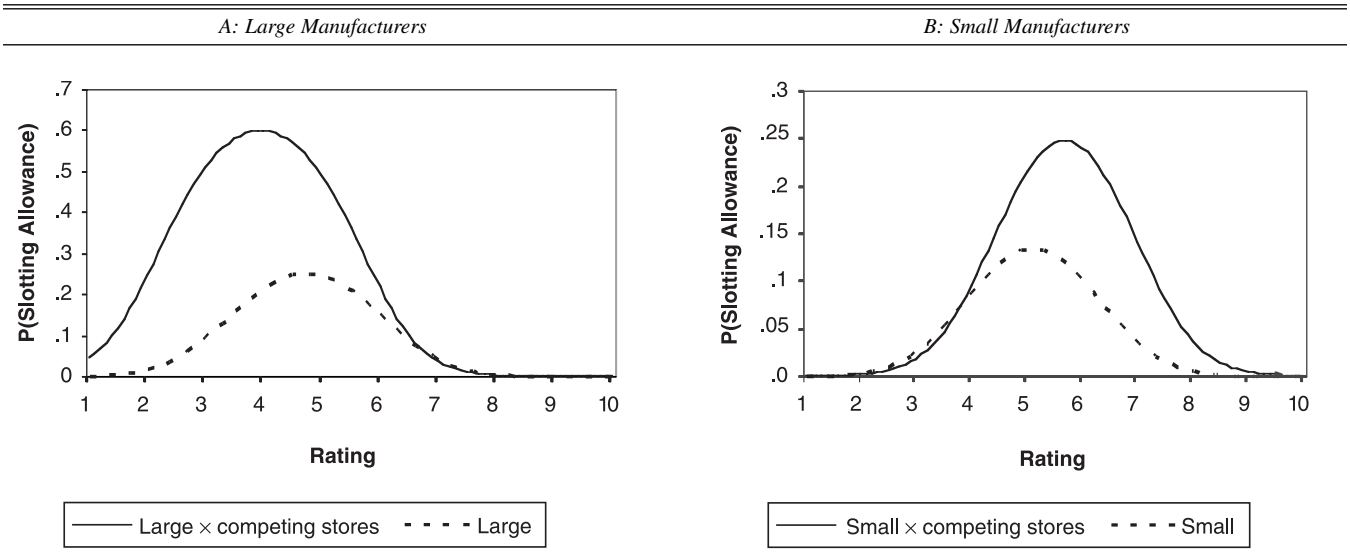


Figure 4
ROLE OF COMPETING STORES




*ACR*

*ACR1: Retailers attempt to mitigate retail competition and increase retail profits*. As we explained in the preceding EER4 subsection, on the basis of the regression results for EER4 and the corresponding Figure 4, we conclude that there is no support for ACR1 in our data.

*ACR2: Exercise of retail power*. Our finding in Figure 1 that the probability of offering slotting allowances falls at high levels of rating even for small manufacturers suggests that our results are not consistent with the retail-power explanation (Chu 1992). As we discussed previously, the presence of private labels may indicate greater opportunity costs or greater bargaining power for the retailer. Both could cause the likelihood of slotting allowances to increase. We find support for the opportunity-costs-of-shelf-space argument (with the shelf-space variable) but not for the retailer-power argument (Figure 1). Thus, we interpret the positive relationship between slotting allowances and private labels as support for the opportunity-cost hypothesis. Further research is required to address this issue conclusively.

Although the exercise-of-retailer-power rationale is inconsistent with data from this particular retailer, we view the conclusion about retailer power as preliminary. To rule out the retailer-power hypothesis, we need to perform this analysis with data from a cross-section of retailers with different characteristics (related to power, such as market share) to ensure that there is no confounding between greater power and greater opportunity costs. For example, a large retailer may be considered powerful because of its size, but the opportunity costs of its shelf space will be greater as well, and both can lead to slotting allowances.

