Abstract

Retailers often solicit assistance from manufacturers in the form of information report about market conditions or advice about retail decisions, or even by requesting manufacturers to make decisions on their behalf. Often such assistance is not governed by formal contracts, causing concerns about manufacturer opportunism. We investigate whether and how the form of manufacturer assistance – information sharing, advice provision or delegation – affects retailer trust and coordination of channel decisions. Standard theory predicts equivalent outcomes – complete lack of trust and coordination – under all three arrangements. However, in laboratory experiments, we find that some arrangements lead to higher trust and coordination than others. We propose that the three forms of manufacturer assistance produce different outcomes due to the differences in manufacturer’s decision domain (information vs. action domain) and decision sequence (whether retailer or manufacturer decides first). We also find that, despite the presence of manufacturer opportunism, retailers that are trusting make higher profits than retailers lacking in trust. In contrast, trustworthy manufacturers do not fare well. Our results offer some insights into how to effectively manage distribution channels and why some channel arrangements lead to more successful outcomes than others.*

Keywords: Advice, Delegation, Distribution Channel, Experimental Economics, Information Sharing, Trust

History: Submitted in January 2015.

1 Introduction

A retailer, such as Safeway and Target, frequently relies upon the market knowledge of a national brand manufacturer, such as Clorox and Kraft, to make better-informed store-level retail decisions

* The authors thank Elena Katok, Ernan Haruvy, Jagmohan Singh Raju, Ram Rao, Yufei Ren, Gokce Sargut, Hong Yuan and Karen Zheng for their constructive and helpful suggestions. The discussions during the authors’ presentations at the October 2014 INFORMS Annual Meeting in San Francisco, CA; University of Central Florida were also beneficial. Comments and suggestions on this version are most welcome.
regarding, for example, product assortment, shelf space allocation and promotions (Progressive Grocer 2005; Ng and Ziobro 2014). The manufacturer often provides assistance in three distinct forms: share information about market conditions; offer advice about retail decisions; or even make retail decisions on the retailer’s behalf (Desrochers et al. 2003). Such assistance, if properly managed, can benefit both the retailer and the manufacturer (ACNielsen 2005; Grocery Manufacturers Association 2007). However, the manufacturer often has a pecuniary motive to influence retail decisions so as to unduly favor its own product even at the retailer’s expense. Consequently, some practitioners and academics are concerned that the manufacturer will behave opportunistically to exploit the retailer, and have questioned the value of using a manufacturer’s assistance (Carameli Jr 2004; Morgan et al. 2007; Gooner et al. 2011; Pearlstein 2013). Others believe that trust between channel members can mitigate manufacturer opportunism, which explains retailers’ continued reliance on various forms of manufacturer assistance (Gruen and Shah 2000; Dupre and Gruen 2004; Aastrup et al. 2007; Özer et al. 2011). This paper examines how trust can facilitate cooperation in such distribution channel settings. More importantly, our main goal is to understand how the form of manufacturer assistance influences trust and trustworthiness and which form of assistance leads to effective channel management.

The manufacturer’s assistance can broadly take one of three distinct forms: information sharing, advice provision and delegation. All three forms are observed in the industry across a variety of product categories (Federal Trade Commission 2001; Desrochers et al. 2003). Under an information sharing arrangement, the retailer simply obtains information from the manufacturer about the product’s market potential and uses this information as it sees fit to make retail decisions. For example, many U.S. retailers have partnered with General Mills to obtain access to its proprietary market research including a consumer panel survey known as “Shopper 360”. This survey provides consumer insights from 120,000 shopping trips across 30 retailers. A retailer can then use this information to decide product assortment and shelf space allocation in its stores (Progressive Grocer 2006).

Under an advice provision arrangement, the retailer receives a recommendation from the manufacturer regarding the course of action the retailer should undertake. The retailer then decides whether and to what extent it follows the manufacturer’s advice. For example, Carrefour, a leading France-based global retailer, receives advice from Colgate-Palmolive regarding shelf design and consumer education initiatives for oral care products (ECR Europe Conference 2004). Based on this advice, Carrefour determines the final shelf layouts and promotional activities in its stores.

Under a delegation arrangement, the manufacturer is largely responsible for making the actual retail-
level decisions. The retailer decides upfront the extent of the manufacturer’s decision-making authority and later implements the manufacturer’s decisions. For example, the retailer may decide the maximum assortment size it can carry and the maximum shelf space it can allocate. The manufacturer then decides the actual assortment and the shelf space allocated to each product. Delegation is commonly used in categories such as magazines and kitchen gadgets (Federal Trade Commission 2001).

Retailers seek manufacturers’ assistance because the manufacturers’ market knowledge can be used to make better retail decisions that create significant economic value (ACNielsen 2005; Grocery Manufacturers Association 2007). To fully benefit from a product’s market potential, the retailer must allocate store resources, such as shelf space and trained staff, to the product. Allocating more store resources to a product can significantly increase its sales by creating consumer awareness or capturing attention in the store (e.g., Dreze et al. 1995; Inman and Winer 1998; Chandon et al. 2009). Such store resources are limited and costly to the retailer. Hence, how much resource to allocate for a product depends on its market potential. However, a national brand manufacturer is often more knowledgeable about its product’s market potential than the retailer is. In particular, because retailers carry a large variety of products, they often find it impractical to invest resources to understand consumer needs and market potential for each product (e.g., Gruen and Shah 2000; ACNielsen 2005; Gooner et al. 2011). Consequently, retailers seek manufacturers’ market knowledge. A case in point is the consumer packaged goods industry, where the practice of using manufacturer knowledge is widespread and well-documented (see, for example, Progressive Grocer (2012, 2013)).

Yet, the practice of using manufacturer assistance has also been controversial. The retailer prefers to provide more store resources to the manufacturer’s product only if it has high market potential. In contrast, the manufacturer prefers to obtain more store resources even if its product’s market potential is low, because store resources increase demand for its product. Hence, the manufacturer has a pecuniary motive to induce the retailer to provide more store resources than what may be optimal for the retailer. In addition, the manufacturer’s assistance is typically not governed by formal contracts. In fact, the manufacturer is never directly compensated for its assistance. Instead, it expects to benefit only indirectly through its influence on retail decisions (Progressive Grocer 2004; Morgan et al. 2007; Gooner et al. 2011; Hartley et al. 2013). Practitioners and industry experts have acknowledged the potential for manufacturer opportunism. As one retailer notes: “It is the nature of the beast. Very few companies are going to give you 100% true [assistance] without skewing it in their favor somehow” (Alaimo 1997). In interviews conducted by Morgan et al. (2007), retailers expressed the belief that a
manufacturer could bias the data analysis to support recommendations that maximize its own profit rather than the retailer’s profit. Other studies have found similar sentiments among retailers (Dupre and Gruen 2004; Gooner et al. 2011). Such concerns have led some to question the retailer’s wisdom and value of using manufacturer assistance.\footnote{In practice, the manufacturer’s assistance may also extend to retail decisions for rival manufacturer brands (see for example, Subramanian et al. 2010; Kurtuluş and Toktay 2011). The concern about manufacturer opportunism also apply to this context. The retailer would prefer that store resources be allocated to different brands based on their relative market potentials. However, the manufacturer would prefer to have more resources for its own brand at the expense of rival brands, regardless of their market potentials.}

Others offer an alternative, and perhaps more optimistic, perspective. They find that trust between channel members can mitigate concerns about manufacturer opportunism, and facilitate positive outcomes (Gruen and Shah 2000; Dupre and Gruen 2004; Özer et al. 2011; Beer et al. 2014). Thus, trust could explain the continued prevalence of this practice. However, the existence and extent of trust is not a foregone conclusion. Trust can vary considerably across retailers and manufacturers (e.g., Gruen and Shah 2000; Dupre and Gruen 2004). Given the prevalence of different forms of manufacturer assistance and the potential for significant economic gains and losses from this practice, understanding which form of assistance can better cultivate trust is critical for effective channel management.

Our main objective, therefore, is to investigate how the form of manufacturer assistance – information sharing, advice provision and delegation – influences the level of trust, trustworthiness and coordination of decisions in a distribution channel. To do so, we first build a parsimonious analytical model that captures the key pecuniary trade-offs involved in managing such distribution channels. We refer to the predictions based on this model as “standard theory” predictions to emphasize that it is based only on pecuniary motives. Next, we consider the role of non-pecuniary motives in supporting trust and trustworthiness. In our context, a retailer’s trust is its willingness to rely on the manufacturer’s assistance - be it information sharing, advice provision or delegation. A manufacturer’s trustworthiness is its ability and willingness to act in the retailer’s best interest. We develop and test behavioral hypotheses regarding how trust and trustworthiness can arise despite the manufacturer’s incentive to be opportunistic, and how the level of trust is influenced by the form of manufacturer assistance. We test our hypotheses through incentivized laboratory experiments that are designed based on the sequence of events and payoffs described in the analytical model. In the remainder of the paper we articulate the role of both pecuniary (economic) and non-pecuniary (trust and trustworthiness) motives in how the three distinct forms of assistance affect channel performance.
2 Literature Review

Prior research on distribution channel management in the operations and marketing literature has extensively examined one particular form of manufacturer assistance, namely, information sharing. One stream of research has examined the incentives for demand information sharing under the assumption that the informed party reveals its information truthfully (e.g., Aviv 2003; Gal-Or et al. 2008; Mittendorf et al. 2013 and references therein). Another stream of research has examined the strategic implications of firms' conflicting pecuniary incentives on their communication and usage of information (e.g., Desai 2000; Cachon and Lariviere 2001; Özer and Wei 2006; Guo and Iyer 2010; Shin and Tunca 2010; Gümüş 2014). This literature implicitly assumes the non-existence of trust, and has developed contracts to align pecuniary incentives alone to facilitate truthful information sharing. Recently, realizing that human behavior does not depend on pecuniary incentives alone, Özer et al. (2011) investigate the role of trust and trustworthiness in information sharing. Together with Özer et al. (2014), these papers determine when trust is important in information sharing, and how the supply chain environment (e.g., capacity cost, market uncertainty, country of origin) affects trust and resulting operational decisions. Several recent studies begin to further explore the behavioral aspects of information sharing (e.g., Hyndman et al. 2013; Inderfurth et al. 2013; Beer et al. 2014).

The study of delegation of retail decisions to a manufacturer has received much less attention in extant literature. Researchers have examined the delegation of assortment decisions (Kurtuluş and Nakkas 2011) and in-store promotional activities (Subramanian et al. 2010; Kurtuluş et al. 2014) under the assumption that the manufacturer credibly commits to a minimum target profit or demand for the retailer. In the context of salesforce management, researchers in marketing have examined the delegation of pricing decisions to the salesforce under different (pecuniary) incentive contracts (e.g., Bhardwaj 2001; Mishra and Prasad 2005; Simester and Zhang 2014). Recently, Lim and Ham (2014) examine the role of non-pecuniary motives in price delegation to the salesforce. They find that salespeople respond benevolently to price delegation, resulting in higher manager profits and higher use of delegation by managers than predicted by standard theory.

To the best of our knowledge, advice provision has not been studied as a distinct form of assistance in distribution channels. Following Bonaccio and Dalal (2006), we define advice as a recommendation regarding a decision or course of action to undertake. Advice provision can thus be contrasted against information sharing, which is the communication of the underlying information to be used for deciding the
course of action. Advice provision has been studied by behavioral researchers in the area of organizational decision making. They implicitly assume that the incentives of the advisor and advisee are fully aligned, and have focused on factors that cause advisees to underutilize advice, such as anchoring and adjustment, ego-centric bias, and lack of access to advisor’s reasoning (e.g., Harvey and Fischer 1997; Krueger 2003; Yaniv 2004). Bonaccio and Dalal (2006) provide a comprehensive review of this literature. In contrast, economists have examined advice provision when the pecuniary incentives of the two parties are not aligned. However, they implicitly assume that advice provision is equivalent to communicating the underlying information used to formulate the advice (see, for example, Sobel (2010) for a review of the advice provision literature in economics). In other words, the economics literature has not explicitly distinguished between advice provision and information sharing, yet.

