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Why Do Salespeople Spend So Much Time Lobbying for Low Prices?

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In business-to-business settings a company's sales force often spends considerable time lobbying internally for authorization to charge lower prices. These internal lobbying activities are time consuming, and divert attention from other tasks, such as interacting with customers. We explain why internal lobbying activities serve an important role. They help the firm elicit truthful reporting of demand information from the sales force. As a result, it may be profitable for the firm to require lobbying (and make the requirement onerous), even though lobbying is a nonproductive activity that creates an additional administrative burden and imposes a deadweight loss.

Keywords: lobbying; influence activities; sales force management; pricing; agency theory; incentives; information; marketing-sales interface
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> I have gradually begun to appreciate that many account managers perceive that it is easier to deal with the customer, compared to the difficulties of negotiating with their own managers and colleagues to get things done on the customer's behalf. Many would argue that internal negotiation is the real crux of the job.
>
> Beth Rogers (Rogers 2011, p. 82)

1. Introduction

Studies of pricing practices in business-to-business settings often refer to the inefficiencies that result from the sales force lobbying internally for lower prices. Crainer and Dearlove (2004, p. 438) report that "more than 80 percent of all cases were 'exceptions' that required internal negotiation between marketing and sales. These constant price negotiations wasted considerable time." Similar examples can be found in Sodhi and Sodhi (2007) and Dietmeyer (2004). Notably, instead of banishing lobbying to reduce bureaucratic inefficiencies, many firms appear to make the process intentionally onerous. We provide an explanation for why firms choose not to banish lobbying and why these apparently nonproductive activities may represent an equilibrium outcome.

The explanation recognizes that the sales force often has private information about the strength of demand. However, if the firm lowers prices when the sales force reports demand is low this may create an incentive for the sales force to understate demand, as it takes less effort to convince customers to buy when prices are low. As a result, the firm must pay the sales force information rents to admit when demand is high. Lobbying is a mechanism that the firm can use to help mitigate these rents. It allows the firm to leverage the private information of the sales force in the low demand condition to reduce the information rents it pays when demand is high.

We model the requirement to lobby for low prices as a prerequisite to present evidence that demand is low. If it is easier for the sales force to produce this evidence when demand truly is low, then making this evidence a condition of approving a discount may be profitable for the firm. This is true even if the effort incurred to produce this evidence represents a deadweight loss.

Previous studies have recognized the tension between the sales force and marketing. For example, Kotler et al. (2006, p. 1) vividly describe the phenomenon: "In many companies, sales forces and marketers feud like Capulets and Montagues. Salespeople accuse marketers of being out of touch with what customers really want or setting prices too high. Marketers insist that salespeople focus too myopically on individual customers and short-term sales at the expense of longer-term profits." Two international surveys of senior executives from different business-to-business industries have identified the tension between sales and marketing as one of the most important organizational challenges facing firms (Miller and Gist 2003, Rouziès 2004, cited in Rouziès et al. 2005).

In the sales force management literature the process associated with lobbying for low prices is generally described as a "special pricing" process or a "price exception" process. This literature contains numerous examples highlighting the magnitude of the issue, often

measured by the proportion of transactions that are treated as exceptions. For example, three authors from McKinsey & Company (Baker et al. 2010) describe the situation at a distribution company: "Internally, this distribution company used the phrases 'exception pricing' or 'nonexception pricing' to describe all their deals with customers—'standard pricing' was not in their vocabulary. Exceptions were so common that they represented well over half of sales, meaning that exceptions were truly the standard." (p. 97). They also cite the example of a high-tech manufacturer where sales people ask for a pricing exception on more than 90% of the transactions. In other examples, Meehan et al. (2011) describe a Fortune 50 consumer products company, where 70% of new deals go through a special pricing process. Simonetto et al. (2012) report that a medical device company found that more than 70% of pricing decisions were exceptions, which added seven to 10 days to the time required to provide a customer with a price.

Supporting this process typically requires a substantial organizational system. The literature offers detailed recommendations about how to manage the work flow (see, for example, Baker et al. 2010 and Meehan et al. 2011). Software companies, including Microsoft, SAP, and Oracle, offer software modules specifically designed to support the price exception process. Consulting firms have also identified this as a market opportunity and have developed consulting practices focused on advising companies how to manage their price exception system.[1]

The underlying advice in the literature is not that firms should discontinue their price exception policies. Instead, the focus is on managing it so that it is not used too often. For example, Baker et al. (2010) offer a guideline that no more than 50% of revenue should go through the process. Our paper provides an explanation for why firms should continue to maintain their price exceptions policies, even though they are essentially bureaucratic mechanisms that consume the organization's resources. In doing so, we point out that a key feature of the process is that it is used only when price exceptions are truly needed to close the sale. If it is designed so that salespeople want to claim every transaction is an exception then the process will not be profitable and will instead merely represent a waste of the organization's resources.

More generally, our paper contributes to the large academic literature on sales force management. Previous studies have investigated various facets of this problem, including the design of sales force compensation (Basu et al. 1985, Lal and Staelin 1986, Rao 1990, Coughlan and Narasimhan 1992, Raju and Srinivasan 1996), the role of sales assistance in product evaluations (Wernerfelt 1994, Kalra et al. 2003), firms' choice between surveillance and wages (Anderson 1985), firms' assignment of different selling skills to different products (Godes 2003), and the design of sales contests (Kalra and Shi 2001, Lim et al. 2009, Lim 2010).[2]

A body of research investigates whether firms should delegate pricing authority to the sales force. Weinberg (1975) shows that when sales outcomes are deterministic a firm can delegate pricing and ensure efficient prices using margin-based wages. Lal (1986) finds that delegation can improve profits if the sales force has better information about the selling environment. Revisiting this conclusion, Joseph (2001) shows that delegation is inefficient if salespeople rely on price discounts to grow sales rather than exert effort to pursue high-valuation customers. Mishra and Prasad (2004) further demonstrate that centralized pricing is profit maximizing if contracting occurs after the salesperson receives his private information. Extending the investigation to competitive settings, Bhardwaj (2001) finds that delegation can soften price competition, and Mishra and Prasad (2005) prove that there always exists an equilibrium in which all firms choose centralized pricing. In a recent paper, Lim and Ham (2013) find that delegation benefits the firm because of positive reciprocity of the salespeople.

We contribute to the sales force management literature by explicitly studying lobbying—a widely observed yet underinvestigated phenomenon.[3] Our benchmark contract takes advantage of the sales force's private information about demand by delegating the pricing decision to the sales force. To ensure that the sales force charges the correct price the firm must pay an information rent to the sales force in high-demand states. We identify conditions under which the firm can reduce this information rent by requiring that the sales force lobby for discounts, even when the costs associated with lobbying represent a deadweight loss.