*Endogeneity of Manufacturer Ratings*

Our empirical analysis has focused on how the likelihood of offering slotting allowances changes with the retailer's ratings of small and large manufacturers in the presence of test market information, advertising, and competing stores. The retailer's rating of likelihood of success of the new product is based on experience with the manufacturer and industry reputation. Therefore, we assumed that ratings are independent of the characteristics of the transaction in question (i.e., whether test market results are shown, whether advertising is promised, and whether competing retailers have accepted). Nevertheless, because buyers rated the manufacturer after the terms of trade were revealed, it is possible that the terms of trade affected manufacturer ratings.

Table 5 reports the regression results of ratings against the terms-of-trade variables. We find an interesting difference between small and large manufacturers. Test markets, advertising, and competing store acceptance all affect small manufacturers' ratings, but the net effect on large manufacturers is close to zero. In hindsight, these results are not surprising, because the retailer has more experience with large manufacturers and their industry reputations are relatively strong, suggesting that the effect of the current transaction's trade terms on ratings is minimal. In contrast, the retailer is

Table 5
EFFECT OF TERMS OF TRADE ON MANUFACTURER REPUTATION

| *Variable* | *Estimate (SE)* |
|---|---|
| Intercept | 5.27** (.07) |
| Large | .94** (.16) |
| Test market | .46** (.16) |
| Advertising dummy | .50** (.16) |
| Competing stores dummy | .49** (.11) |
| Large × test market | –.57** (.24) |
| Large × advertising | –.55** (.25) |
| Large × competing stores | –.40* (.21) |
| $R^2$ | .08 |

*$p < .1$.
**$p < .01$.

likely to have less experience with small manufacturers, and their industry reputations are not as well defined. Thus, from a Bayesian updating perspective, it makes sense that the current transaction's trade terms affect the small manufacturers' ratings to a larger extent.

Therefore, we check whether the results change if we work with the retailer's a priori ratings of the manufacturers rather than the a posteriori ratings after the terms of trade are revealed to the retailer. We compute the a priori ratings without the terms of trade as follows: a priori rating = actual rating – $\beta X$, where X is the set of variables related to the terms of trade for each offer in the regression in Table 5 (i.e., excludes Intercept and Large) and $\beta$ is the estimated coefficients. The results using these a priori ratings appear in the All (Endogeneity-Adjusted Rating) column of Table 4. The coefficients are fairly similar and the qualitative results are identical to the prior results.

### *Which of the Theoretical Models Is Most Consistent with the Data?*

Thus far, we have evaluated empirical support for the implications of alternative models. We now examine the support for the underlying model structure of the various theories to evaluate the modeling assumptions that are most consistent with the data.

*Model structure*. A key difference in the structure among the game theoretic models of slotting allowances is in the way they operationalize the balance of power between manufacturers and retailers in terms of the party that moves first in the model. Chu's (1992) screening model assumes that the retailer has power and first sets the terms of trade. Shaffer's (1991) model assumes that manufacturers are in a perfectly competitive market and that the power, if any, rests with the retailers that are interested in mitigating retailer competition. Because manufacturers are perfectly competitive, Shaffer's model does not predict a relationship between slotting allowance offers and product potential. To address this issue, we developed a model similar in spirit to that of Shaffer in terms of (1) the objective of mitigating retail competition and (2) the retailer setting the terms of trade, but we allowed slotting allowances to vary with a product's potential. The essential conclusion is that when the retailer has the power to set the terms of trade, slotting allowances increase with product potential because the retailer attempts to extract the entire available surplus from the manufacturers.