The aforementioned literature on information sharing, advice provision and delegation have by and large evolved separately from each other. A notable exception is Dessein (2002), who studies a setting in which a principal can either obtain information from an agent through cheap talk communication, or delegate decision-making authority to the agent. He finds that the principal’s tradeoff is between the loss of information under cheap talk, and loss of control under delegation. More recently, Kartik (2009) shows that, if the sender in a classic cheap-talk communication model incurs a sufficiently high cost to distort information, then communication can dominate delegation. Experimental economists have examined overcommunication in cheap talk games (e.g., Dickhaut et al. 1995; Cai and Wang 2006), the role of non-pecuniary behavioral motives in trust games (e.g., Berg et al. 1995; Ashraf et al. 2006), and the motivational effect of authority in delegation games (e.g., Falk and Kosfeld 2006; Fehr et al. 2013). But they too have examined these issues separately in different settings.

Our work contributes to the literature by introducing a comparison of information sharing, advice provision and delegation in a channel management context. All three forms of assistance lead to the same outcome under extreme forms of trust, i.e., when both parties make decisions based only on their pecuniary payoff and have zero trust, or when they are fully-trusting and trustworthy. We investigate where actual behavior lies between these extremes. We develop and test hypotheses regarding how the form of assistance can influence outcomes in the presence of non-pecuniary behavioral motives. To do so, we distinguish between information sharing and advice provision based on how the domain of manufacturer’s input to the retailer can influence decision makers’ behavioral motives. We further distinguish between advice provision and delegation based on how the sequence of interactions between the manufacturer and retailer can influence behavioral motives.
There is a growing body of work that investigates channel interactions using laboratory experiments. Researchers have examined contract design (e.g., Katok and Wu 2009; Lim and Ho 2007; Ho and Zhang 2008; Kalkanci et al. 2011), fairness concerns (Cui and Mallucci 2012; Katok et al. 2012), inventory decisions (e.g., Croson and Donohue 2006; Ho et al. 2010), and signaling trustworthiness (Beer et al. 2014). Gino and Pisano (2008) and Bendoly et al. (2010) provide recent reviews of this fast evolving area. We contribute to this literature by studying how the form of manufacturer assistance influences trust, trustworthiness and channel performance.

3 Standard Theory and Predictions

Consider a distribution channel with a manufacturer supplying its product to a retailer. The retailer can increase market demand for the product by providing retail service in its stores. For example, the retailer can enhance demand by allocating more shelf space and end-of-aisle displays, or by training sales staff to assist consumers about the product. All such activities determine the number of consumers who consider buying the product by creating and capturing consumer awareness. In conjunction, the product’s intrinsic appeal determines the number of consumers whose needs the product can meet. Demand for the product can therefore be expressed as

\[ D(q, s) = qs, \]  

where \( q > 0 \) denotes the product’s intrinsic appeal, and \( s \in [0, \bar{s}] \) denotes the retail service level. The demand function in Equation (1) is increasing in both retail service and intrinsic appeal. Retail service is more effective in stimulating demand if the product’s intrinsic appeal is higher. For example, increasing consumer awareness for the product through a display is likely to be more effective in increasing demand if the product has a better match with consumer tastes. However, most retail services are costly to provide. Following the literature (e.g., Subramanian et al. 2010; Kurtuluş et al. 2014), we model the cost of retail service as

\[ C(s) = \frac{1}{2} ks^2, \]  

where \( k > 0 \) is the service cost parameter.

The product’s intrinsic appeal \( q \) depends on uncertain market condition. The manufacturer has superior information about the market condition than the retailer. Specifically, let \( q = \xi + \epsilon \), where \( \xi \) follows a distribution with cdf \( F(\cdot) \), mean \( \mu \), variance \( \sigma \), and support \([\xi, \bar{\xi}]\); \( \epsilon \) follows a distribution with
cdf \( G(\cdot) \), zero mean, support \([\epsilon, \bar{\epsilon}]\) and is independent of \( \xi \). The manufacturer knows the realization of \( \xi \) but the retailer does not. Neither firm knows the realization of \( \epsilon \). Thus, the actual realization of \( q \) remains uncertain to both firms. However, \( \xi \) is available to the manufacturer. Hence, it has more information about \( q \) than the retailer. We refer to \( \xi \) as the manufacturer’s demand information, and to \( \epsilon \) as the market uncertainty. We remark that \( \xi \) is an unbiased estimate of the product appeal, i.e., \( \mathbb{E}[q \mid \xi] = \xi \).

The manufacturer provides assistance in one of three forms: information sharing (IS), advice provision (AP) or delegation (DL). The sequence of events under each form is as follows. The retailer and the manufacturer establish a distribution channel and transact on a wholesale price \( w \). Under each form of assistance, the sequence of decisions is as follows: The manufacturer observes the realization of its demand information \( \xi \) at the start of the selling season. Under IS, the manufacturer provides an information report \( \hat{\xi} \in [\xi, \bar{\xi}] \) to the retailer. Then, the retailer sets the service level \( s \in [0, \bar{s}] \). Under AP, the manufacturer provides an advice \( \hat{s} \in [0, \bar{s}] \) to the retailer. Then, the retailer sets the service level \( s \in [0, \bar{s}] \). Under DL, the retailer first sets a service limit \( s_{\text{lim}} \in [0, \bar{s}] \). The manufacturer then decides the service level \( s_{\text{DL}} \in [0, s_{\text{lim}}] \) to be implemented. The service limit \( s_{\text{lim}} \) essentially determines the extent of the manufacturer’s decision-making authority\(^2\). In all three cases, demand is realized after the service level is set and the retailer sells the product to consumers at a retail price \( p \). The upper bound on the retail service level is \( \bar{s} = \frac{2}{k} (p - w) (\bar{\xi} + \bar{\epsilon}) \), which is the highest service level above which the retailer’s profit is negative irrespective of the realizations of \( \xi \) and \( \epsilon \). Any service level higher than \( \bar{s} \) is unambiguously dominated by a lower service level and, in particular, by \( s = 0 \).

Given the demand information \( \xi \) and service level \( s \), the retailer’s and the manufacturer’s expected profits are

\[
\Pi_R(s, \xi) = (p - w) \mathbb{E}[D(\xi + \epsilon, s) \mid \xi] - C(s) = (p - w) s \xi - \frac{1}{2} k s^2, \\
\Pi_M(s, \xi) = w \mathbb{E}[D(\xi + \epsilon, s) \mid \xi] = w s \xi.
\]

The retailer maximizes its expected profit conditional on its belief about \( \xi \) given available information, such as the manufacturer’s report \( \hat{\xi} \) or advice \( \hat{s} \). The manufacturer also takes actions to maximize its own expected profit. All model parameters including the distributions of \( \xi \) and \( \epsilon \) are common knowledge.\(^2\)

\(^2\)Starting with the seminal work of Hölmstrom (1984), delegation of decision-making authority has been commonly modeled as the principal specifying the set of permissible decisions that the agent can make. We too adopt this approach.
The notation is summarized in Appendix A.

Our goal is to build a parsimonious model that captures the key pecuniary trade-offs in managing the aforementioned distribution channel. In doing so, we simplify the experimental task and decision faced by participants. Such a model enables participants to focus only on the key trade-offs that matter while minimizing possible cognitive errors. Therefore, we intentionally keep retail price exogenous, and do not explicitly model production cost.

Note that if the retailer knew the realization of $\xi$ (i.e., for a given $\xi$), the service level that maximizes the retailer’s expected profit is

$$s_i(\xi) = \left(\frac{p - w}{k}\right) \xi.$$  \hspace{1cm} (5)

We refer to $s_i(\xi)$ as the retailer’s optimal service level. The retailer, however, does not know the demand information $\xi$. The service level that maximizes the retailer’s expected profit given its prior belief about manufacturer’s demand information is

$$s_{ni} = \left(\frac{p - w}{k}\right) \mu.$$  \hspace{1cm} (6)

We refer to $s_{ni}$ as the retailer’s uninformed service level - the service level the retailer would set without manufacturer assistance. We note that channel members’ expected profits are on average higher under the retailer’s optimal service level than under the retailer’s uninformed service level, as shown below.

$$E[\Pi_R(s_i(\xi)), \xi)] = \frac{(p - w)^2}{2k} (\mu^2 + \sigma) = E[\Pi_R(s_{ni}, \xi)] + \frac{(p - w)^2}{2k} \sigma.$$  \hspace{1cm} (7)

$$E[\Pi_M(s_i(\xi), \xi)] = \frac{w(p - w)}{k} (\mu^2 + \sigma) = E[\Pi_M(s_{ni}, \xi)] + \frac{w(p - w)}{k} \sigma.$$  \hspace{1cm} (8)

In Equations (7) and (8), $E[\Pi_R(s_i(\xi), \xi)]$ and $E[\Pi_M(s_i(\xi), \xi)]$ are the expected channel member profits under the retailer’s optimal service level, and $E[\Pi_R(s_{ni}, \xi)]$ and $E[\Pi_M(s_{ni}, \xi)]$ are the expected channel member profits under the retailer’s uninformed service level.

To determine which form of assistance performs best, we derive the equilibrium in IS, AP and DL and compare the outcomes. Here, we discuss the intuition and defer the formal analysis and results to Theorem 1 below. Consider IS. The manufacturer’s expected profit in Equation (4) is strictly increasing in the retail service level. Therefore, irrespective of its demand information $\xi$, the manufacturer prefers that the retailer provides a high service level. Note also that the retailer’s optimal service level in Equation (5) is increasing in $\xi$. Thus, the manufacturer has every incentive to inflate its report of
demand information (i.e., report $\hat{\xi} > \xi$). A strategic retailer may anticipate such manipulation and adjust its decisions. Anticipating such adjustment, a strategic manufacturer may potentially adopt various strategies, e.g., sometimes inflate and sometimes deflate. Consequently, the manufacturer’s information report is not correlated with its demand information, and the retailer’s service decision is independent of the information report it receives. In all equilibria, the retail service level is equal to the uninformed service level $s_{nj}$ irrespective of the manufacturer’s demand information.

Similarly, in AP, a strategic retailer anticipates the manufacturer’s incentive to manipulate its advice by recommending a higher service level than is optimal for the retailer (i.e., $\hat{s} > s_{j}(\xi)$). Anticipating this manipulation, the retailer may adjusts the advice it receives accordingly. A strategic manufacturer then determines its advice strategy anticipating the retailer’s response. As a result, in all equilibria, the manufacturer’s advice is also uninformative, i.e., $\hat{s}$ is not correlated with $\xi$. Further, the retailer’s service decision is independent of any advice it receives and is equal to $s_{nj}$.

In DL, given any service limit $s_{lim}$ set by the retailer, the manufacturer can maximize its expected profit by setting the service level equal to the service limit $s_{lim}$. Anticipating the manufacturer’s behavior, the retailer maximizes its expected profit by setting $s_{lim} = s_{nj}$. Hence, the manufacturer sets the service level to $s_{nj}$. Therefore, the unique equilibrium decision in this case corresponds to the uninformed service level. Theorem 1 formally establishes these results by analyzing the interactions as a game of incomplete information. The proof is deferred to Appendix B.

**Theorem 1.** Under all forms of assistance, the manufacturer does not base its assistance on its demand information. The retailer does not rely on the manufacturer’s assistance. The equilibrium retail service level is independent of the demand information and equal to $s_{nj}$ in Equation (6). Specifically, in equilibrium:

(a) In IS (resp., AP), the manufacturer’s information report (resp., advice) is uninformative. The retailer’s service decision is independent of the report (resp., advice) it receives.

(b) In DL, the manufacturer’s best response is to set a service level equal to the service limit. The retailer sets a service limit equal to $s_{nj}$.