The paper is also related to the economics literature on "influence activities." In many organizations significant effort is exerted on influencing organizational decisions, such as capital allocation among competing projects. The literature has largely focused on the inefficiencies caused by influence activities (Milgrom

[1] See, for example, http://www.mckinsey.com/insights/marketing_sales/building_a_better_pricing_infrastructure.

[2] See Mantrala et al. (2010) for a recent survey of the literature on sales force modeling, and Misra and Nair (2011) for a structural model of sales force compensation dynamics.

[3] As additional background research for this study we investigated the prevalence of the lobbying phenomenon by surveying managers attending executive education classes. In particular, we asked whether there was often concern at their firms that "salespeople want to charge prices that are too low." Almost three quarters of the respondents agreed with this statement. A more detailed description of these results is provided in the online appendix (available as supplemental material at http://dx.doi.org/10.1287/mksc.2014.0856).

1988, Meyer et al. 1992, Scharfstein and Stein 2000, Wulf 2009). One exception is Laux (2008), who argues that influence activities can benefit the firm's capital budgeting process because a project manager's choice to lobby reveals to the firm which projects are worth defending. Similar to Laux (2008), we find that the seemingly wasteful activity of lobbying can help firms improve profits. The main difference is that in Laux (2008), the screening effect of lobbying comes from the different returns it brings to different projects—better projects offer higher values to justify the same cost of lobbying. In our paper, the screening effect comes from the different costs of lobbying in different demand conditions—it is harder to provide convincing evidence and lobby effectively when demand is high, even if the returns to lobbying are the same across demand conditions.

The paper proceeds in §2 with examples that help to illustrate the context and motivate the modeling assumptions. We then introduce the model setup and in preliminary analysis illustrate how price delegation requires that the firm pay information rents to induce the sales force to report demand honestly. We use the equilibrium profits under price delegation as a benchmark and in §3 show that the lobbying mechanism can improve expected profit beyond this benchmark. In §4 we consider several extensions to the model, together with a more general version of the model that imposes minimum functional-form assumptions. The paper concludes in §5.

2. Model Setup and Preliminary Analysis

As background for this research we conducted a series of interviews with product managers and sales managers in business-to-business firms. The sales process typically includes three steps: (a) from initial interactions with the customer the sales force learns about the customer's needs, including the strength of their demand; (b) the sales force meet with the product managers (and sometimes the finance team) to agree on what price to charge; and (c) the sales force then returns to the customer and attempts to close the order. For example, a major technology hardware and software supplier engages in an extended sales process with large customers. This process begins with the sales force diagnosing the customers' needs and negotiating a "solution" with the customer, comprising software, hardware, services, and support (step a). The sales force then negotiates the price of that solution internally with the product managers and the finance department (step b). To support these internal negotiations the sales force will present evidence from the customer that they are actively considering purchasing from an alternative supplier, together with indications that a competitor is offering a more attractive deal. One product manager described the process as a fine balance; if they approve every request, the sales force will ask for deep discounts on every deal, but if they always say no then the firm will lose sales. The goal is to make the process difficult enough so that the sales force only asks for a discount when they really need it, not just when it would make their life easier. Once the price is agreed on internally, the sales force then presents the price to the customer and tries to convince the customer that this is the lowest price they will be able to obtain (step c).

Beyond illustrating the typical steps in the sales process, this example highlights several common features of the process that form the basis of our analytical model. First, after step (a) the sales force has better information about demand than the firm does. Second, lowering prices makes it easier for the sales force to close transactions in step (c). The resulting potential for moral hazard leads to an atmosphere of distrust when the sales force requests a discount in step (b). Finally, all of these activities occur within the framework of a compensation contract that is established before any of these three steps occur. These observations provide motivation and interpretation for the setup of our model.

We consider a firm that hires a sales representative to sell its product to a customer. The sales representative chooses whether to invest in a selling effort. The customer's willingness to pay depends on this selling effort and the customer's intrinsic strength of demand, which is high with probability $\rho \in (0, 1)$ and low with probability $1 - \rho$. The firm and the sales representative share the prior belief that demand is high with probability ρ. If demand is high, the customer's willingness to pay is v_H if the sales representative incurs selling effort and is v_L otherwise. If demand is low, the customer's willingness to pay is v_L if the sales representative incurs selling effort and is zero otherwise. We assume that $v_H > v_L > 0$, so that both high demand and diligent selling increase willingness to pay.

Selling effort is costly to the sales representative. Let the cost of selling effort be $e_H > 0$ when demand is high and $e_L > 0$ when demand is low. We allow e_H and e_L to be different from each other without imposing a rank order between them (they may also be equal). The firm does not observe the sales representative's selling effort. Neither does the firm observe the demand state because the sales representative has more localized information about the customer (see also Lal 1986).

We consider a game with the following sequence of moves:

1. The firm offers a contract that specifies the sales commission. If the sales representative rejects the contract, the game ends. If the sales representative accepts the contract, the game proceeds.

2. The sales representative privately observes the realized demand state.

3. The sales representative reports to the firm whether demand is high or low.

4. The firm determines the price to be charged to the customer.

5. The sales representative chooses selling effort.

6. The customer decides whether to buy and this decision is commonly observed. The firm receives its profit and the sales representative receives his compensation according to the contract.

We offer two comments about the timing of these moves. In practice, the salesperson actually exerts sales effort in two places: during the initial customer interactions to learn the customer's needs and the strength of demand (step 2 in the model sequence), and then to close the deal once the price has been decided (step 5). However, we only model the effort required to close the deal; the effort to acquire private information is assumed to be costless. Modeling the effort to obtain private information would introduce additional parameters but would not produce additional insight about lobbying.[4] We also note that, with one exception, all the results in the paper will remain the same if we switch steps 1 and 2 of the timing structure of the game such that contracting occurs after the sales representative has received private information about demand. The only exception involves a model extension in §4, where we allow for punishment.

How the firm determines the price in step 4 depends on the pricing mechanism. If the firm implements *price delegation*, it will simply choose the price following the sales representative's demand report in step 3, so that the price is effectively chosen by the sales representative. If the firm implements *lobbying*, the sales representative must provide evidence to justify his demand report in step 3, and the firm will follow the sales representative's report only if he has met the evidentiary requirement. In addition, the firm can implement *verification*, in which case the firm will verify the sales representative's demand report itself before approving the price. We will analyze these mechanisms in order.

We assume that demand shocks are i.i.d. across time and so the firm does not learn demand over time. Demand shocks are also i.i.d. across customers and only one sales representative can work with each customer, so that there is no competition between salespeople.

We allow the sales representative to be either risk neutral or risk averse. Let $U(x)$ denote the utility that the sales representative derives from his net payoff x, which equals the commission he earns net of any cost of selling and cost of lobbying. The utility function $U(x)$ exhibits the usual properties: $U(0) = 0$, $U' > 0$, and $U'' \leq 0$. The firm is risk neutral, as conventionally assumed in the literature (e.g., Lal 1986).