In contrast to these studies, Lariviere and Padmanabhan (1997) and Desai (2000) assume that manufacturers move first and set the terms of trade. For these researchers, the opportunity costs of shelf space are critical elements without which slotting allowances will not arise in equilibrium. The key idea in both of these studies is that slotting allowances can arise as a result of the private information that is available to manufacturers about the success of the product and the manufacturers' interests in "signaling" such information to the retailer. Desai (2000) also shows that signaling private information is not necessary for slotting allowances to occur. When expected profits for retailers fall as a result of retail competition, slotting allowances can be used to reduce retail competition and induce retailers to participate. We summarize relevant characteristics of the different theoretical models and the nature of the empirical support for the different models (rather than the rationales we discussed previously) in Table 6.

*Empirical evidence*. As we discussed previously, we find that the likelihood of slotting allowances can decrease as the retailer ratings of new product success increase. This negates the possibility that the retailer uses its power to extract as much slotting allowances as possible from manufacturers. The finding that this is true even for small manufacturers suggests that the retailer-power story is not a reasonable explanation for the use of slotting allowances. Therefore, we conclude that there is no support for the underlying model structure of retailer as the first mover (Chu 1992; Shaffer 1991).

Table 6
THE MODEL STRUCTURE OF DIFFERENT THEORIES

| | *Manufacturer Offers Slotting Allowances (i.e., Manufacturer Is First Mover)* | *Retailer Extracts Slotting Allowances (i.e., Retailer Is First Mover)* |
|---|---|---|
| Opportunity costs of shelf space | Sullivan (1997) models opportunity costs of shelf space endogenously. (*not tested*)<br>Lariviere and Padmanabhan (1997) and Desai (2000) treat this as exogenous. (*supported)* | |
| Slotting allowance as signal | Lariviere and Padmanabhan (1997) and Desai (2000) predict that slotting allowance is a signal of the potential success of a product. (*supported*) | |
| Slotting allowance and advertising as signaling substitutes | Desai (2000) predicts that advertising is used as a signal when it is effective and that slotting allowances are used when advertising is less effective. (*supported*) | |
| Mitigation of retail competition | Desai (2000) predicts that the retailer uses slotting allowance to mitigate retailer competition to induce retailer participation. (*supported*) | Shaffer (1991) and the current article predict that retailers use slotting allowance to sustain retail collusion. (*not supported*) |
| Exercise retail power; demand slotting allowances for high demand products | | Chu (1992) predicts that retailers use slotting allowance to screen high-demand products and extract manufacturer surplus. (*not supported*) |

We find support for the opportunity-cost prediction, a critical ingredient in Lariviere and Padmanabhan's (1997) and Desai's (2000) models.[17] We also find support for Desai's prediction that advertising becomes a substitute for slotting allowances when it is effective. Finally, we find support for the retail-competition-mitigation hypothesis but only insofar as its intent is to induce retailer participation, as Desai (2000) predicts.

Thus, we find support for many of Desai's (2000) predictions, suggesting that his theoretical framework could be the most plausible in explaining our data. Because Desai (2000) nests Lariviere and Padmanabhan's (1997) modeling structure with respect to opportunity costs and manufacturer signaling, our results are also consistent with Lariviere and Padmanabhan's model.

[17]In contrast to the work of Lariviere and Padmanabhan (1997) and Desai (2000), who treat opportunity costs of shelf space as an exogenous parameter in their model, Sullivan (1997) models endogenously the scarcity of shelf space itself as a trade-off between consumers' value for variety and the manufacturer's incentives for new products; slotting allowances are the equilibrium outcome of this scarce shelf space. Given the cross-sectional nature of our data, we cannot test for Sullivan's specific theory about how opportunity costs arise endogenously, but our results could be consistent with her theory.