4 Behavioral Theory and Predictions

Standard theory predicts that all forms of assistance will perform the same because the conflicting pecuniary motives result in a lack of coordination. However, a growing body of research has shown that non-pecuniary motives can give rise to trust and trustworthiness, resulting in some coordination despite
conflicting pecuniary motives. The non-pecuniary motives that give rise to trust and trustworthiness include social preference such as caring for others' payoffs (e.g., Ashraf et al. 2006; Cui et al. 2007; Loch and Wu 2008; Cui and Mallucci 2012; Lim and Ham 2014), and emotions associated with deception or betrayal (e.g., Bohnet and Zeckhauser 2004; Gneezy 2005; Bohnet et al. 2008; Özer et al. 2011; Erat and Gneezy 2012). Therefore, contrary to standard theory predictions, one may expect individuals to be trusting and trustworthy in all three forms of manufacturer assistance. In our context, a manufacturer’s trustworthiness is its ability and willingness to provide assistance in the retailer’s best interest, by providing informative report (in IS) or advice (in AP), or by setting a service level (in DL) based on the demand information. A trusting retailer relies on the manufacturer’s assistance by making its service decision based on the manufacturer’s input (in IS and AP), or by setting a service limit to be higher than $s_{nt}$, thus delegating high decision-making authority to the manufacturer (in DL). Thus, we test the following hypotheses against the predictions from standard theory.

**Hypothesis 1 (Presence of Trust and Trustworthiness).** Under all forms of assistance: (a) the manufacturer bases its assistance on its demand information; and (b) the retailer relies on the manufacturer’s assistance.

To the extent that trusting and trustworthy behaviors arise in the channel, our main objective is to determine how different forms of assistance influence behaviors and channel outcomes differently. The three forms of assistance differ along two dimensions: decision domain and decision sequence. IS and AP differ in the manufacturer’s decision domain. In IS, the manufacturer provides an information report, which is in the information domain. In AP, the manufacturer provides an advice, which is in the action domain. In both cases, the retailer makes its decision after obtaining the manufacturer’s input. Hence, IS and AP do not differ in decision sequence. In contrast, AP and DL differ in the decision sequence but not in the decision domain. In AP, the retailer sets the service level after obtaining the manufacturer’s advice. In DL, the retailer first sets an upper limit for the service level and then the manufacturer decides the service level subject to this limit. In either case, the decisions of the retailer and the manufacturer are both in the action domain.

As shown in Theorem 1, the differences in decision domain and decision sequence do not affect the outcomes under standard theory, because standard theory assumes complete lack of trust and trustworthiness. The other extreme is to assume that decision makers are fully trusting and trustworthy. We will refer to a manufacturer as being fully-trustworthy if it acts in the retailer’s best interest. We
refer to a retailer as being fully-trusting if it believes that the manufacturer is fully-trustworthy. At this extreme too, all forms of assistance will lead to the same outcome – the service level will be equal to the retailer’s optimal service level – despite the differences in the form of assistance. Specifically, in IS, a fully-trustworthy manufacturer provides a truthful report $\hat{\xi} = \xi$. A fully-trusting retailer takes the manufacturer’s report $\hat{\xi}$ to be true and sets a service level $s_i(\hat{\xi}) = s_i(\xi)$. In AP, a fully-trusting manufacturer provides unbiased advice $\hat{s} = s_i(\xi)$. A fully-trusting retailer follows the manufacturer’s advice by setting $s = \hat{s} = s_i(\xi)$. Finally, in DL, a fully-trustworthy manufacturer makes an unbiased service decision $s_{dl} = \min\{s_{lim}, s_i(\xi)\}$ subject to the service limit set by the retailer. A fully-trusting retailer sets a service limit $s_{lim} \geq s_i(\hat{\xi})$ such that the manufacturer has enough leeway to set the optimal service level for all possible realizations of the demand information $\xi \in [\xi, \bar{\xi}]$. Consequently, the service level set by the manufacturer equals $s_i(\xi)$.

We expect that the level of trusting and trustworthy behaviors, and hence the extent of coordination of channel decisions and channel member profit, will depend on the form of assistance. Hence, the actual behavior will lie somewhere in between the aforementioned extremes and differ across three forms of assistance. The following sections develop our behavioral hypotheses regarding the effects of decision domain and decision sequence, and how we measure their impact on trust, trustworthiness, and coordination.

### 4.1 Measures

Our metrics are inspired and hence are variations of those in Özer et al. (2011) and Özer et al. (2014). In IS and AP, a manufacturer that is not fully-trustworthy is likely to inflate its report (relative to the true demand information) or advice (relative to the retailer’s optimal service level) in order to induce the retailer to set a higher service level. The more inflated the report or advice, the less trustworthy the manufacturer. Therefore, we use inflation as the measure of trustworthiness. In IS, inflation is given by $\hat{\xi} - \xi$. In AP, the inflation is given by $\hat{s} - s_i(\xi)$. In DL, a manufacturer that is not fully-trustworthy will inflate its service decision if the service limit is higher than the unbiased service level. Hence, we measure inflation with $s_{dl} - s_i(\xi)$.

In IS and AP, a retailer that is not fully-trusting will expect that the manufacturer inflates its report

---

3We remark that inflation in IS can be equivalently expressed in the action domain relative to the retailer’s optimal service level as $s_i(\hat{\xi}) - s_i(\xi)$, where $s_i(\hat{\xi})$ is the service level suggested by the manufacturer’s information report (i.e., the retailer’s optimal service level taking the manufacturer’s information report to be true). This transformation allows us to compare inflation in IS and AP. We note that $s_i(\hat{\xi}) - s_i(\xi) = (\frac{p-w}{k}) (\hat{\xi} - \xi)$. Therefore, inflation expressed in the action domain is simply inflation in the information domain multiplied by a constant factor $(\frac{p-w}{k})$. In our experimental setting, $(\frac{p-w}{k}) = 1$. Hence, inflation expressed in either domain is numerically the same.
or advice. Therefore, the retailer will set a lower service level than suggested by the manufacturer’s report or advice. The more the retailer deflates the manufacturer’s report or advice, the less trusting the retailer is. Therefore, we use deflation as the measure of trust. In IS, the service level suggested by the manufacturer’s report is $s_i(\hat{\xi})$. Therefore, deflation is given by $s_i(\hat{\xi}) - s$. In AP, deflation is given by $\hat{s} - s$. In DL, we measure trust based on the service limit the retailer sets. A trusting retailer will set a higher service limit than predicted by standard theory, thus providing the manufacturer more leeway to determine the service level. The higher the leeway, the more trusting the retailer is. Hence, we use the leeway relative to standard theory prediction, given by $s_{lim} - s_{N1}$, as the measure of trust.

If there is some coordination of decisions in the channel, then the retail service level will vary in response to the manufacturer’s demand information. The higher the coordination, the higher the influence of demand information on the service level. Therefore, we use the sensitivity of retail service level to the demand information as the measure of coordination in channel decisions. Finally, to compare channel member performance, we use the expected retailer and manufacturer profits, as defined in Equations (3) and (4).

4.2 Impact of Decision Domain

We expect the difference in decision domain between IS and AP to lead to higher trust and trustworthy behavior in IS because of two behavioral motives. First, the extent of psychological cost or disutility from deceiving others is likely to depend on the domain in which the decisions are represented. Decision makers often engage in motivated reasoning to rationalize unjustifiable actions without feeling guilt. Such motivated reasoning is, however, constrained by the ability to construct reasonable justifications (e.g., Kunda 1990; Hsee 1995, 1996). Therefore, decision domains that offer the flexibility to rationalize deviations from the fully-trustworthy decision or even avoid acknowledging the deviation will lead to less trustworthy behavior (e.g., Schweitzer and Hsee 2002; Mazar et al. 2008). In our context, in the information domain, the actual demand information serves as an objective and readily available benchmark for a manufacturer participant to evaluate how truthful her report is. We expect that deviations from the truthful report will be difficult to ignore or rationalize. However, in the action domain, no such objective benchmark for unbiased advice is readily available to the manufacturer participant. It is up to the manufacturer to construct its own subjective benchmark to evaluate its actions, which leaves more room for motivated reasoning and rationalization. Therefore, we expect that the manufacturer’s decisions will be more trustworthy in IS than in AP.

Second, in the action domain, the retailer’s trust is likely to depend on the manufacturer’s capability
to determine the retailer’s optimal service level. The capability of the trusted party to perform the
task he or she is trusted with is a key determinant of trust (e.g., Mayer et al. 1995; McKnight et al.
1998; Ross and LaCroix 1996; Williams 2001; Colquitt et al. 2007). In our context, the manufacturer’s
capability to correctly process the demand information and determine the retailer’s optimal service level
is relevant only when the manufacturer’s decision is in the action domain. In the information domain, no
significant capability is required for the manufacturer to report the demand information. To the extent
that the retailer cannot be completely confident about the manufacturer’s capability to optimize in AP,
we expect the retailer to be more trusting in IS than in AP.

We expect that the higher trust and trustworthiness in IS will lead to higher coordination of channel
decisions and retailer profit compared to AP. We remark that the manufacturer’s expected profit is
higher under full cooperation compared to no cooperation (as shown in Equations (7) and (8) in §3).
However, the manufacturer’s payoff can be higher from being untrustworthy when it faces fully-trusting
retailers. Therefore, we will report our findings in §6 regarding how manufacturer profits are impacted,
and do not offer an a priori prediction. We, thus, establish the following hypotheses.

**Hypothesis 2 (Trust and Trustworthiness in IS vs. AP).** (a) Manufacturers inflate their infor-
mation less than they inflate their advice; (b) Retailers deflate information reports less than they deflate
advice.

**Hypothesis 3 (Coordination and Retailer Profit in IS vs. AP).** (a) Coordination of channel
decisions is higher in IS than in AP; (b) Expected retailer profit is higher in IS than in AP.

### 4.3 Impact of Decision Sequence

The difference in decision sequence between AP and DL will likely have the following effects. First,
the act of delegating authority in DL may activate the behavioral motive of **positive reciprocity**, i.e.,
reciprocating kind actions in a cooperative manner. Positive reciprocity has been found to support
trusting and trustworthy behaviors in settings such as gift exchange, trust games, investment games,
and market design (e.g., Fehr et al. 1998; Charness and Rabin 2002; McCabe et al. 2003; Charness 2004;
Falk et al. 2008; Bolton et al. 2013). Lim and Ham (2014) find that managers can realize higher profits
by delegating pricing decisions to salespeople because salespeople respond reciprocally (to delegation) by
exerting higher sales effort than predicted by standard theory. Therefore, in DL, the manufacturer may
exhibit positive reciprocity when the retailer sets a high service limit and provides more decision-making
authority. In addition, positive reciprocity may induce the retailer to delegate more authority. Thus,
positive reciprocity can lead to higher trust and trustworthiness in DL than in AP.

Second, when a trusting party must place its trust upfront, the extent of trust is influenced by the behavioral motive of *betrayal aversion*, i.e., the psychological disutility experienced by the trusting party from potentially being betrayed by the trusted party (e.g., Bohnet and Zeckhauser 2004; Bohnet et al. 2008). In DL, the retailer must place its trust in the manufacturer upfront when setting the service limit. Thus, in addition to the monetary payoffs associated with setting a particular service limit, the retailer is also likely to be influenced by betrayal aversion. In contrast, in AP, the retailer does not have to place its trust upfront. It can evaluate and respond to the risk posed by manufacturer’s potential opportunism on a case-by-case basis, after receiving the manufacturer’s advice. For example, advice to set a low service level may indicate that the manufacturer is trustworthy. The retailer thus has the opportunity to judge the trustworthiness of the manufacturer by observing its advice before acting on it. Therefore, the retailer is less vulnerable to manufacturer betrayal in AP than in DL. Also, because of motivated reasoning, the manufacturer in DL may self-servingly interpret the service limit as permission from the retailer that it is acceptable to set a service level as high as this limit. Hence, we expect the retailer to be less trusting and trustworthy in DL than in AP. Since there are competing behavioral motives at work for the impact of decision sequence, we propose the following competing hypotheses.