We normalize the sales representative's outside options to 0. The sales representative holds limited liability to the firm and is guaranteed to receive nonnegative wages. The limited liability assumption is also common in the literature (e.g., Bester and Krähmer 2008, Bergmann and Friedl 2008, Shin 2008, and Simester and Zhang 2010). It rules out the possibility that the firm sells its business to the sales representative. This assumption is also plausible because employees generally retain the right to leave the firm at any time. We will nevertheless relax the limited liability assumption later. Finally, we normalize the firm's marginal cost of producing the good to 0.

2.1. First Best

We begin with the benchmark case in which the firm observes demand. We assume that it is worthwhile to induce selling effort in both demand states:[5]

$$v_H - v_L > e_H, \tag{1}$$

$$v_L > e_L. \tag{2}$$

It follows that the firm will charge a price of v_H and offer a commission of $w_H = e_H$ if demand is high. It will charge a price of v_L and offer a commission of $w_L = e_L$ if demand is low. If the sales representative fails to sell, the firm should optimally pay zero given the limited liability assumption. These commissions are just sufficient to induce the sales representative to make selling effort in either demand state. Observing demand thus allows the firm to earn the first-best expected profit of

$$\mathbb{E}\,\pi^* = \rho(v_H - e_H) + (1-\rho)(v_L - e_L).$$

2.2. Price Delegation

If the firm does not observe demand, it must design an incentive scheme to influence the sales representative's reporting of demand and choice of selling effort. We will focus on settings in which the firm prefers to sell in both demand conditions and tailors prices to demand. Under this assumption (which we will later formalize) the firm will want to elicit demand information from the sales representative, and will pay the sales representative a commission conditional on the price charged. In particular, the firm will charge

[4] Before the sales representative's initial customer interaction to learn about demand he has no private information. The problem is whether the firm wants to induce the sales representative to acquire this private information. These types of information acquisition issues have been extensively studied in the literature (e.g., Laux 2008, Simester and Zhang 2010) and are not the focus of this paper.

[5] In subsequent analysis, we make analogous assumptions to Conditions (1) and (2) to ensure that the firm wants to induce selling effort in equilibrium.

the price v_H and offer a commission of w_H if the sales representative claims that demand is high, and charge v_L and offer a commission w_L if the sales representative claims that demand is low. To find the optimal w_H and w_L the firm maximizes its expected profit by solving the following problem (where P denotes price delegation):

$$\begin{aligned} \max_{w_H,\, w_L \geq 0} \quad & \mathbb{E}\,\pi_P = \rho(v_H - w_H) + (1-\rho)(v_L - w_L) \\ \text{s.t.} \quad & U(w_L - e_L) \geq 0, \quad (\text{IC}_L) \\ & U(w_H - e_H) \geq U(w_L), \quad (\text{IC}_H) \\ & \rho U(w_H - e_H) + (1-\rho)U(w_L - e_L) \geq 0. \quad (\text{IR}) \end{aligned}$$

The IC (incentive compatibility) constraints ensure that the sales representative exerts selling effort and truthfully states the demand condition. When demand is low, the sales representative earns zero by either overstating demand or shirking selling effort. When demand is high, the best deviation payoff is w_L because the sales representative can understate demand, sell at price v_L, and receive the commission w_L without making any selling effort. The firm must pay the sales representative an information rent for him to admit that demand is high. The IR (individual rationality) constraint ensures that the sales representative is willing to accept the contract—his expected utility must be no worse than his outside option 0. In equilibrium both IC constraints are binding, whereas the IR and limited liability constraints ($w_H, w_L \geq 0$) hold with slack.[6] It follows that the optimal commissions are $w_L = e_L$ and $w_H = e_H + e_L$. The firm earns an expected profit of

$$\mathbb{E}\,\pi_P^* = \rho(v_H - e_H - e_L) + (1-\rho)(v_L - e_L) = \mathbb{E}\,\pi^* - \rho e_L.$$

It can be easily shown that, by Condition (1), price delegation is more profitable than simply charging a low price v_L and offering a constant commission of e_L. However, the firm could serve the high demand condition exclusively by always charging a high price v_H and offering a constant commission of e_H.[7] To rule out this trivial outcome we assume that the firm prefers to sell in both demand states, which requires that

$$(1-\rho)v_L > e_L. \tag{3}$$

In the rest of the paper we will treat the maximum expected profit of price delegation, $\mathbb{E}\,\pi_P^*$, as the benchmark and compare it with the expected profit of lobbying.

We conclude this section with two observations. First, although the firm actually sets prices, because it always follows the sales representative's demand report in equilibrium, we obtain the same outcome if the firm delegates pricing authority to the sales representative (Lal 1986). Of course, because compensation depends on the price that the customer pays, the sales representative has an incentive to charge the correct price. Price delegation also yields the same profits as allowing renegotiation of the compensation contract after the sales representative obtains private information. To see this it is helpful to recall that in the low demand condition the salesperson earns no rents. It is only in the high-demand condition that the firm must pay the salesperson rents to acknowledge that demand is high. Even if renegotiation is allowed, to serve both demand conditions the firm must pay the sales representative the same rents in the high-demand condition.[8]

Second, it is important to recognize that price delegation cannot on its own restore the first-best profit. Although the firm is able to condition prices on demand information, to elicit demand information it pays the sales representative in the high-demand state an information rent of $w_L = e_L$. This helps explain why companies often find price delegation inadequate, and represents a standard result in the agency literature (Laffont and Martimort 2002). Indeed, up until this point, we have presented a standard agency model describing the distortions that result from information asymmetry. In the next section, we depart from this standard model by introducing lobbying as a screening mechanism. Compared with price delegation that relies solely on compensation to regulate the agent's behavior, we investigate if the firm can do better by adding an evidentiary requirement as a contractual instrument.

3. Lobbying

A frequent observation from our interviews is that firms require the sales representative to "acquire convincing evidence of low demand" in order to lobby for a lower price. For example, a manager at an African beverage manufacturer described how his sales force gathers evidence of competitors' "dealer communications" that document the competitors' discounts. Another sales manager described searching historical transactions to find evidence that past discounts contributed to additional sales.[9] In modeling terms, we can think of this information acquisition process as the sales representative searching for "signals" to support claims that demand is low. The sales representative incurs

[6] Because the sales representative can always shirk selling effort and earn a payoff of 0 ex post (except when the firm can punish the sales representative—see §4), his ex ante IR constraint is trivially satisfied.

[7] Given Condition (1), this strategy dominates the alternative of always charging the low price v_L and offering a commission of 0 (and again selling only in the high demand condition).

[8] To eliminate these rents, the firm could offer $w_H = e_H$ and $w_L = 0$ to serve the high demand state exclusively. But this strategy is strictly dominated given Condition (3).