### *ANALYSIS OF THE RETAILER PRODUCT ACCEPTANCE DECISION*

The role of slotting allowances is to increase the chances of the retailer accepting the new product. We use retailer-acceptance data to address the following questions: (1) Do slotting allowances help improve retailer acceptance? and (2) Do slotting allowances moderate the effects of the variables that we have considered thus far on the probability of retailer acceptance?[18]

To address these questions, we perform a logistic regression with retailer acceptance as the dependent variable on the same set of products we previously studied. We report the results in Table 7. In Column 1, we directly enter slotting allowance (dummy variable) into the regression along with the other variables that we considered in the empirical tests of rationales. We find that an offer of slotting allowances has a negative impact on the product acceptance decision up to a rating of 5 for small manufacturers and up to a rating of 7 for large manufacturers. Such a negative effect is inconsistent with the role of slotting allowances in improving new product acceptance, as we have argued thus far. To determine whether this effect is due to the endogenous nature of ratings, we ran the regression with the

[18]We thank a reviewer for encouraging us to perform this analysis.

Table 7
DEPENDENT VARIABLE: RETAILER ACCEPTANCE

| *Variable* | *Slotting Allowance: No Endogeneity Correction (Unadjusted Rating)* | *Slotting Allowance: No Endogeneity Correction (Endogeneity-Adjusted Rating)* | *Slotting Allowance: Endogeneity Correction (Endogeneity-Adjusted Rating)* |
|---|---|---|---|
| Intercept | –4.46** | –4.44** | –4.63** |
| | (.49) | (.49) | (.56) |
| Manufacturer rating | .42** | .42** | .44** |
| | (.06) | (.06) | (.08) |
| Large | .83** | .87** | .85** |
| | (.26) | (.26) | (.30) |
| Slotting allowance | –2.61* | –2.58** | –2.08 |
| | (1.37) | (1.28) | (2.33) |
| Slot × large | –.94* | –1.23** | –2.89** |
| | (.49) | (.51) | (1.25) |
| Slot × manufacturer rating | .47** | .51** | .93** |
| | (.23) | (.23) | (.43) |
| Shelf space | .18** | .17** | .16** |
| | (.05) | (.05) | (.05) |
| Private label | –.07 | –.07 | –.09* |
| | (.05) | (.05) | (.05) |
| Test market | –.34 | –.09 | –.79** |
| | (.27) | (.26) | (.36) |
| Large × test market | .09 | –.22 | .55 |
| | (.41) | (.40) | (.47) |
| Gross rating points dummy | .96** | 1.21** | 1.39** |
| | (.25) | (.25) | (.28) |
| Large × gross rating points | –.03 | –.31 | –.54 |
| | (.39) | (.39) | (.42) |
| Competing store dummy | .55** | .80** | .49*** |
| | (.18) | (.18) | (.21) |
| Large × competing stores | –1.29** | –1.49** | –1.15** |
| | (.34) | (.34) | (.36) |
| $\rho^2$ | .12 | .12 | .13 |

*$p < .1$.
**$p < .01$.
Notes: We report estimates; standard errors are in parentheses.

endogeneity-adjusted ratings we discussed previously. The results continue to be similar in that slotting allowances have a negative effect on retailer acceptance until the retailer ratings are fairly high. This negative effect of slotting allowances is also reported in the work of Rao and McLaughlin (1989), who suggest that this is possibly due to unobserved negative characteristics of products for which slotting allowances are offered (i.e., there is an endogeneity problem).

To obtain the true effect of slotting allowances, we need to correct for the endogeneity bias. Suppose that $y_1$ denotes the dichotomous slotting allowance variable and that $y_2$ denotes the dichotomous retailer-acceptance variable. Suppose also that there are two underlying latent variables that capture the need to offer slotting allowances ($y_1^*$) and the attractiveness of the product, which determines retailer acceptance ($y_2^*$). Now suppose that $y_1^* = X_1\beta_1 + \varepsilon_1$ and that $y_2^* = \gamma y_1 + X_2\beta_2 + \varepsilon_2$. Maddala (1983, pp. 122–23) and Maddala and Lee (1976) suggest the following two-stage logit procedure to obtain consistent estimates of $\gamma$ and $\beta_2$.