**Hypothesis 4** (Coordination and Retailer Profit: AP performs better than DL). (a) Coordination of channel decisions is higher in AP than in DL, and (b) Expected retailer profit is higher in AP than in DL.

**Hypothesis 5** (Coordination and Retailer Profit: AP performs worse than DL). (a) Coordination of channel decisions is lower in AP than in DL, and (b) Expected retailer profit is lower in AP than in DL.

We do not propose formal hypotheses comparing trust and trustworthiness in AP versus DL because the difference in decision sequence does not allow for directly comparable measures. Nevertheless, we investigate trusting and trustworthy behavior under each case separately later in the analysis section. One can also construct hypothesis comparing IS vs DL. Note that while positive reciprocity favors DL, betrayal aversion, motivated reasoning and manufacturer’s capability to make optimal decisions favor IS. In §6, we examine whether IS or DL performs better. For brevity, we do not propose formal hypotheses.
5 Experimental Design and Procedure

We designed an experiment with three treatment conditions corresponding to the three forms of manufacturer assistance. In each treatment condition, participants played the *channel game* as described in §3. We used a between-subjects design. There were 3 experimental sessions for each treatment and 12 participants per session, resulting in a total of 108 participants (3 treatments × 3 sessions/treatment × 12 participants/session). We used the following model parameters in the experiment: \( k = 1, \ w = 0.5, \ p = 1.5, \ \xi = 10, \ \xi = 80, \ \epsilon = -10, \bar{\epsilon} = 10, \) and \( s = \frac{2}{k} (p - w) (\bar{\xi} + \bar{\epsilon}) = 180. \) The random variables \( \xi \) and \( \epsilon \) were uniformly distributed integers over their supports. To facilitate the comparison of results across treatments, we pre-generated the values of the random variables needed for each decision round and used the same values and sequence in all experimental sessions.\(^4\)

Participants’ decisions in the channel game are likely to be influenced by their ability to compute the service level from the demand information. Therefore, we included a *retailer-only task* to measure participants’ ability. In the retailer-only task, each individual played the role of a retailer who observed the actual value of \( \xi \) and then made a decision on how much retail service \( s \) to provide. The retailer’s profit was identical to that in the channel game. Therefore, the retailer’s optimal service level was still given by \( s_i(\xi) \). We measure each participant’s ability using *participant decision bias*, defined as the average difference between the participant’s service decision and the optimal service level, i.e. the average of \( s - s_i(\xi) \).

In each experimental session, participants were randomly seated in front of computer terminals networked through a z-Tree program (Fischbacher 2007). They could only interact through computer terminals and were not allowed to communicate in any other way among themselves. Participants started with the retailer-only task, which involved 2 practice rounds and 10 paying rounds. Then there was a 5-minute break, followed by the channel game (IS, AP or DL) with 2 practice rounds and 11 paying rounds. In the channel game, participants were paired anonymously in each round and did not know the identity of the person they were playing with. To further minimize the possibility of repeated interaction effects, no participant was matched more than once with another participant. The instructions provided to participants clearly stated that there would be no re-matching. Participants could be assigned different roles (either the manufacturer or the retailer) from one round to the next. By rotating roles, participants...

\(^4\)We selected the sequence of random values from a sample of 100,000 sequences. To ensure that the sequence used was sufficiently representative of draws from a uniform distribution, we selected the sequence that minimized the Kolmogorov-Smirnov test statistic (which is used to compare an empirical distribution with a reference distribution) computed relative to the uniform distribution.
could gain a better understanding of the strategic considerations of both roles in the game, giving the theory its best chance to be supported. Rotating roles also ensured that the individual compensation did not differ systematically due to fixed role assignment. In each session, half of the participants took on the role of a manufacturer in 5 (of 11) rounds, and the remaining half in 6 rounds.\footnote{See Bolton et al. (2004); Ho and Zhang (2008); Özer et al. (2011); Bolton et al. (2013); Wang and Haruvy (2013) for the use of rotating role assignment in related literature.}

In the IS treatment, the channel game proceeded as follows. In each round, the manufacturer participant observed the value of demand information $\xi$ and sent a report to his retailer partner. The retailer participant set the retail service level after observing her partner’s report. After both decisions were made, demand and firm profits were automatically computed. Participants then received feedback, including the value of the realized intrinsic appeal $q$, the manufacturer’s report $\hat{\xi}$, the retailer’s service level $s$, the respective profit of the firms, and their own cumulative profit. The AP treatment was identical to the IS treatment with the only difference that the manufacturer participant sent an advice $\hat{s}$ to the retailer. In DL, the retailer participant first set the retail service limit $s_{\text{lim}}$. The manufacturer participant then observed the value of $\xi$ as well as $s_{\text{lim}}$ set by the retailer, and set the service level $s$.

For both the retailer-only task and the channel game, detailed experimental instructions were displayed on the computer screen. Participants could read the instructions at their own pace. After all participants finished reading the instructions, the experimenter highlighted the key components of the task by reading a pre-prepared script. The game set-up and information structure were common knowledge for all participants. Each participant also had a hard copy of a reference sheet, which summarized key information about the task. Participants then had to pass a computerized quiz before starting the first practice round. Also, on each decision screen, each participant could use a decision support tool to better understand how their decisions (or their partner’s decisions) may affect the outcomes of that decision round.\footnote{The experimental instructions, screen-shots of the experimental software, and other experimental documents are available from the authors upon request.}

After the retailer-only task and channel game were completed, participants completed an exit survey about their decisions in the game and provided information about their demographics and academic background. Besides a $10 fixed participation fee, individual compensation was proportional to how much profit was accumulated in the retailer-only task and the channel game. The experimenter paid cash, thanked and dismissed all participants. Each experimental session lasted for about two and a half hours. The individual payment was between $20 and $40, with an average of $32.35.
6 Experimental Results

Table 1 provides summary statistics for the retailer-only task and the channel game. In the retailer-only task, we observe that participant decisions are fairly close to optimal in all treatment conditions and participant decision bias does not differ significantly from zero ($p = 0.89$, $0.52$, and $0.20$ respectively in IS, AP and DL).\(^7\) In the channel game, our main interest is in comparing the effects of the three forms of manufacturer assistance. We make two preliminary observations from the summary statistics in Table 1. First, inflation and deflation are lower in IS than in AP. This observation suggests that there is more trusting and trustworthy behaviors in IS than in AP. Second, coordination of channel decisions and retailer’s expected profits are highest in IS and lowest in DL.\(^8\) Before we investigate these differences formally, we first establish whether trust and trustworthiness arise under each form of assistance.

<table>
<thead>
<tr>
<th>Table 1: Summary Statistics: Mean, [Median], (Standard Deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retailer-Only Task</strong></td>
</tr>
<tr>
<td>Treatment</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>IS</td>
</tr>
<tr>
<td>AP</td>
</tr>
<tr>
<td>DL</td>
</tr>
</tbody>
</table>

Abbreviations: Cordn. = Coordination of channel decisions.
Observations per treatment: 36 for retailer-only task, 198 in channel game.

6.1 Testing for the Presence of Trust and Trustworthiness

6.1.1 Does Information Sharing Support Trust and Trustworthiness?

We estimate the following random-effects regressions for manufacturer and retailer decisions in IS

$$\hat{\xi}_{it} = \alpha_0 + \alpha_1 \xi_t + \alpha_2 b_i + \alpha_3 t + \varepsilon_i + \eta_{it},$$

$$s_{it} = \beta_0 + \beta_1 \hat{\xi}_{it} + \beta_2 b_i + \beta_3 t + \varepsilon_i' + \eta_i',$$

\(^7\)All p-values are 2-sided unless stated otherwise.

\(^8\)In Table 1, the sensitivity of retail service level to demand information (which measures the extent of coordination in channel decisions) is obtained from the slope of the simple regression between service level and demand information.
where \( i \) and \( t \) are participant and decision round indices, respectively.\(^9\) Equation (9) allows us to test for correlation between manufacturers’ reports (\( \hat{\xi}_{it} \)) and their demand information (\( \xi_t \)). We use a Tobit model to account for the possible right-censoring of the report. We use \( \hat{\xi}_{it}^* \) to denote the latent variable for \( \hat{\xi}_{it} \) in this Tobit model. Equation (10) allows us to test for correlation between the retailers’ service decisions (\( s_{it} \)) and the reports they received (\( \hat{\xi}_{it} \)). In both cases, we control for participant decision bias (\( b_i \)), time trend (\( t \)), and unobserved participant-level heterogeneity (\( \varepsilon_i \) and \( \varepsilon_i' \)). Table 2 provides the regression results. We observe that manufacturers’ reports are significantly and positively correlated with their demand information, and retailers’ service decisions are significantly and positively correlated with manufacturers’ reports. Thus, contrary to standard theory predictions, manufacturers base their reports on their information and retailers rely on these reports. Hence, Hypothesis 1 is supported for IS.

Table 2: Regression Results for IS: Estimate (Standard Error)

<table>
<thead>
<tr>
<th>Variable</th>
<th>( \hat{\xi}^* )</th>
<th>( s )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>25.29** (3.33)</td>
<td>12.55** (3.183)</td>
</tr>
<tr>
<td>( \xi )</td>
<td>0.67** (0.05)</td>
<td>-</td>
</tr>
<tr>
<td>( \hat{\xi} )</td>
<td>-</td>
<td>0.44** (0.04)</td>
</tr>
<tr>
<td>( b )</td>
<td>0.01 (0.42)</td>
<td>0.42 (0.43)</td>
</tr>
<tr>
<td>( t )</td>
<td>0.04 (0.30)</td>
<td>0.16 (0.25)</td>
</tr>
</tbody>
</table>

** indicates \( p \leq 0.01 \)

6.1.2 Does Advice Provision Support Trust and Trustworthiness?

We estimate the following random-effects regressions for manufacturer and retailer decisions in AP

\[
\begin{align*}
\hat{s}_{it}^* &= \alpha_0 + \alpha_1 \xi_t + \alpha_2 b_i + \alpha_3 t + \varepsilon_i + \eta_{it}, \\
\hat{s}_{it} &= \beta_0 + \beta_1 \hat{s}_{it} + \beta_2 b_i + \beta_3 t + \varepsilon_i' + \eta_{it}'.
\end{align*}
\]

Equation (11) allows us to test for correlation between manufacturers’ advice (\( \hat{s}_{it} \)) and their demand information (\( \xi_t \)). We use a Tobit model to account for the possible right-censoring of advice. We use \( \hat{s}_{it}^* \) to denote the latent variable for \( \hat{s}_{it} \) in this Tobit model. Equation (12) allows us to test for correlation between the retailers’ service decisions (\( s_{it} \)) and the advice they received (\( \hat{s}_{it} \)). Table 3 provides the regression results. We observe that manufacturer advice is significantly and positively correlated with their demand information, and retailers’ service decisions are significantly and positively correlated with

\(^9\)See Fehr et al., 1998; Charness, 2004; Özer et al., 2011 for uses of random-effects regression models in related literature.
manufacturer advice. Hence, Hypothesis 1 is supported for AP.