[9] Notice that the firm could conduct this type of search itself. In our analysis of "verification" we will explicitly investigate this possibility.

effort to draw signals of demand without knowing whether any individual signal will indicate that demand is high or low. He can continue to search for evidence of low demand by making additional draws.

The firm can decide *whether* to require evidence of low demand before agreeing to lower prices. We interpret this as a decision about whether to require lobbying. We will show that it may be profitable to require lobbying, even where the cost of lobbying represents a deadweight loss. The firm may also vary *how much evidence* is required before it will lower prices. We investigate how the firm will make these decisions and how the outcome will be influenced by factors such as the accuracy of the demand signals.

We begin by deriving the optimal commissions under the lobbying mechanism. Assume that each demand signal drawn by a sales representative could indicate whether demand is high or low and that the signals are i.i.d. conditional on the true state of demand. The signal generating process is characterized by the following conditional probabilities:

$$\begin{aligned}&\Pr(\textit{high signal} \mid \textit{high demand})\\ &\quad = \Pr(\textit{low signal} \mid \textit{low demand}) = r,\end{aligned}$$

where $r \in (1/2, 1)$ measures the precision of demand signals.[10]

Suppose the firm requires the sales representative to provide n signals of low demand.[11] We use $z_H(n)$ to denote the total number of draws needed to meet this requirement when demand is high, and use $z_L(n)$ to denote the number when demand is low. The number of high demand signals drawn in this process follows the negative binomial distribution. Therefore, the expected total number of draws is $\mathbb{E}\, z_H(n) = n/(1-r)$ if demand is high and is $\mathbb{E}\, z_L(n) = n/r$ if demand is low. Naturally, fewer draws are expected if demand is low. A higher evidentiary requirement (larger n) amplifies the difference. Additionally, the more precise the demand signals are (the closer r is to 1), in expectation the fewer draws are needed if demand is low and the more draws are needed if demand is high. In other words, higher evidentiary thresholds and greater signal precision polarize the expected lobbying costs between the two demand states.

The sales representative incurs a search cost $c > 0$ for each draw of a demand signal. This could represent the cost of researching historical transactions or documenting the intensity of competition in the marketplace. We recognize that besides search cost there may be other costs associated with lobbying. In particular, there may be an opportunity cost of foregone time spent on more productive sales activities, such as interacting with customers. We will later consider this possibility as an extension.

Let w_H and w_L denote the commissions for selling at prices v_H and v_L, respectively. The firm solves the following optimization problem, where L denotes lobbying:

$$\begin{aligned}\max_{w_H, w_L \ge 0, n \ge 0} \quad & \mathbb{E}\,\pi_L = \rho(v_H - w_H) + (1-\rho)(v_L - w_L)\\ \text{s.t.} \quad & \mathbb{E}\,U(w_L - e_L - z_L(n)c) \ge 0, \quad (\text{IC}_L)\\ & U(w_H - e_H)\\ & \quad \ge \max\big[0, \mathbb{E}\,U(w_L - z_H(n)c)\big], \quad (\text{IC}_H)\\ & \rho U(w_H - e_H) + (1-\rho)\\ & \quad \cdot \mathbb{E}\,U(w_L - e_L - z_L(n)c) \ge 0. \quad (\text{IR})\end{aligned} \tag{4}$$

Note that the firm will want to induce selling effort in both demand states. If the firm does not induce selling effort when demand is high, the customer's willingness to pay can only be v_L or 0, and the firm might as well mandate a constant price of v_L. If the firm induces selling effort when demand is high but does not when demand is low, willingness to pay will be v_H if demand is high and otherwise. The firm should then mandate a constant price of v_H. Both outcomes defeat the purpose of enforcing a lobbying mechanism. Moreover, the firm will respond to lobbying by cutting prices, otherwise the sales representative will not engage in costly lobbying in either demand condition.[12] Finally, to elicit truthful reporting of demand information, the firm will want the sales representative to lobby for a low price only when demand is low.

When demand is low, the sales representative earns an expected utility of $\mathbb{E}\,U(w_L - e_L - z_L(n)c)$ by making selling effort and lobbying. His best deviation utility is 0: he will not be able to earn the commission if he shirks selling effort or if he does not lobby. When demand is high, the sales representative earns an expected utility of $U(w_H - e_H)$ by making selling effort and not lobbying. However, if he lobbies he can sell effortlessly and earn an expected utility of $\mathbb{E}\,U(w_L - z_H(n)c)$. He also has the option of doing nothing and earning 0. The IR constraint is again redundant given the IC constraints. Hence the optimal commissions are given by

$$\begin{aligned}&\mathbb{E}\,U(w_L - e_L - z_L(n)c) = 0,\\ &U(w_H - e_H) = \max[0, \mathbb{E}\,U(w_L - z_H(n)c)].\end{aligned} \tag{5}$$

These results lead to a number of insights even without functional form assumptions about U. Jensen's inequality implies that $\mathbb{E}\,U(w_L - e_L - z_L(n)c) \le U(w_L - e_L -$

[10] This assumption is consistent with the premise of demand measurement, that market data are noisy reflections of the true state of demand.

[11] The firm has no incentive to introduce a fixed cost of lobbying. Doing so exacerbates the deadweight loss of lobbying without improving its screening power, because this fixed cost is the same across demand conditions.

[12] The firm has no incentive to randomize between responding to lobbying and not responding.

$\mathbb{E}\, z_L(n)c)$ and that $\mathbb{E}\, U(w_L - z_H(n)c) \le U(w_L - \mathbb{E}\, z_H(n)c)$. Therefore, the optimal commissions under lobbying exhibit the following properties:

$$\begin{aligned} w_L &\ge e_L + \mathbb{E}\, z_L(n)c, \\ w_H &\le e_H + \max[0,\, w_L - \mathbb{E}\, z_H(n)c]. \end{aligned} \tag{6}$$

Recall that the optimal commissions are $w_L = e_L$ and $w_H = e_H + w_L$ under price delegation. Under lobbying, the firm must offer a higher commission in the low demand state to compensate the sales representative for his lobbying cost, in addition to selling effort. This is a disadvantage of the lobbying mechanism to the firm. However, when demand is high, the cost of collecting evidence of low demand makes it less attractive for the sales representative to understate demand. This helps the firm reduce the information rent it must pay for the sales representative to admit that demand is high. The trade-off between these effects determines the firm's choice between lobbying and price delegation.

3.1. Lobbying versus Price Delegation

Given the optimal commissions, the firm's choice between lobbying and price delegation depends on the optimal value of n in Problem (4). The equilibrium mechanism is lobbying if the optimal n is positive, and is price delegation if the optimal n equals 0. To obtain closed-form solutions of the optimal contract, we impose further functional form assumptions on the sales representative's utility. We assume that a risk-neutral sales representative has linear utility $U(x) = x$, and that a risk-averse sales representative has exponential utility $U(x) = 1 - e^{-\alpha x}$, where $\alpha > 0$ measures the sales representative's degree of absolute risk aversion. We prove the following result in the online appendix.