This procedure involves two steps: First, we estimate the logit model for slotting allowances, as in Table 4. Second, we replace the dichotomous endogenous slotting allowance variable ($y_1$) with the estimated Prob(slotting allowance = 1) from the slotting allowance regression equation estimates in Table 4 and then estimate the logit model of retailer product acceptance. Because we use the endogeneity-adjusted measure of retailer rating for a product, we use the estimates from the Endogeneity-Adjusted Rating column in Table 4 to compute Prob(slotting allowance = 1).

We report the estimates in the last column of Table 7. The results show that slotting allowances increase the likelihood of product acceptance. The coefficient for slotting allowances is not significantly different from zero (it was significantly negative without the endogeneity correction); furthermore, the interaction coefficient for Slot × Manufacturer Rating is significantly positive and larger than it was without the correction. Thus, slotting allowances have a positive effect on retailer acceptance for small manufacturers at all levels of ratings. For large manufacturers, slotting allowances have a positive effect when the rating is greater than 3. Perhaps the reason for this difference between larger and smaller manufacturers is that slotting allowances offered by smaller manufacturers have greater credibility than those offered by larger manufacturers at low ratings because of their greater risk aversion.

When we control for rating, the positive coefficient for Large demonstrates that large manufacturers' products are accepted at a higher rate. This cross-validates our previous argument that the retailer also perceives greater risk from small manufacturers.

We continue to find that products with competing private labels are less likely to be accepted, even after taking into account the moderating effect of slotting allowances. However, the effect of shelf space on retailer acceptance is positive, which, given the opportunity costs argument, was not as expected. It is plausible that the shelf-space effect on likelihood of acceptance is a category-level effect in that products with higher shelf-space ratings may be systematically more profitable at the category level. Inclusion of category-level fixed effects made this coefficient insignificant, suggesting that this is a plausible hypothesis.

We find that after we account for the moderating role of slotting allowances, advertising has a positive effect on product acceptance for both large and small retailers. Thus, retailers like products with greater advertising support. The presence of competing stores has differential effects on large and small manufacturers. Consistent with the negative impact of the retail competition effect, we find a negative effect for large manufacturers, but we find a positive effect for small manufacturers, suggesting that there is an information effect for small manufacturers when competing stores accept a product. Although we do not have an explanation for the unexpected negative effect of test markets on product acceptance for small manufacturers, the effect may be due to the lack of credibility of such information from small manufacturers.

Overall, the analysis of retailers' acceptance decisions suggests that there is both a direct effect of opportunity costs, advertising, and competing stores on retailer-acceptance decisions and an indirect effect through slotting allowances. Furthermore, we find that acceptance by competing stores provides a positive information value to retailers for products from small manufacturers, but the negative effect of competition is dominant for large manufacturers.

## *CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS*

This article provides the first empirical investigation of multiple rationales presented in the literature for the use of slotting allowances in new product introductions. For this purpose, we use a unique data set that consists of all new products that were offered to a retailer during a period of nine months (some of which had slotting allowances and others that did not). Our empirical analysis suggests that slotting allowances are efficiency enhancing and not anticompetitive. Specifically, we conclude the following:

- Slotting allowances efficiently allocate scarce retail shelf space.
- Slotting allowances help balance risk by shifting the downstream risk of retailers toward manufacturers.
- Slotting allowances are offered in a manner consistent with predictions of signaling theories.
- Although slotting allowances mitigate retail competition, the impetus is not anticompetitive but rather to enhance retail distribution.
- We do not find support for the retailer power rationale, but this lack of evidence might be due to the characteristics of our data.