Table 3: Regression Results for AP: Estimate (Standard Error)

<table>
<thead>
<tr>
<th>Variable</th>
<th>( \hat{s}^* )</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>19.65** (6.06)</td>
<td>29.83** (3.11)</td>
</tr>
<tr>
<td>( \xi )</td>
<td>0.88** (0.09)</td>
<td>-</td>
</tr>
<tr>
<td>( \hat{s} )</td>
<td>-0.07 (0.52)</td>
<td>0.12** (0.03)</td>
</tr>
<tr>
<td>( b )</td>
<td>0.70 (0.58)</td>
<td>0.16 (0.31)</td>
</tr>
</tbody>
</table>

** indicates \( p \leq 0.01 \)

6.1.3 Does Delegation Support Trust and Trustworthiness?

Consider a participant \( i \) in the role of a manufacturer in decision round \( t \), whose retailer partner has set a service limit \( s_{lim,it} \). Standard theory predicts that the manufacturer participant will always set a service level \( s_{it} = s_{lim,it} \). Recall from §4 that a fully-trustworthy manufacturer will set \( s_{it} = s_i(\xi_t) \) if \( s_{lim,it} > s_i(\xi_t) \), and \( s_{it} = s_{lim,it} \) otherwise. Therefore, we can distinguish between trustworthy and untrustworthy behavior only if \( s_{lim,it} > s_i(\xi_t) \). In our experimental data, we find that \( s_{lim,it} > s_i(\xi_t) \) in 85 (out of 198) observations. In 80% of these instances (68 out of 85 observations), manufacturers set \( s_{it} = s_{lim,it} \). This result suggests that manufacturer participants are mostly untrustworthy. To investigate further, we estimate the relationship between \( s_{it} \) and \( \xi_t \) controlling for the service limit \( s_{lim,it} \). We note that \( s_{it} \) is right-censored at \( s_{lim,it} \), and \( s_{lim,it} \) varies across observations. Therefore, we define \( \tilde{s}_{it} = s_{it} - s_{lim,it} \), which is always right-censored at zero. We estimate the following random-effects Tobit regression

\[
\tilde{s}^*_{it} = \alpha_0 + \alpha_1 \xi_t + \alpha_2 s_{lim,it} + \alpha_3 b_i + \alpha_4 t + \varepsilon_i + \eta_{it},
\]  

(13)

where \( \tilde{s}^*_{it} \) denotes the latent variable for \( \tilde{s}_{it} \) in the Tobit model. We control for the variation in service limit \( (s_{lim,it}) \), participant decision bias \( (b_i) \), time trend \( (t) \), and unobserved participant-level heterogeneity \( (\varepsilon_i) \). Table 4 presents the results. We observe that the coefficient of \( \xi_t \) is not significant. The intercept is significant, positive and relatively large in magnitude. Since \( \tilde{s}_{it} \) is right-censored at zero, the large intercept indicates a tendency for manufacturers to set the service level equal to the service limit. In fact, the estimated model predicts that \( \tilde{s}^*_{it} \geq 0 \), and hence \( s_{it} = s_{lim,it} \), in 91% of instances. Therefore, we find that manufacturers do not base their service decisions on their demand information even if the
retailer provides sufficient leeway to make the service decision.

We next estimate the following random-effects Tobit regression for retailers’ leeway (denoted by $l$)

$$l_{it}^* = \beta_0 + \beta_2 b_i + \beta_3 t + \epsilon_i + \eta_{it}. \quad (14)$$

In Equation (14), $l_{it}^*$ denotes the latent variable for the retailer’s leeway $l_{it}$ in the Tobit model. Standard theory predicts zero leeway. Thus, the intercept in Equation (14) allows us to measure whether retailers provide higher (or lower) leeway than predicted by standard theory. Table 4 presents the results. We observe that the intercept is negative and significant. Thus, retailers do not rely on manufacturers, and delegate even lesser decision-making authority than predicted by standard theory. Hence, we reject Hypothesis 1 for DL.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\tilde{s}$</th>
<th>$l^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>66.66 (4.38)</td>
<td>-5.24 (2.16)</td>
</tr>
<tr>
<td>$\xi$</td>
<td>0.83 (0.33)</td>
<td>-</td>
</tr>
<tr>
<td>$s_{lim}$</td>
<td>-0.78 (0.17)</td>
<td>-</td>
</tr>
<tr>
<td>$b$</td>
<td>1.86 (2.78)</td>
<td>0.70 (0.34)</td>
</tr>
<tr>
<td>$t$</td>
<td>1.72 (2.25)</td>
<td>-0.16 (0.34)</td>
</tr>
</tbody>
</table>

** indicates $p \leq 0.01$, * indicates $p \leq 0.05$

### 6.2 Comparison Across Arrangements

To test Hypothesis 2, which predicts lower inflation and deflation in IS compared to AP, we estimate the following random-effects regressions for inflation (denoted by $m$) and deflation (denoted by $r$)

$$m_{it} = \alpha_0 + \alpha_1 IS + \alpha_2 \xi_t + \alpha_3 b_i + \alpha_4 t + \epsilon_i + \eta_{it}, \quad (15)$$

$$r_{it} = \beta_0 + \beta_1 IS + \beta_2 \xi_t + \beta_3 b_i + \beta_4 t + \epsilon_i' + \eta_{it}'. \quad (16)$$

In Equations (15) and (16), $IS$ is the indicator variable for the IS treatment. Its coefficient determines whether inflation / deflation is higher (or lower) in IS relative to AP. Table 5 provides the results. The coefficient of $IS$ is negative and significant in both regressions. Thus, both inflation and deflation are lower in IS. Hence, Hypothesis 2 is supported.
Table 5: Regression Results for Equations (15) and (16): Estimate (Standard Error)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$m$</th>
<th>$r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>26.32**</td>
<td>0.28 (4.17)</td>
</tr>
<tr>
<td>$IS$</td>
<td>-7.93**</td>
<td>-6.82* (3.28)</td>
</tr>
<tr>
<td>$\xi$</td>
<td>-0.23**</td>
<td>0.52** (0.06)</td>
</tr>
<tr>
<td>$b$</td>
<td>-0.01</td>
<td>0.33 (0.35)</td>
</tr>
<tr>
<td>$t$</td>
<td>0.41 (0.33)</td>
<td>0.18 (0.37)</td>
</tr>
</tbody>
</table>

** indicates $p \leq 0.01$, * indicates $p \leq 0.05$.

Next, we determine which form of assistance allows channel members to coordinate their decisions better. We estimate the following random-effects regression to compare the sensitivity of retail service level to demand information in the three treatment conditions

$$s_{ijt} = \lambda_0 + \lambda_1 \xi_t + \lambda_2 IS \cdot \xi_t + \lambda_3 DL \cdot \xi_t + \lambda_4 IS + \lambda_5 DL + \lambda_6 b_i + \lambda_7 b_j' + \lambda_8 t + \varepsilon_i + \varepsilon_j' + \eta_{ijt}, \quad (17)$$

where $i$ indexes the participant in the retailer role, $j$ indexes the participant in the manufacturer role, and $t$ indexes the decision round. $IS$ and $DL$ are respectively the indicator variables for the IS and DL treatments. The coefficient of $\xi_t$ provides the sensitivity of retail service level to demand information in AP. The coefficients of the interaction terms $IS \cdot \xi_t$ and $DL \cdot \xi_t$ allow us to compare whether service decisions are more (or less) sensitive to demand information in IS and DL, respectively, relative to AP. We include as controls the time trend ($t$), decision biases of participants in retailer role ($b_i$) and manufacturer role ($b_j'$), and unobserved participant-level heterogeneity in the retailer and manufacturer roles ($\varepsilon_i$ and $\varepsilon_j'$). Table 6 provides the results.\(^{10}\) We observe that the interaction between $IS$ and $\xi_t$ is positive but not statistically significant, and the interaction between $DL$ and $\xi_t$ is negative and significant. Thus, coordination of channel decisions is directionally higher in IS, and significantly lower in DL compared to AP.

Finally, to compare channel member profits, we estimate the following random-effects regressions for

---

\(^{10}\)The estimate for the coefficient of $DL \cdot \xi$ is influenced by outliers in the data. We used robust regression to identify the outliers (Mahajan et al. 1984; Yohai 1987). The robust regression estimation procedure assigns lower weight to observations that have undue influence on the estimates. We find that it assigns zero weight to 5 observations (all in DL). We estimate Equation (17) after excluding these 5 observations and report these results in Table 6. Since the estimates from the robust regression are similar, we defer its details to Appendix C.
In Equations (18) and (19), \( i \) and \( t \) are participant and round indices, respectively. The coefficients of \( IS \) and \( DL \) provide a measure of how much more (or less) channel members’ expected profits are in IS and DL relative to AP. We include as controls the expected demand level (\( \xi_t \)), participant decision bias (\( b_i \)), time trend (\( t \)), and unobserved participant-level heterogeneity.\(^{11}\) Table 6 provides the results. In Equation (18), the coefficient for \( IS \) is positive but not significant. The coefficient for \( DL \) is negative and significant. Thus, retailer profits are not significantly different between IS and AP, and is significantly lower in DL. In Equation (19), the coefficient for \( IS \) and \( DL \) are not statistically significant. Thus, manufacturer profits do not differ significantly across the three forms of assistance. Based on our comparisons of coordination and retailer profit, we reject Hypothesis 3, and find support for Hypothesis 4 as opposed to Hypothesis 5.

Table 6: Regression Results for Equations (17),(18) and (19): Estimate (Standard Error)

<table>
<thead>
<tr>
<th>Variable</th>
<th>( \Pi_{R, it} )</th>
<th>( \Pi_{M, it} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>27.07** (2.67)</td>
<td>-733.18** (100.19)</td>
</tr>
<tr>
<td>( IS )</td>
<td>-3.82 (3.48)</td>
<td>23.66 (71.82)</td>
</tr>
<tr>
<td>( DL )</td>
<td>6.86** (3.51)</td>
<td>-200.81** (72.91)</td>
</tr>
<tr>
<td>( IS \cdot \xi )</td>
<td>0.06 (0.06)</td>
<td>-</td>
</tr>
<tr>
<td>( DL \cdot \xi )</td>
<td>-0.20** (0.06)</td>
<td>-</td>
</tr>
<tr>
<td>( \xi )</td>
<td>0.23** (0.04)</td>
<td>35.47** (1.41)</td>
</tr>
<tr>
<td>( b )</td>
<td>0.55** (0.21)</td>
<td>17.88** (6.45)</td>
</tr>
<tr>
<td>( b' )</td>
<td>-0.06 (0.14)</td>
<td>-</td>
</tr>
<tr>
<td>( t )</td>
<td>0.23 (0.15)</td>
<td>13.15 (9.28)</td>
</tr>
</tbody>
</table>

\(^{**}\) indicates \( p \leq 0.01 \), \( ^{*} \) indicates \( p \leq 0.05 \), \( ^{+} \) indicates \( p \leq 0.1 \).

6.3 Summary of Treatment Effects

To summarize, trust, trustworthiness and coordination decline as we move from IS to AP to DL. Between IS and AP, the difference in decision domain leads to higher trust and trustworthiness in IS than in AP. Specifically, manufacturers distort advice more than they distort information reports, and retailers...
discount advice more than they discount information reports. The extent of coordination in channel decisions and retailer profits are only directionally higher in IS. We explain the reason in §7.

In contrast to IS and AP, DL does not support trust and coordination. First, manufacturers in DL are mostly untrustworthy. In 80% of the instances in which they had sufficient leeway to choose the retailers’ optimal service level, i.e., where \( s_{\text{lim}} > s_i(\xi) \), manufacturers instead chose to set service levels equal to the service limit and benefited at the retailer’s expense. Second, retailers in DL provide even less leeway than predicted by standard theory, i.e., they set service limits lower than \( s_{Ni} \). The lower-than-predicted service limits cannot be explained by participants’ ability to optimize. Recall from Table 1 that participant decisions in the retailer-only task did not differ significantly from the theoretically optimal decisions. These observations support the argument that the decision sequence in DL hinders trust and trustworthiness. Consequently, we find that coordination in channel decisions and retailer profits are significantly lower in DL than in IS or AP. In fact, delegation is counterproductive. We compared retailers’ expected profits in DL with their expected profits under the uninformed service level \( s_{Ni} \) (i.e., the service level the retailer would have set if it had acted without the manufacturer’s assistance). We find that the profits in DL are significantly lower than under the retailer’s uninformed service level.\(^{12}\) What makes this outcome remarkable is that retailers always had the option of setting the service limit equal to the uninformed service level. Instead, they set a lower service limit.