Proposition 1. *There exist $\hat{r} \in (1/2, 1)$ and $\hat{\rho} \in (0, 1)$ such that the firm will choose lobbying over price delegation if and only if evidence of demand is sufficiently accurate ($r > \hat{r}$) or demand is sufficiently likely to be high ($\rho > \hat{\rho}$). In addition, the firm is more likely to choose lobbying over price delegation if the sales representative is more risk averse.*

The intuition is as follows. When demand signals are more accurate, lobbying is more costly for the sales representative in the high demand state and less costly in the low demand state, which makes lobbying a more effective tool to elicit truthful demand information. Meanwhile, by using the lobbying mechanism, the firm reduces the information rent in the high demand state but has to subsidize the sales representative's lobbying cost in the low demand state. Therefore, lobbying is more profitable if demand is more likely to be high.

The effect of risk aversion is more delicate. The lobbying mechanism begets uncertainty because the sales representative's search for low demand signals is governed by a random process.[13] A more risk-averse sales representative will need a higher commission to be willing to lobby when demand is low. But a risk-averse sales representative is also reluctant to search when demand is high. Moreover, searching for low demand signals is associated with greater uncertainty when demand is high than when demand is low.[14] In other words, greater risk aversion serves to amplify the screening power of the lobbying mechanism. Therefore, as the sales representative becomes more risk averse the firm ends up being more willing to choose lobbying over price delegation, although lobbying looms as a "riskier" mechanism to the sales representative.

In practice, the firm can choose what represents "evidence" of low demand. This provides an opportunity to improve the efficacy of the lobbying mechanism. The firm should choose signals that are easy to obtain when demand is low, but hard to obtain when demand is high. For example, should the firm accept evidence that a competitor is charging lower prices as justification of the need to give a discount to another dealer? If the competitor charges the same price to all dealers, then evidence that the competitor is charging a low price to one dealer may indeed represent sufficient evidence to grant a discount. However, if the competitor charges different prices across dealers, so that it is always possible to find examples of some dealers who are getting lower prices, then the firm may not accept this as sufficient justification to give a discount to the other dealer.

We derive the optimal evidentiary threshold n^* in the online appendix. The optimal n^* increases with the effort cost in the low demand condition (e_L), and decreases with the accuracy of evidence (r), the cost of search (c), and the sales representative's degree of risk aversion (α). These comparative statics have intuitive interpretations. First, recall that e_L is the sales representative's information rent in the high demand state under price delegation. The larger this rent, the more the firm wants to extract it with an onerous evidentiary requirement. Second, the more precise demand signals are, the more difficult it is to gather low signals when demand is actually high. As a result, fewer low signals are needed to prevent the sales representative from understating demand.

[13] The sales representative faces ex ante demand uncertainty under both price delegation and lobbying. However, as discussed earlier the sales representative's ex ante participation constraint is satisfied regardless of his risk preferences. Therefore, risk aversion only affects the lobbying mechanism (and the firm's choice between lobbying and price delegation) through the search process.

[14] To fulfill the requirement of n signals of low demand, the number of draws needed is associated with a variance of $nr/(1-r)^2$ when demand is high and a lower variance of $n(1-r)/r^2$ when demand is low.

Finally, costly search, sales representative risk aversion, and high evidentiary requirements act as substitutes; they all make the lobbying mechanism more costly to implement when demand is low yet more effective as a screening device. Therefore, when search is more costly or the sales representative is more risk averse, a lower evidentiary requirement suffices to induce truthful reporting of demand.

When the firm imposes the optimal evidentiary threshold n^*, the optimal commissions become $w_H^* = e_H$ and $w_L^* = e_L + \Delta$, where Δ is the subsidy the firm must pay to cover the sales representative's lobbying cost in the low demand state. When the sales representative is risk neutral, $\Delta = cn^*/r$, which is the sales representative's expected total search cost. When the sales representative is risk averse, $\Delta > cn^*/r$ because the firm must pay a risk premium (see the online appendix). The firm's expected profit under the optimal lobbying mechanism is

$$\mathbb{E}\,\pi_L^* = \mathbb{E}\,\pi^* - (1-\rho)\Delta.$$

Notice that the optimal lobbying mechanism introduces a deadweight loss of $(1-\rho)\Delta > 0$. However, the firm is willing to introduce this deadweight loss in order to reclaim the rent it would otherwise pay when demand is high. This result reflects the different implications of lobbying. From the social efficiency perspective, lobbying is wasteful. From the firm's perspective, the costly nature of lobbying helps it recover information rent from the sales force.

3.2. Lobbying versus Verification

Recall that we model lobbying as the sales representative's search for evidence of low demand. To conclude this section we investigate the possibility that the firm could search for its own evidence. Of course, this requires that the evidence is available to the firm. There are some types of evidence for which this is unlikely to be true. For example, if the customer will only work with one sales team on a transaction, then it would be unlikely that the firm can independently collect evidence that requires customer interaction.[15] However, there are other examples of evidence that the firm can obtain on its own. For example, firms may be able to learn competitors' prices without requiring help from the sales force. We will investigate whether this could provide an opportunity to improve the firm's profits.

It is helpful to also clarify that the agent has two sources of demand information in the lobbying game: (a) his private information about the strength of demand obtained through the initial customer interactions and (b) evidence collected about that demand. Distinguishing these sources of information is important; the agent's private information requires interactions with customers, and so only the agent can acquire this information. What the firm may be able to collect is the evidence of demand.

We consider the following "verification" mechanism—the sales representative makes a claim about the state of demand. If the sales representative claims that demand is high, the firm will charge a high price. If the sales representative claims that demand is low, the firm will verify this claim by acquiring evidence of demand on its own. The firm will approve the price discount if and only if there is sufficient evidence of low demand, and will determine what amounts to "sufficient evidence." To facilitate comparison, we assume that the firm also incurs a search cost c for each draw of demand signals.[16]

Without loss of generality, sufficient evidence can be defined as "finding at least j signals of low demand within the first k draws." Given the signal generating process, the sequence by which these signals arrive does not affect the probability of observing sufficient evidence. The sales representative's probability of passing verification is $\phi_L(j,k) = \sum_{i=j}^{k} \binom{k}{i} r^i (1-r)^{k-i}$ if demand is low and is $\phi_H(j,k) = \sum_{i=j}^{k} \binom{k}{i} r^{k-i}(1-r)^i$ if demand is high. The firm determines the values of j and k.

Note that the firm could also conduct a "blanket search"—it could acquire evidence of demand on its own regardless of the sales representative's claims of demand. However, blanket search is strictly dominated by verification (see the online appendix for proof). This is because verification helps the firm condition its search decision on the sales representative's reporting of demand, and this information saves the firm the cost of search when demand is high.