### *Implications for Practitioners*[19]

Our study offers useful insights for manufacturers and retailers. In general, it suggests that both large and small

[19]A press release based on a previous version of the article led to several articles in the trade press (e.g., Hamstra 2005; *Progressive Grocer* 2005). These articles elicited several reactions from practitioners and experts in the retailing industry. Small manufacturers tended to be overwhelmingly negative about our conclusion that slotting allowances have efficiency-enhancing aspects and indicated that they perceived the system of slotting allowances to be structurally unfair to small manufacturers with fewer resources. The trade press and consultants were more balanced (though tilted to the negative). Not surprisingly, retailers tended to be positive. This section is inspired by comments we received and our responses to them.

manufacturers should train their sales forces to communicate credibly and effectively the success potential of their products to retailers to reduce the need to offer slotting allowances. Our results suggest that there is little danger that the retailer will ask for more slotting allowances when it realizes the success potential of the product.

Our results show that small manufacturers have greater marginal impact for more favorable evaluations by offering information about test markets and committing to greater advertising (if, indeed, the product is likely to be effective) because the retailer has less experience/knowledge about these vendors than they do about larger manufacturers. In addition, as we observed in the retailer-product-acceptance regression results and with the rating regression, small manufacturers find it particularly effective to provide likely evidence of marketplace success. One approach would be to introduce the product first at smaller retailers that have lower profitability thresholds than larger chains. If, indeed, the product becomes successful at these smaller retailers, this can help the manufacturer persuade the retailer to accept the product.[20]

Small manufacturers that do not operate on the same scale as large manufacturers often complain that their products do not get the same attention as larger manufacturers' products and that they are unable to afford slotting allowances. Our results for opportunity costs and retailer participation suggest a possible solution to this problem. Retailers consider their shelf space valuable real estate and therefore need to evaluate product success information provided by small manufacturers and to consider offering localized product assortments. This will reduce their opportunity-cost thresholds for participation and make the shelf-space allocation more efficient on a store-by-store basis. This approach would be particularly helpful when dealing with smaller manufacturers that typically offer products that cater to more localized tastes. Such small manufacturers currently feel shut out of supermarkets because their locally preferred products only do well at few of the chain's stores and, therefore, do not meet the aggregate profitability threshold across all stores of the chain. Retailers need to consider modifying their systems to be flexible in accepting products on the basis of their potential for localized success.

Finally, small manufacturers that are initially seeking a foothold in a market should consider offering a product on an exclusive basis (for an initial period of one to two years) to only one of the larger retail chains in any particular market. This could mitigate the problems of retailer competition and thus reduce the need to pay slotting allowances.

*Implications for Researchers*

Our study suggests two major takeaways for any future empirical analysis of slotting allowances: First, the effect of critical variables (test markets, advertising, competing stores) on offers of slotting allowances is a function of the perceived likely success of the product. As we discovered, these effects are highly nonlinear and therefore need to be carefully controlled. Second, the role of slotting allowances is different for large and small manufacturers. Extant opinion-based survey research does not make this distinction. Our results show that because of the disproportionate number of small manufacturers in any sample, the average results reported in prior studies are likely weighted toward the effects of small manufacturers. Their impact on the econometric results is disproportionate relative to their economic impact. The several crossover interaction effects we discovered for large and small manufacturers over high and low values of manufacturer ratings (see Figures 1–4) demonstrate the importance of using size and interactions in the empirical analysis of slotting allowances.

*Limitations and Further Research*

Admittedly, we analyze data from just one retailer. Although it is possible to generalize cautiously to other large regional retail chains, it is important to investigate whether our results continue to hold at other retailers. It is possible that retailers' behavior (national-level retailers or smaller, independent grocery stores) would differ depending on their strengths; this requires further study.

Another important caveat is that the data are from 1986 to 1987. The intensity of slotting allowances has been rising over the past 15 years. Thus, newer data are needed to investigate whether these rationales still hold. As such, our study provides a historical snapshot. However, many of these rationales are not entirely new and were discussed in many articles in the trade press during the early 1990s.