Our results regarding delegation pertain to a setting in which the extent of authority transferred is determined endogenously, through the service limit set by the retailer. Starting with the seminal work of Hölmstrom (1984), delegation of authority has been commonly modeled as the transfer of decision-making authority by setting a limit on the extent of authority transferred. In this regard, our work complements that of Lim and Ham (2014) who find that delegation can be beneficial when the extent of authority transferred is \textit{exogenously} fixed, i.e., without setting a limit to delegation. We show that delegation with the ability to set limits proves counterproductive.

7 Trust and Trustworthiness Types

Table 1 in §6 shows considerable variation in the extent of trusting and trustworthy behaviors in each treatment. Here we investigate in detail how variation in participants’ behaviors affect performance. To do so, we group participants into distinct trustworthiness and trust types in each treatment condition.

\(^{12}\)We use a random-effects regression for retailers’ incremental expected profit relative to their expected profits under the uninformed service level, and find that the intercept in this regression is significantly negative (\( p < 0.01 \)). See Appendix D.1 for details.
We group participants into *trustworthiness types* based on each participant’s average inflation in the manufacturer role. Specifically, we rank participants in increasing order of their average inflation and divide them into three equal-sized groups (a tertile split), representing three trustworthiness types. We label the type with the least inflation as *saints*, the type with the most inflation as *scoundrels*, and the intermediate type as *in-betweens*. We also group participants into three *trust types* using a tertile split based on each participant’s average deflation (in treatment IS and AP) and average leeway (in treatment DL) in the retailer role. We label the three trust types as *believers*, *in-betweens*, and *skeptics* in the increasing order of trusting behavior. We remark that in DL, a participant’s inflation in the manufacturer role, hence her trustworthiness, can be measured only if the retailer participant sets a service limit $s_{lim}$ higher than $s_i(\xi)$. For 21 out of 36 participants, we only have two or fewer observations in the manufacturer role in which the partnering retailer participant set $s_{lim} > s_i(\xi)$. Hence, we only classify participants into trust types in DL.

![Figure 1: Behavioral Types in IS](image)

In all treatments, we find that the trust and trustworthiness types differ considerably in their behaviors. In addition, participants’ behaviors are consistent over time, e.g., those participants who are on average saints continue to be saints over time. Figure 1 graphically depicts these differences for the case of IS. Figure 1(a) plots manufacturers’ reports $\hat{\xi}$ against their demand information $\xi$ for saints and scoundrels. The dashed line is the truthful report $\hat{\xi} = \xi$. The solid lines are the fitted linear relationships between $\hat{\xi}$ and $\xi$ for saints and scoundrels. We immediately observe that saints are relatively truthful
while scoundrels inflate their reports substantially. Figure 1(b) plots retailers’ service decisions $s$ against manufacturers’ reports $\hat{\xi}$ for believers and skeptics. The dashed line represents the service decisions of a fully-trusting retailer, i.e., $s = s_i(\hat{\xi})$. The solid lines are the fitted linear relationships between $s$ and $\hat{\xi}$ for believers and skeptics. Believers are relatively trusting while skeptics discount the manufacturer reports substantially. The pattern of behaviors across trust and trustworthiness types is similar in AP. In DL, believers set significantly higher service limits than the skeptics. We perform formal comparisons to establish that the trust types and trustworthiness types differ significantly and these differences persist over time in each treatment condition. We defer the details to Appendix D.2.

We use this classification to examine the implications of trusting and trustworthy behaviors. Since participants are consistent in their behaviors, we use their type classification to understand how trusting and trustworthy behaviors influence channel member profits. Coordination in channel decisions and retailer profits can be expected to be highest when retailers who are believers (highly trusting) are paired with manufacturers who are saints (highly trustworthy). We find that believers were paired less frequently (by random matching) with saints in IS than in AP (28% in IS, 46% in AP, $p = 0.03$). Thus, the heterogeneity in trust and trustworthiness across participants can lead to a “mismatch” that counteract the effects of the overall levels of trust and trustworthiness on coordination and retailer profit. Hence, despite higher trust and trustworthiness in IS than in AP, the extent of coordination and retailer profits are not significantly different between these two arrangements. Next, we investigate the implications for the manufacturer and the retailer in more detail.

7.1 The Manufacturer’s Perspective

We estimate the following random-effects regression to test the effect of types on manufacturers’ profits:

$$
\Pi_{M,it} = \beta_0 + \beta_1 I_{M,i} + \beta_2 S_{M,i} + \beta_3 I_{R,it} + \beta_4 S_{R,it} + \beta_5 \xi_t + \beta_6 t + \varepsilon_i' + \eta_{it}.'
$$

(20)

In Equation (20), $I_{M,i}$ and $S_{M,i}$ are indicator variables for participant $i$’s trustworthiness types, and denote in-betweens and scoundrels respectively. $I_{R,it}$ and $S_{R,it}$ are indicator variables for the trust types of participant $i$’s retailer partner in round $t$, and denote in-betweens and skeptics respectively. In DL, because we do not classify participants into trustworthiness types, we estimate the regression without the indicator variables for trustworthiness types, i.e., without $I_{M,i}$ and $S_{M,i}$. In this way, we are still able to study the effect of retailer’s trust on manufacturer profits. Table 7 reports the regression results for each treatment condition.
Manufacturers benefit from retailers' trust. In Table 7, the coefficients of $I_R$ and $S_R$ are negative in all three treatment conditions, and significant in all cases except for in-betweens in DL. Hence, manufacturers realize lower profits if they are paired with an in-between or a skeptic than a believer. In IS and AP, retailers that are in-betweens and skeptics considerably deflate the manufacturers' information reports or advice. As a result, manufacturers have limited influence on retailers' decisions.\(^{13}\) In contrast, believers are more influenced by the information report or advice. Consequently, manufacturers fare better when the retailer is more trusting. In DL, skeptics set significantly lower service limits than believers. Thus, manufacturers fare worse when paired with skeptics as they do not have much leeway to set the service level.

Table 7: Impact of Behavioral Types on Manufacturer Profit: Estimate (Standard Error)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>IS</th>
<th>AP</th>
<th>DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-66.47 (86.31)</td>
<td>-36.08 (87.91)</td>
<td>33.87 (44.70)</td>
</tr>
<tr>
<td>$I_R$</td>
<td>-176.82** (54.94)</td>
<td>-175.13** (60.62)</td>
<td>-47.43 (40.20)</td>
</tr>
<tr>
<td>$S_R$</td>
<td>-523.01** (54.74)</td>
<td>-383.48** (62.93)</td>
<td>-306.47** (48.12)</td>
</tr>
<tr>
<td>$I_M$</td>
<td>113.70** (58.59)</td>
<td>93.16 (59.24)</td>
<td>-</td>
</tr>
<tr>
<td>$S_M$</td>
<td>208.53** (59.26)</td>
<td>35.06 (61.94)</td>
<td>-</td>
</tr>
<tr>
<td>$\xi$</td>
<td>23.82** (1.06)</td>
<td>23.83** (1.16)</td>
<td>19.98** (0.95)</td>
</tr>
<tr>
<td>$t$</td>
<td>4.97 (7.03)</td>
<td>6.13 (7.67)</td>
<td>6.34 (4.94)</td>
</tr>
</tbody>
</table>

\(^{**}\) indicates $p \leq 0.01$, \(^{*}\) indicates $p \leq 0.05$.

To further examine the effect of trust, we compare manufacturers’ profits with that under the retailer’s uninformed service level $s_{SM}$ (i.e., the service level the retailer would have set if it had acted on its own without the manufacturer’s assistance). We use random-effects regressions to conduct these tests accounting for possible within-subject correlation. We defer the details to D.3. Our analysis shows that, in IS and AP, manufacturers benefit from providing assistance if they are paired with believers, but are hurt if they are paired with skeptics. In DL, we find that manufacturers do not benefit from providing assistance even when paired with believers. Essentially, even believers do not provide sufficient leeway in DL. These results highlight the importance of developing retailer’s trust for manufacturers.

Trustworthy behavior does not pay off. In Table 7 the coefficients of $I_M$ and $S_M$ are positive in IS and AP, and significant in IS. Hence, the trustworthy behavior of saints comes at the expense\(^{13}\) In IS, the mean service level set by skeptics is 25.76, whereas the mean optimal service level based on the actual demand conditions, i.e., $s_1 (\xi)$, is 42.75. In AP, the corresponding figures are 31.37 and 43.63. Thus, skeptics considerably under-provide service relative to the actual demand conditions. The difference is statistically significant in both IS and AP ($p < 0.01$ in both cases; we use random-effects regressions for the difference and test whether the intercept is significantly positive).
of their own pecuniary payoff. One might think that saints may have been trustworthy because they were less capable in making decisions that maximized their pecuniary payoffs. However, in the retailer-only task, saints did not differ significantly from the other types in their expected profits. Hence, saints were equally capable as others in making decisions that maximized their pecuniary payoffs. These observations suggest that saints are trustworthy because of non-pecuniary motives.

**Non-pecuniary motives influence trustworthy behavior.** Exit survey responses provide support for the role of non-pecuniary motives for trustworthy behavior. In the exit survey, participants answered questions regarding their role as a manufacturer. They indicated the extent to which they agreed or disagreed (1 = Strongly Disagree, 7 = Strongly Agree) to statements about being motivated by concern for their own profit (economic motive), discomfort from misreporting demand information in IS or providing biased advice in AP (deception discomfort), concern for the retailer’s profit (other’s interest), and willingness to sacrifice their own profit to benefit the retailer (sacrifice motive). Table 8 summarizes the exit survey responses in IS and AP. In both cases, the trustworthiness types differ significantly in their economic motive (ANOVA $p < 0.01$ in both cases), with saints being driven significantly less by their economic motive compared to scoundrels ($p < 0.01$ in both cases).

### Table 8: Exit Survey Measures by Trustworthiness Types: Mean [Median] (Standard Deviation)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Types</th>
<th>Economic Motive</th>
<th>Deception Discomfort</th>
<th>Other’s Interest</th>
<th>Sacrifice Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS</td>
<td>In-between</td>
<td>5.25 [6] (1.91)</td>
<td>3.25 [3] (1.28)</td>
<td>2.92 [3] (1.31)</td>
<td>2.75 [2] (1.29)</td>
</tr>
<tr>
<td></td>
<td>Scoundrels</td>
<td>6.5 [7] (0.67)</td>
<td>1.92 [2] (1.16)</td>
<td>2.58 [2.5] (1.31)</td>
<td>1.92 [1.5] (1.24)</td>
</tr>
<tr>
<td></td>
<td>In-between</td>
<td>6.00 [6] (1.04)</td>
<td>4.00 [5] (1.54)</td>
<td>3.00 [4] (1.65)</td>
<td>2.42 [2.5] (1.16)</td>
</tr>
</tbody>
</table>

Notes: 12 participants per type.

Further investigation reveals that deception discomfort plays a larger role in supporting trustworthiness in IS than in AP. This observation supports our argument (from §4.2) that it is more difficult to engage in motivated reasoning in the information domain than in the action domain to justify (to oneself) deviations from trustworthy behavior. Specifically, in IS, the trustworthiness types differ significantly in their deception discomfort (ANOVA $p < 0.01$), with saints experiencing significantly higher

---

14To make the comparison, we use a random-effects regression with indicator variables for the trustworthiness type. We find that the coefficients for the indicator variables are not significant.
deception discomfort than scoundrels ($p < 0.01$). In contrast, in AP, the trustworthiness types do not differ significantly in their deception discomfort (ANOVA $p = 0.41$). Also, in IS, the trustworthiness types do not differ significantly in their concern for retailer’s profits or in their willingness to sacrifice their own profit (ANOVA $p = 0.41$ and $p = 0.31$, respectively). The reverse is true in AP (ANOVA $p = 0.03$ and $p < 0.01$ respectively), with saints expressing significantly higher concern for retailers’ profits, and higher willingness to sacrifice their own profits ($p = 0.01$ and $p = 0.04$, respectively). Thus, manufacturers in AP are still motivated to be trustworthy by the non-pecuniary motive of concern for retailer profit. However, the higher trustworthiness in IS compared to AP (as shown in §6.2) suggests that concern for retailer profit is not as potent a motive as deception discomfort in driving trustworthy behavior.