The verification process gives the firm greater contractual freedom in setting its commissions. A sale now occurs in three possible ways: the sales representative requests (and always obtains) the high price, requests and obtains the low price, requests the low price but obtains the high price. Correspondingly, the firm offers a commission of w_H, w_L, and w'_H upon sale. The firm chooses these commissions to maximize the expected profit of the verification mechanism (denoted as V):

$$\max_{w_H,\, w'_H,\, w_L \geq 0,\, k \geq j \geq 0} \mathbb{E}\,\pi_V = \rho(v_H - w_H) + (1-\rho)[\phi_L(j,k)(v_L - w_L) - ck]$$

s.t.

$$\phi_L(j,k)U(w_L - e_L) \geq 0, \quad (\mathrm{IC}_L)$$

$$U(w_H - e_H) \geq \max\{0, \phi_H(j,k)U(w_L) + [1-\phi_H(j,k)]\max[0, U(w'_H - e_H)]\}, \quad (\mathrm{IC}_H)$$

$$\rho U(w_H - e_H) + (1-\rho)\phi_L U(w_L - e_L) \geq 0. \quad (\mathrm{IR})$$

[15] British Airways would be unlikely to allow two Boeing sales teams to interact with it on the same aircraft procurement deal.

[16] In reality, the firm may face a higher search cost because it is likely in less close contact with the client.

This optimization problem is interpreted as follows. If demand is low and the sales representative asks for a low price, the firm will agree with probability $\phi_L(j,k)$. The sales representative earns zero by not exerting selling effort, and $U(w_L - e_L)$ by exerting selling effort once the discount is approved; he has no incentive to make selling effort if the discount is turned down.[17] Meanwhile, the sales representative earns a maximum payoff of 0 by asking for a high price. If demand is high and the sales representative asks for a low price, with probability $\phi_H(j,k)$ he will obtain the low price and earn the commission w_L without selling effort. With probability $1-\phi_H(j,k)$ he will fail verification. In this case, he will earn $U(w'_H - e_H)$ if he exerts selling effort and otherwise.[18] If the sales representative asks for a high price, he earns $U(w_H - e_H)$ if he exerts selling effort and zero if he does not.

The sales representative's IR constraint is again redundant. Therefore, to induce truthful reporting of demand and selling effort (once the requested price is approved), the firm must offer $w_L = e_L$, $w'_H \in [0, e_H]$ and $w_H = e_H + U^{-1}(\phi_H(j,k)U(e_L))$. It follows that the verification mechanism generates an expected profit of

$$\mathbb{E}\,\pi_V = \mathbb{E}\,\pi^* - \rho U^{-1}(\phi_H(j,k)U(e_L)) - (1-\rho)[1-\phi_L(j,k)](v_L - e_L) - (1-\rho)ck.$$

This profit function illustrates the effects of verification. When demand is high, the firm pays an information rent of $U^{-1}(\phi_H(j,k)U(e_L))$, which is less than the information rent e_L under price delegation. This is because the chance of failing verification makes it less tempting for the sales representative to understate demand. When demand is low, the firm faces the possibility of not granting a truly needed low price. In addition, the firm must pay for its own cost of search.

To manage these effects, the firm will want to make it easy for the discount request to pass verification when demand is low, and make it difficult when demand is high. This amounts to increasing $\phi_L(j,k)$ and decreasing $\phi_H(j,k)$. Meanwhile, the firm will want to reduce its total search cost (lower k). In the online appendix we derive the optimal verification mechanism, compare it with the optimal lobbying mechanism, and prove the following result.

[17] The firm will prefer to let the sales representative condition his selling effort on the outcome of verification. If the sales representative must choose his selling effort before observing the outcome of verification, the firm will have to offer a higher commission w_L to induce selling effort.

[18] We derive the optimal value of w'_H assuming that the firm can commit to its commission offers. If the firm cannot commit, it will want to offer $w'_H = e_H$ to induce selling effort in case demand is high. However, this does not change the firm's optimal choice of w_H or its expected profit from verification. The key is that the sales representative earns 0 whenever his discount request fails verification, which discourages the sales representative to understate demand.

Proposition 2. *There exist $\tilde{r} \in (1/2, 1)$ and $\tilde{\rho} \in (0, 1)$ such that the firm will choose lobbying over verification if evidence of demand is sufficiently accurate ($r > \tilde{r}$) or if demand is sufficiently likely to be high ($\rho > \tilde{\rho}$). In addition, the preference for lobbying over verification increases with risk aversion if demand is sufficiently likely to be high, and decreases with risk aversion if demand is sufficiently likely to be low.*

The intuition is as follows. Verification as a screening mechanism is associated with errors. There is always a positive chance that the sales representative will fail verification even if demand is low (type 1 error) and pass verification even if demand is high (type 2 error). As a result, verification always leads to lost sales when demand is low and never eliminates the sales representative's information rent when demand is high. In comparison, the lobbying mechanism eliminates the sales representative's information rent if demand signals are sufficiently accurate, because the difficulty of meeting the evidentiary requirement makes lobbying unappealing to the sales representative. Therefore, lobbying dominates verification if demand is sufficiently likely to be high.

The effect of evidentiary accuracy has to do with the deadweight cost of search generated by both mechanisms. When evidence is sufficiently accurate, the sales representative in the low demand condition does not have to search too broadly to meet the evidentiary threshold of lobbying—to collect n signals of low demand, he needs n/r draws in expectation, which approaches n when r approaches 1. Under verification, however, the firm must search extensively beyond the evidentiary threshold j—the type 1 error will be too sizable if the firm requires nearly all of the signals drawn to be low demand signals. Therefore, when evidence is sufficiently accurate, less search is needed to achieve the same evidentiary requirement under lobbying than under verification.

Finally, the profitability of verification increases with risk aversion. When demand is high, the sales representative earns the bonus for certain if he truthfully reports demand and makes selling effort. If he requests a low price, however, he may not pass verification. Greater risk aversion thus makes it less attractive to understate demand, which helps the firm mitigate the information rent. This effect is more prominent if demand is more likely to be high. The profitability of lobbying also increases with risk aversion but for a different reason. With greater risk aversion, a lower evidentiary requirement suffices to induce truthful reporting of demand, which reduces the deadweight cost of search. Because in equilibrium the sales representative only lobbies in the low demand condition, this effect is more prominent if demand is more likely to be low. Therefore, the firm's prior belief about demand and the sales representative's risk aversion interact to determine the firm's choice between lobbying and verification.

3.3. Summary

In this section we have shown that the firm can use the lobbying mechanism to improve its expected profit beyond price delegation. We model the lobbying mechanism as the requirement that the sales representative provide sufficient evidence of low demand before the firm agrees to a discount. Lobbying reduces the information rent the firm pays to the sales representative when demand is high, even though it is an unproductive activity that leads to a deadweight loss. We also allow the firm to verify the sales representative's reporting of demand by collecting evidence on its own. The probability of failing verification motivates the sales representative to truthfully report demand. We derive conditions under which the firm will choose lobbying over price delegation or verification.