Small manufacturers often complain that larger manufacturers use slotting allowances to exclude them from markets. Farrell (2001) formalizes the argument. Essentially, a large, dominant manufacturer with an exclusive position at one competing retailer has a greater incentive to reduce competition in wholesale prices at another retailer because its losses from competition on wholesale prices will also include its sales at the first retailer. Therefore, the large, dominant manufacturer will pay more slotting allowances to monopolize shelf space than the small manufacturer. Although most observers believe that exclusive dealing is rare in grocery markets, a comprehensive analysis of whether large manufacturers pursue exclusion strategies should be investigated.

Further research should also investigate how the magnitude of slotting allowances changes in response to the variables studied. The 2003 study by the FTC has information on the actual magnitude of slotting allowances offered to the retailers in a few categories. A systematic investigation of the FTC data could provide additional insights into and refinements of the evidence for the alternative rationales we find in this article.

Another issue of interest is how retailers' ratings of products correlate with market success of the product. In this study, we used retail buyers' a priori ratings of a product's success as the basis of uncertainty about a product's success. It would be useful to determine how retailer ratings correlate with product success in the market. For example, are small manufacturers systematically underrated compared with their actual performance in the market?

In summary, our study provides the first systematic empirical approach to test alternative rationales for the use

[20]Some practitioners mentioned that this possibility is becoming increasingly difficult for small manufacturers with the waves of mergers in the supermarket and drugstore format because regional chains increasingly disappear. The currently existing smaller retailers tend to be greater credit risks, and therefore small manufacturers tend to avoid them. In addition, it is extremely costly for sales forces to deal with the very small remaining independents, and thus small manufacturers are at a disadvantage.

of slotting allowances. Although our analysis enables us to conclude that efficiency-enhancing rationales are more at work than anticompetitive rationales, research using more recent data from a larger sample of retailers is needed before this can be conclusively accepted. Nevertheless, our findings in support of the efficiency-enhancing aspects of slotting allowances show that without additional empirical evidence of the anticompetitive effects of slotting allowances, the FTC was perhaps correct in its reluctance to ban this practice in the grocery sector.

## *APPENDIX*

Consider a market in which a manufacturer sells through two differentiated, competing retailers. Let the product demand for retailer j be $q_j = a - p_j + bp_{3-j}$, where j = 1, 2; "a" indicates the market potential; and "b" (the cross-price coefficient) indicates the extent of competition between the two retailers.

First, given the greater bargaining power of the retailers than the manufacturers, the retailers set the contractual terms of trade to the manufacturers; that is, they set both wholesale prices and slotting allowances ($w_j$, $S_j$) to the manufacturer to maximize their profits. Conditional on these contractual wholesale prices and slotting allowances, the retailers then set retail prices to maximize their profits.

In the second stage, conditional on the contractual wholesale price and slotting allowances that the retailers set in the first stage, the retailers' objective is given by $\max_{p_j} \Pi_j^R = (p_j - w_j)q_j$. Taking first-order conditions and given symmetry between the two retailers, we can show that

$$p_j^* = \frac{a + w_j}{2 - b}.$$

Because the retailers can extract the entire manufacturer surplus through the slotting allowances, their objective at this stage is given by

$$\max_{w_j, S_j} \Pi_j^R = (p_j - w_j)q_j + S_j = (p_j - w_j)q_j + w_j q_j = p_j q_j.$$

Substituting the second-stage retail price

$$p_j^* = \frac{a + w_j}{2 - b},$$

and taking the first-order conditions with respect to $w_j$, we observe that

$$w_j^* = \frac{ab}{2(1 - b)}.$$

Thus, the optimal slotting allowance is given by

$$S_j^* = \frac{a^2 b}{4(1 - b)}.$$

When retailers use their bargaining power to set slotting allowances, slotting allowances increase as market potential (represented by "a") and retail competition (represented by "b") increase. This is in contrast to the situation when the manufacturer sets the slotting allowances, as in the work of Desai (2000), in which the slotting allowances decrease as a function of market potential (see Desai's Technical Appendix).

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