7.2 The Retailer’s Perspective

We estimate the following random-effects regression to test the effect of types on retailers’ profits

$$
\Pi_{R,it} = \alpha_0 + \alpha_1 I_{R,i} + \alpha_2 S_{R,i} + \alpha_3 I_{M,it} + \alpha_4 S_{M,it} + \alpha_5 \xi_t + \alpha_6 t + \varepsilon_i + \eta_{it}. \quad (21)
$$

In Equation (21), $I_{R,i}$ and $S_{R,i}$ are indicator variables for participant $i$’s trust type, and denote in-betweens and skeptics respectively. $I_{M,it}$ and $S_{M,it}$ are indicator variables for the trustworthiness type of participant $i$’s manufacturer partner in round $t$, and denote in-betweens and scoundrels respectively. In case of DL, we estimate the regression without the indicator variables for partner trustworthiness types, i.e., without $I_{M,it}$ and $S_{M,it}$. Table 9 provides the regression results in each treatment condition.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>IS</th>
<th>AP</th>
<th>DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-604.84**</td>
<td>-708.89**</td>
<td>-759.14**</td>
</tr>
<tr>
<td></td>
<td>(88.68)</td>
<td>(85.93)</td>
<td>(70.61)</td>
</tr>
<tr>
<td>$I_R$</td>
<td>-29.28</td>
<td>54.36</td>
<td>-18.06</td>
</tr>
<tr>
<td></td>
<td>(57.44)</td>
<td>(63.51)</td>
<td>(54.27)</td>
</tr>
<tr>
<td>$S_R$</td>
<td>-205.51**</td>
<td>-72.62</td>
<td>-202.88**</td>
</tr>
<tr>
<td></td>
<td>(56.87)</td>
<td>(65.52)</td>
<td>(54.40)</td>
</tr>
<tr>
<td>$I_M$</td>
<td>17.11</td>
<td>-47.12</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(56.36)</td>
<td>(56.80)</td>
<td>-</td>
</tr>
<tr>
<td>$S_M$</td>
<td>-80.40</td>
<td>-110.12+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(57.14)</td>
<td>(59.34)</td>
<td>-</td>
</tr>
<tr>
<td>$\xi$</td>
<td>36.14**</td>
<td>38.61**</td>
<td>36.91**</td>
</tr>
<tr>
<td></td>
<td>(1.11)</td>
<td>(1.11)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>$t$</td>
<td>7.15</td>
<td>-1.94</td>
<td>11.19+</td>
</tr>
<tr>
<td></td>
<td>(7.37)</td>
<td>(7.31)</td>
<td>(6.54)</td>
</tr>
</tbody>
</table>

** indicates $p \leq 0.01$, * indicates $p \leq 0.05$, + denotes $p \leq 0.1$.

**Trusting behavior can pay off.** We observe from Table 9 that skeptics fare worse than believers (coefficient of $S_R$ is negative) and this difference is significant in IS and DL. We also compare retailers’
profits with the expected profits under the retailer’s uninformed service level $s_{\text{nl}}$. We use random-effects regressions to conduct these tests accounting for possible within-participant correlation. We defer the details to Appendix D.4. Our analysis shows that, in IS and AP, believers realize higher expected profits than under the uninformed service level. Even though manufacturers are not completely trustworthy, their input is still informative. As a result, believers benefit from relying on their input. Skeptics, however, realize significantly lower profits than under the uninformed service level. This is because they “overly” discount the manufacturers’ input and fail to exploit the information contained in the manufacturer reports. In other words, in IS and AP, retailers benefit from the manufacturer’s assistance only if they are trusting, even in the presence of manufacturer opportunism. In DL, we find that the expected profits of believers are not significantly different than under the uninformed service level.

The question of whether retailers should rely on manufacturer’s assistance has been somewhat controversial. While some are skeptical about the value of this practice due to concerns about manufacturer opportunism, others believe that trust between channel members can mitigate these concerns and allow retailers to benefit from the manufacturer’s assistance. Our study offers a more nuanced picture. It shows that whether trust can arise in the channel and whether retailers can benefit from this practice depends on the form of manufacturer assistance. Information sharing and advice provision are better in supporting trustworthy behaviors amongst manufacturers, such that retailers can benefit from relying on manufacturer’s assistance. Delegation, in which the retailer sets a limit on the manufacturer’s decision-making authority, does not foster trustworthy behavior. Consequently, there is lack of trust and retailers do not benefit from the manufacturer’s assistance.

**Retailers benefit from manufacturers’ trustworthiness.** We observe from Table 9 that retailers fare directionally better if their manufacturer partner is more trustworthy (coefficients of $S_M$ in IS, and $I_M$ and $S_M$ in AP are negative). To understand the effect of trustworthiness further, we estimate Equation (21) for retailer profits separately for each trust type. We defer the details to Appendix D.5. Our analysis shows that manufacturer’s trustworthiness matters considerably for believers, but not for scoundrels. Since believers mostly trust the manufacturer’s information report or advice, it is important that their manufacturer partner is trustworthy. Skeptics, on the other hand, significantly discount any information or advice they receive. Hence, their profit is not influenced significantly by the manufacturer’s trustworthiness.

**Non-pecuniary motives influence trusting behavior.** In the exit survey, participants responded to statements regarding the retailer role, and indicated the extent to which they were motivated by
concern for their own profit (economic motive), concern for the manufacturer’s profit (other’s interest), and willingness to sacrifice their profit to benefit the manufacturer (sacrifice motive). In IS, compared to skeptics, believers expressed lower economic motive, higher concern for manufacturer’s profit, and higher willingness to sacrifice their profit to benefit the manufacturer (1-sided $p = 0.07$, $p = 0.07$, and $p = 0.08$ respectively). In AP and DL, the trust types did not differ significantly in their motives. Details are provided in Appendix D.6. These results suggest that the higher trust in IS is in part due to non-pecuniary motives of the retailer.

8 Discussion and Conclusion

This paper investigates the practice of a retailer relying on a manufacturer’s assistance to make better-informed retail decisions. While some practitioners and academics have been skeptical about the value of this practice, others believe that trust between channel members can facilitate co-ordination and help realize significant gains. Our study offers a refined perspective. It shows that whether trust can arise in the channel and whether firms can benefit from this practice depends on the form of manufacturer assistance. We study how the three prevalent forms of manufacturer assistance – information sharing (IS), advice provision (AP) and delegation (DL) – affect trust, trustworthiness and coordination of channel decisions. All three forms of assistance lead to the same outcome under extreme forms of trust, i.e., when both parties make decisions based only on their pecuniary payoff and have zero trust, or when they are fully-trusting and trustworthy. We investigate where actual behavior lies between these extremes, and how the form of assistance affects the extent of trust, and hence coordination and firms’ profits.

Some of our results are as follows. We determine that IS and AP support trust and coordination. A significant proportion of manufacturers act in a trustworthy manner at the expense of their own pecuniary payoff, and retailers rely on their assistance. In stark contrast, in DL, we find that manufacturers are mostly untrustworthy, and retailers provide manufacturers even less leeway (to set service levels) than predicted by standard theory. We attribute the lack of trust and trustworthiness in DL to the decision sequence, i.e., the retailer deciding first by setting a service limit. Manufacturers in DL can (self-servingly) interpret the service limit as permission to set a high service level at the expense of the retailer. Further, when setting the service limit upfront, retailers are likely to perceive higher vulnerability from potential betrayal by the manufacturer, leading to lower trust. Consequently, coordination and retailer profits are significantly lower in DL compared to IS and AP. In fact, delegation in our context
is counterproductive for the retailer. Retailer profits are lower than it would have been had they acted on their own without manufacturers’ assistance. In addition, by comparing IS and AP, we determine that IS leads to higher levels of trust and trustworthiness, supporting behavioral predictions that manufacturer decisions in the information domain lead to higher trust. We also observe significant variation across participants in their trusting and trustworthy behaviors, which was consistent over the course of their interaction with others. Linking the variations in behavior to channel member profits, we find that trustworthiness does not pay off. Trustworthy manufacturers fare poorly and do not benefit from providing assistance. In contrast, trust can pay off despite the presence of manufacturer opportunism. Trusting retailers benefit from manufacturer assistance and even fare better than those lacking in trust.

We conclude that, while concerns regarding opportunism are not completely misplaced, they do not preclude effective coordination. Even in the absence of complex contracts to govern the manufacturer’s behavior, retailers can benefit from relying on manufacturer assistance in the form of information sharing and advice provision. Retailers should, however, be circumspect about delegating authority to the manufacturer. Delegation with retailer-imposed limits does not induce trustworthy behavior and is counterproductive for the retailer. If retailers were to delegate decisions to the manufacturer, then our results taken along with those of Lim and Ham (2014) suggest that retailers should not set explicit limits. Developing trust is imperative for manufacturers. Manufacturers benefit from information sharing or advice provision only when the retailer places sufficient trust in them. Further, manufacturers should prefer information sharing over advice provision, as the former supports higher trust.

References


### Appendix A Notation

<table>
<thead>
<tr>
<th>Exogenous constants</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>$k$ : Service cost parameter</td>
<td>$\hat{\xi}$ : Manufacturer’s information report in IS</td>
</tr>
<tr>
<td>$p$ : Retail price</td>
<td>$\hat{s}$ : Manufacturer’s advice in AP</td>
</tr>
<tr>
<td>$w$ : Wholesale price</td>
<td>$s_{\text{lim}}$ : Retailer’s service limit in DL</td>
</tr>
<tr>
<td><strong>Demand parameters</strong></td>
<td></td>
</tr>
<tr>
<td>$q$ : Product’s intrinsic appeal</td>
<td>$s$ : Retail service level</td>
</tr>
<tr>
<td>$\xi$ : Manufacturer’s demand information (mean $\mu$, variance $\sigma$, support $[\xi, \bar{\xi}]$)</td>
<td>$s_{\text{dl}}$ : Service level set by manufacturer in DL</td>
</tr>
<tr>
<td>$\epsilon$ : Market uncertainty (zero mean, support $[\epsilon, \bar{\epsilon}]$)</td>
<td>$s_{\text{i}}(\hat{\xi})$ : Retailer’s optimal service level</td>
</tr>
<tr>
<td>$s_{\text{ip}}(\hat{\xi})$ : service level suggested by the report</td>
<td>$s_{\text{ni}}$ : Retailer’s uninformed service level</td>
</tr>
<tr>
<td>$\Pi_R(s, \xi)$ : Retailer’s expected profits</td>
<td>$\Pi_M(s, \xi)$ : Manufacturer’s expected profits</td>
</tr>
</tbody>
</table>
Appendix B  Proof for Theorem 1

B.1 Information Sharing Equilibrium

We show that there always exists an equilibrium that leads to the outcome described in Theorem 1, and that all equilibria lead to the same outcome. We also show that \( \hat{\xi} \) is not correlated with \( \xi \) in any equilibrium. Let \( \Omega = [\xi, \hat{\xi}] \) denote the support of \( \xi \). Let \( \Delta (Z) \) denote the set of all probability distributions over the set \( Z \). Let \( \text{supp} (\cdot) \) denote the support of a probability distribution. Define the following:

(i) Manufacturer’s reporting strategy \( g_{bs}(\hat{\xi}; \xi) \in \Delta (\Omega) \) given its demand information \( \xi \);

(ii) Retailer’s posterior beliefs \( b_{bs}(\xi; \hat{\xi}) \in \Delta (\Omega) \) about \( \xi \) given the report \( \hat{\xi} \);

(iii) Retailer’s service strategy \( h_{t_s}(s; \hat{\xi}) \in \Delta ([0, \|s\|]) \) given the report \( \hat{\xi} \).