4. Extensions

In this section, we explore the robustness of the lobbying mechanism in the following scenarios: the sales representative's lobbying effort constrains his selling effort, the firm can punish the sales representative, or there is a continuum of demand states. We present the full analysis in the online appendix, and summarize the findings below.

4.1. When Lobbying Constrains Selling

The time and energy a sales representative spends on lobbying might limit the extent of effort he can invest in other (more productive) selling activities. How should the firm adjust its evidentiary requirement? One might expect the firm to lower its requirement because searching for more evidence is especially wasteful when it results in an opportunity cost. However, we find that the opposite may be true.

When lobbying prevents the sales representative from exerting full selling effort, the firm must offer a higher commission in the low demand state to compensate the sales representative for the risk of losing the business. This higher commission makes it more attractive for the sales representative to claim that demand is low. Raising the evidentiary requirement helps the firm counter this tendency, although it also increases the lobbying cost when demand is low. This result again highlights the different implications of lobbying for social efficiency versus firm profit—the socially efficient amount of lobbying is zero, whereas the profit-maximizing amount of lobbying is positive and may even increase if lobbying is more wasteful.

4.2. When the Firm Can Punish the Sales Representative

We have assumed that the sales representative earns a minimum wage of zero. We extend the analysis by allowing the firm to punish the sales representative up to some limit. We continue to assume that the sales representative's outside opportunity is normalized as zero. In addition, once the sales representative has accepted the contract, he is "locked in" with the firm over the contract duration (otherwise the punishment would be meaningless).

We find that the firm will always punish the sales representative if he fails to sell. Meanwhile, the conditions derived in Proposition 1 remain relevant. The firm will again use price delegation if evidence of demand is sufficiently noisy ($r \le \hat{r}$) or if demand is sufficiently likely to be low ($\rho \le \hat{\rho}$). Otherwise, the firm will use price delegation if it can severely punish the sales representative and use lobbying if it cannot, with one exception—if evidence of demand is really accurate ($r > \check{r}$, where $\check{r} > \hat{r}$) and the sales representative is risk averse, the firm will use lobbying regardless of the allowed extent of punishment. Compared with the main model of §3, the lobbying mechanism imposes a lower evidentiary threshold and generates a higher expected profit.

The reason is as follows. Being able to punish the sales representative makes both price delegation and lobbying more profitable. Punishment allows the firm to induce selling effort with smaller commissions in both demand states. Moreover, cutting the commission in the low demand state makes it less attractive for a sales representative in the high demand state to pretend that demand is low. If the firm is able to severely punish a risk-neutral sales representative, price delegation alone suffices to restore the first-best expected profit. The firm will then choose price delegation over lobbying because lobbying inevitably leads to a deadweight loss. If punishment is limited, the firm will have to rely on lobbying again under conditions that favor lobbying (see Proposition 1). Finally, if the sales representative is risk averse, price delegation will not be able to achieve the first-best expected profit because the firm must pay the sales representative a risk premium. Therefore, if evidence of demand is really accurate, lobbying dominates price delegation regardless of the limit of punishment.

4.3. General Model

Although the main model has focused on two demand states, in general, demand will take on a broader range of possibilities. This potentially complicates the design of the lobbying process because a single evidentiary threshold is no longer sufficient to discriminate between all of the demand states. Instead, a complete screening mechanism will require a different evidentiary threshold for each of the demand states. In this section we allow for a continuous distribution of demand states, which requires a continuous function of evidentiary thresholds in order for the firm to completely take advantage of the sales representative's private information.

We generalize the model in the following way. We continue to assume that a customer's willingness to pay depends on the strength of demand v and the sales representative's selling effort. However, we allow the demand states v to follow a generic p.d.f. (probability distribution function) $f(v)$ and c.d.f. (cumulative distribution function) $F(v)$ over $[\underline{v}, \bar{v}]$. Meanwhile, let the function $\varepsilon(p, v)$ describe the cost of selling effort the sales representative must incur for a customer in demand state v to be just willing to buy at price p. We assume that, for a given price, less selling effort is required if demand is higher: $\partial\varepsilon(p, v)/\partial v < 0$.

Extending the main model, we use $n(\tilde{v}) \geq 0$ to denote the number of low demand signals the sales representative must provide in order to claim that demand is $\tilde{v}$. Specifically, we assume that the sales representative has a probability $b(v) \in (0, 1)$ of finding a low signal in one shot of search in demand state v. Search cost is again $c > 0$ per draw. We let $\iota(\tilde{v}, v) > 0$ denote the lobbying cost to claim that demand is $\tilde{v}$ when it is actually v. The expected lobbying cost is thus $\mathbb{E}\,\iota(\tilde{v}, v) = cn(\tilde{v})/b(v)$.

Following the sales representative's demand report $\tilde{v}$, the firm sets price $p(\tilde{v})$ and offers a commission $w(\tilde{v})$ if the sales representative sells at this price. In equilibrium, the sales representative will incur just enough selling effort $\varepsilon(p(\tilde{v}), v)$ to earn the commission. The firm chooses the evidentiary threshold, price scheme, and commission scheme to maximize its expected profit $\mathbb{E}\,\pi_G$ (G for general):[19]

$$\max_{p(v),\, w(v),\, n(v)\geq 0} \mathbb{E}\,\pi_G = \int_{\underline{v}}^{\bar{v}} [p(v) - w(v)]\, dF(v)$$

s.t.

$$\mathbb{E}\,U(w(v) - \varepsilon(p(v), v) - \iota(v, v)) \geq \max\big[0, \mathbb{E}\,U(w(\tilde{v}) - \varepsilon(p(\tilde{v}), v) - \iota(\tilde{v}, v))\big], \quad \forall\, \tilde{v} \neq v, \quad \text{(IC)}$$

$$\int_{\underline{v}}^{\bar{v}} \mathbb{E}\,U(w(v) - \varepsilon(p(v), v) - \iota(v, v))\, dF(v) \geq 0. \quad \text{(IR)}$$

We will begin by establishing a necessary condition for lobbying to outperform price delegation: it must be easier to find evidence of low demand in lower demand states:

Lemma. *The firm will choose lobbying over price delegation only if evidence of low demand is harder to obtain in higher demand states*: $b'(v) < 0$.

[19] To simplify exposition, we assumed that the firm intends to serve consumers in all demand states. This is analogous to Condition (3) of the main model.

Recall that $b(v)$ is the probability of finding a low signal in one shot of search. In other words, this function measures how easily the sales force can find evidence in each demand state. Lobbying is only profitable if it is harder (more costly) to obtain the evidence in higher states. This can be thought of as an example of a monotonicity condition. It demonstrates that the intuition in the main model survives in a very general continuous model. Lobbying is only profitable if the firm can identity sources of evidence that are more accessible to the sales force when demand truly is low. For the remainder of this section we will assume that the condition $b'(v) < 0$ holds.

The lemma states a general result that does not depend on the particular evidentiary process that we have modeled. How much lobbying cost the sales representative incurs in equilibrium, however, depends on the lobbying mechanism design. We derive the optimal lobbying mechanism in the online appendix and prove the following result.

Proposition 3. *The firm will induce lobbying in demand state v if*: (1) *the probability of finding evidence of low demand declines sufficiently sharply with demand* ($-b'(v)$ *sufficiently large*), (2) *the probability of demand being in state v is sufficiently low, or* (3) *the probability that demand exceeds v is sufficiently high*.

The interpretation of Proposition 3 again reflects the intuition of the main model. First, lobbying is a more effective screening mechanism if it is much harder to produce evidence of low demand as demand increases. This is analogous to requiring that demand signals be sufficiently accurate in the main model (r large enough). Second, if the focal demand condition v is less likely to occur, the firm expects to incur the corresponding lobbying cost with a lower probability. Third, if there is a greater probability that demand is higher than v, it is more important to recapture the information rents in these higher demand states. These last two conditions are analogous to requiring that demand be sufficiently likely to be high in the main model (ρ large enough).

In the online appendix we illustrate how to calculate the optimal contract for explicit functions of $U(x)f(v)$, $b(v)$, and $\varepsilon(p, v)$.[20] In Figures 1–3 we present the optimal price, optimal evidentiary threshold, and optimal commission for this example.

As we would expect, the firm charges higher prices in higher demand states. The firm does not require evidence if the sales representative admits that demand

[20] Specifically, the sales representative's utility function is $U(x) = x$. Demand v is distributed over $[0, 1]$ following the p.d.f. $f(v) = av + 1 - a/2$, where $a \in (-2, 2)$. The sales representative finds a low demand signal with probability $b(v) = -\beta v + (1 + \beta)/2$ for each draw, where $\beta \in (0, 1)$. Finally, the sales representative's cost of selling effort is $\varepsilon(p, v) = [\max(0, p - v)]^3/3$. Figures 1–3 assume that $a = 0.3$, $\beta = 0.9$, and $c = 0.02$.

Figure 1 Optimal Price in the General Model—An Illustration

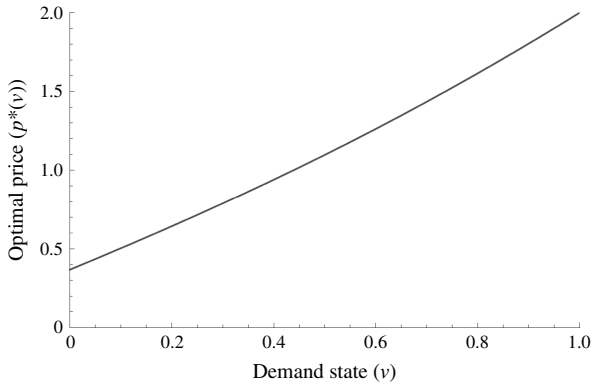


Figure 2 Optimal Evidentiary Threshold in the General Model—An Illustration

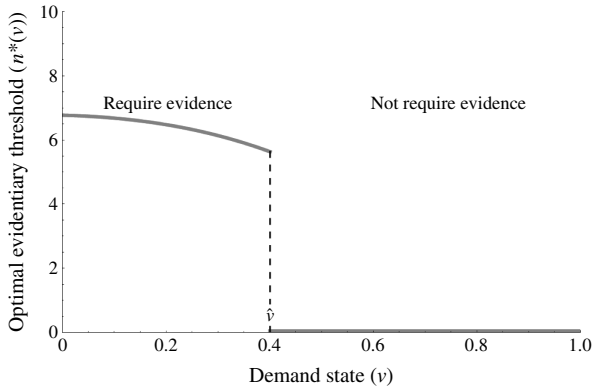
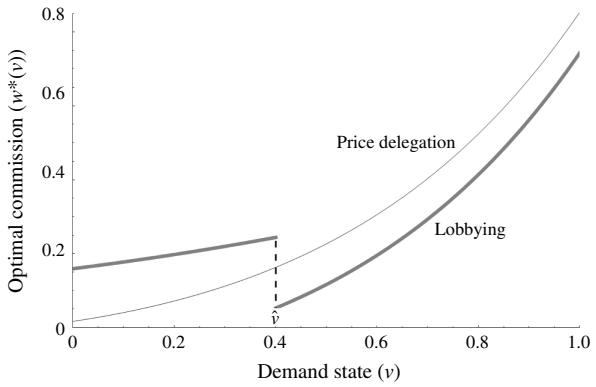


Figure 3 Optimal Commission in the General Model—An Illustration



is high enough (higher than $\hat{v}$). The evidentiary requirement is only imposed when the sales representative claims that demand is lower than $\hat{v}$.[21] Finally, although price delegation and the optimal lobbying mechanism lead to the same optimal prices, the optimal commissions are different. The commission under the optimal lobbying mechanism is higher when the lobbying mechanism requires evidence ($v \le \hat{v}$) because the firm must compensate the sales representative for his lobbying cost. However, when demand exceeds $\hat{v}$ the commissions are lower under the optimal lobbying mechanism. Requiring evidence to claim that demand is lower than $\hat{v}$ reduces the sales representative's information rent in higher demand states. These comparisons echo the central message in this paper—the firm leverages the private information of the sales force in the low demand condition to reduce the information rents it pays when demand is high.

[21] In the figure we see that the lower demand the sales representative wants to claim, the more evidence of low demand he must provide. However, we caution that the optimal evidentiary threshold does not necessarily decrease with demand. Its slope depends on functional form assumptions and parameter values.

5. Conclusions

Price delegation can help the firm harness the sales force's private information about demand. However, the firm must pay information rents to the sales force to admit that demand is high. The focus of the paper is on exploring what internal mechanisms the firm can use to reduce these rents. The key finding is that lobbying serves this role. We model the requirement to lobby for low prices as a prerequisite to present evidence that demand is really low. The profitability of this mechanism crucially depends on how easily the sales force can acquire this evidence in different demand states. If the evidence is a lot easier to produce in the low demand state than in the high demand state, then lobbying is a more efficient mechanism. We derive the set of conditions under which the firm will prefer lobbying over price delegation or collecting demand evidence on its own.

Throughout the paper we assume that the sales representative knows the state of demand. The search for evidence is socially wasteful as it does not bring any new information into the system. Future research might consider markets in which the sales representative's prior information about demand is imperfect, but he can update his information by collecting demand signals. This possibility may yield interesting effects. On one hand, the sales representative's private information is of worse quality, which reduces the firm's incentive to elicit this information through a costly evidentiary process. On the other hand, the sales representative now has a private incentive to acquire more information, which means the firm might not need to fully reimburse these costs.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/mksc.2014.0856.

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