If the retailer’s service strategy is a pure strategy, then we denote it by \( h_{t_s}(\hat{\xi}) \). Let \( E[\cdot | \hat{\xi}, b_{bs}] \) denote the retailer’s expectation given its posterior beliefs \( b_{bs} \) and report \( \hat{\xi} \). Let \( \hat{\Omega} = \cup_{\xi \in \Omega} \text{supp} (g_{bs}(\hat{\xi}; \xi)) \) denote the set of reports that the manufacturer makes with positive probability. In a Perfect Bayesian Equilibrium (PBE), we require that each player’s strategy is sequentially rational given their beliefs, and that the beliefs are consistent with the strategies as per Bayes’ rule.

We now show that there always exists an uninformative equilibrium in which the retailer sets the service level \( s_{N_1} \) for any information report it receives in equilibrium. Consider the following specification of strategies and posterior beliefs: \( g_{bs}(\hat{\xi}; \xi) \) is a uniform distribution over \( \Omega \) for all \( \xi \in \Omega, b_{bs}(\xi; \hat{\xi}) = F(\xi) \) and \( h_{t_s}(\hat{\xi}) = s_{N_1} \) for all \( \hat{\xi} \in \hat{\Omega} \). Given the manufacturer’s reporting strategy, the retailer’s posterior beliefs are consistent with Bayes’ rule. Given the retailer’s posterior beliefs, we have that \( E[\xi | \hat{\xi}, b_{bs}] = E[\xi] = \mu \). The retailer’s service strategy is sequentially rational if

\[
h_{t_s}(\hat{\xi}) \in \arg \max_{s \in [0, \|s\|]} E \left[ \xi + \epsilon | \hat{\xi}, b_{bs} \right] s (p-w) - \frac{1}{2} k s^2 = \{s_{N_1}\}
\]

which holds by construction. The manufacturer’s reporting strategy is sequentially rational if

\[
\text{supp} \left( g_{bs}(\hat{\xi}; \xi) \right) \subseteq \arg \max_{\xi \in \Omega} \xi \cdot h_{t_s}(\hat{\xi}) \cdot w = \Omega ,
\]

which also holds by construction. Thus, an uninformative PBE always exists.
To establish that any PBE must be uninformativ e, we show: (i) the retailer follo ws a pure strategy for its service decision, (ii) the retailer sets the same service lev el for all information reports it receiv es in equilibrium, and (iii) this service lev el equals \( s_{ni} \). The retailer’s faces the follo wing maximization problem

\[
\max_{s \in [0, \bar{s}]} E \left[ \xi + \epsilon \mid \hat{\xi}, b_{ni} \right] s (p - w) - \frac{1}{2} ks^2. \tag{24}
\]

The objective function in Equation (24) is strictly concave in \( s \). Therefore, the retailer’s strategy must be a pure strategy. In any PBE, the man ufacturer’s equilibrium strategy is sequen tially rational if

\[
\text{supp} \left( g_{\xi} (\hat{\xi}; \xi) \right) \subseteq \arg \max_{\xi \in \Omega} \xi \cdot h_{\xi} (\hat{\xi}) \cdot w = \arg \max_{\xi \in \hat{\Omega}} h_{\xi} (\hat{\xi}). \tag{25}
\]

The RHS of Equation (25) is well-defined by our assumption that an equilibrium exists. It also follows from Equation (25) that \( h_{\xi} (\hat{\xi}) \) must be the same for any \( \hat{\xi} \in \text{supp} \left( g_{\xi} (\hat{\xi}; \xi) \right) \). In fact, since the RHS of Equation (25) is independent of \( \xi \), \( h_{\xi} (\hat{\xi}) \) should be the same for any \( \hat{\xi} \in \hat{\Omega} \). Since the retailer’s posteri or beliefs must be consistent in equilibrium, we require that \( E[\xi \mid \hat{\xi}, b_{ni}] = E[\xi \mid \hat{\xi}] \). Further, its posterior expectation must be unbiased. Therefore,

\[
E_{\hat{\xi}} \left[ E[\xi \mid \hat{\xi}] \right] = E[\xi], \tag{26}
\]

Finally, since the retailer’s strategy is sequen tially rational, we have

\[
h_{\xi} (\hat{\xi}) = \max_{s \in [0, \bar{s}]} E \left[ \xi + \epsilon \mid \hat{\xi}, b_{ni} \right] s (p - w) - \frac{1}{2} ks^2 = \max_{s \in [0, \bar{s}]} E [\xi \mid s] s (p - w) - \frac{1}{2} ks^2 \tag{27}
\]

It follows from Equation (27) that, since \( h_{\xi} (\hat{\xi}) \) is the same for any \( \hat{\xi} \in \hat{\Omega} \), \( E[\xi \mid \hat{\xi}] \) must be the same for any \( \hat{\xi} \in \hat{\Omega} \). In turn, it follows from Equation (26) that \( E[\xi \mid \hat{\xi}] = E[\xi] = \mu \). Hence, \( h_{\xi} (\hat{\xi}) = s_{ni} \) from Equation (27). Thus, the PBE is uninformativ e.

To see that \( \hat{\xi} \) must be uncorrelated with \( \xi \) in any equilibrium, note that

\[
\text{Cov} \left( \hat{\xi}, \xi \right) = E \left[ \hat{\xi} \xi \right] - E \left[ \hat{\xi} \right] E \left[ \xi \right] = E_{\xi} \left[ E \left[ \hat{\xi} \xi \mid \hat{\xi} \right] \right] - E \left[ \hat{\xi} \right] E \left[ \xi \right], \tag{28}
\]

where we have substituted \( E[\xi \mid \hat{\xi}] = E[\xi] = \mu \) in the last step.
B.2 Advice Provision Equilibrium

We show that there always exists an equilibrium that leads to the outcome described in Theorem 1, and that all equilibria lead to the same outcome. We also show that \( \hat{s} \) is not correlated with \( \xi \) in any equilibrium. Define the following:

(i) Manufacturer’s advice strategy \( g_{AP} (\hat{s}; \xi) \in \Delta ([0, \bar{s}]) \) given its demand information \( \xi \);

(ii) Retailer’s posterior beliefs \( b_{AP} (\xi; \hat{s}) \in \Delta (\Omega) \) about \( \xi \) given the advice \( \hat{s} \);

(iii) Retailer’s service strategy \( h_{AP} (s; \hat{s}) \in \Delta ([0, \bar{s}]) \) given the advice \( \hat{s} \).

If the retailer’s service strategy is a pure strategy, then we denote it by \( h_{AP} (\hat{s}) \). Let \( E [\cdot | \hat{s}, b_{AP}] \) denote the retailer’s expectation given its posterior beliefs \( b_{AP} \) and advice \( \hat{s} \). Given the manufacturer’s advice strategy, the retailer’s posterior beliefs are consistent with Bayes’ rule. Given the retailer’s posterior beliefs, we have \( E [\xi | \hat{s}, b_{AP}] = E [\xi] = \mu \). The retailer’s strategy is sequentially rational if

\[
\hat{h}_{AP} (\hat{s}) \in \arg \max_{s \in [0, \bar{s}]} E [\xi + \epsilon | \hat{s}, b_{AP}] s (p - w) - \frac{1}{2} k s^2 = \{ s_{N1} \},
\]

which holds by construction. The manufacturer’s advice strategy is sequentially rational if

\[
\text{supp} (g_{AP} (\hat{s}; \xi)) \subseteq \arg \max_{\hat{s} \in [0, \bar{s}]} \xi \cdot s_{N1} \cdot w = \Omega ,
\]

which also holds by construction. Thus, an uninformative PBE always exists.

To establish that any PBE must be uninformative, we show: (i) the retailer follows a pure strategy for its service decision, (ii) the retailer sets the same service level for all advice it receives in equilibrium, and (iii) this service level equals \( s_{N1} \). The retailer’s faces the following maximization problem

\[
\max_{\hat{s} \in [0, \bar{s}]} E [\xi + \epsilon | \hat{s}, b_{AP}] s (p - w) - \frac{1}{2} k s^2 .
\]
The objective function in Equation (31) is strictly concave in \( s \). Therefore, the retailer’s strategy must be a pure strategy. In any PBE, the manufacturer’s strategy is sequentially rational if

\[
\text{supp} \left( g_{AP} (\hat{s} ; \xi) \right) \subseteq \arg \max_{\hat{s} \in [0, \bar{s}]} \xi \cdot h_{AP} (\hat{s}) \cdot w = \arg \max_{\hat{s} \in [0, \bar{s}]} h_{AP} (\hat{s}) .
\]  

(32)

The RHS of Equation (32) is well-defined by our assumption that an equilibrium exists. It follows from Equation (32) that \( h_{AP} (\hat{s}) \) must be the same for any \( \hat{s} \in \text{supp} \left( g_{AP} (\hat{s} ; \xi) \right) \). In fact, since the RHS of Equation (32) is independent of \( \xi \), \( h_{AP} (\hat{s}) \) should be the same for any \( \hat{s} \in \hat{S} \). Since the retailer’s posterior beliefs must be consistent in equilibrium, we require that \( E [\xi | \hat{s}, b_{AP}] = E [\xi | \hat{s}] \). Further, its posterior expectation must be unbiased. Therefore,

\[
E_{\hat{s}} [E [\xi | \hat{s}]] = E [\xi] ,
\]  

(33)

Finally, since the retailer’s strategy is sequentially rational, we have

\[
h_{AP} (\hat{s}) = \max_{s \in [0, \bar{s}]} E [\xi + \epsilon | \hat{s}, b_{AP}] s (p - w) - \frac{1}{2} k s^2 = \max_{s \in [0, \bar{s}]} E [\xi | \hat{s}] s (p - w) - \frac{1}{2} k s^2
\]  

(34)

Since \( h_{AP} (\hat{s}) \) is the same for any \( \hat{s} \in \hat{S} \), it follows from Equation (34) that \( E [\xi | \hat{s}] \) must be the same for any \( \hat{s} \in \hat{S} \). In turn, it follows from Equation (33) that \( E [\xi | \hat{s}] = E [\xi] = \mu \). Hence, \( h_{AP} (\hat{s}) = s_{NI} \) from Equation (34). Thus, the PBE is uninformative.

To see that \( \hat{s} \) must be uncorrelated with \( \xi \) in any equilibrium, note that

\[
\text{Cov} (\hat{s}, \xi) = E [\hat{s} \xi] - E [\hat{s}] E [\xi] = E_{\hat{s}} [E [\hat{s} \xi | \hat{s}] - E [\hat{s}] E [\xi]] = E_{\hat{s}} [E [\xi | \hat{s}]] - E [\hat{s}] E [\xi] = 0,
\]  

(35)

where we have substituted \( E [\xi | \hat{s}] = E [\xi] = \mu \) in the last step.

B.3 Delegation Equilibrium

Let \( s_{DL} = g_{DL} (\xi; s_{lim}) \) denote the manufacturer’s best response given the retailer’s service limit \( s_{lim} \). We have

\[
g_{DL} (\xi; s_{lim}) \in \arg \max_{s_{DL} \in [0, s_{lim}]} \xi \cdot s_{DL} \cdot w = \{ s_{lim} \} .
\]  

(36)
Therefore, $g_{DL}(\xi; s_{lim}) = s_{lim}$. The retailer’s optimal limit is given by

$$
\arg \max_{s_{lim} \in [0, s]} E[\xi + \epsilon | s_{lim}] (p - w) - \frac{1}{2} k s_{lim}^2 = \{ s_{N1} \}.
$$

(37)

**Appendix C  Robust Regression for Coordination of Channel Decisions**

Despite there being no evidence of trusting and trustworthy behaviors in DL, we observe from Table 1 that the sensitivity of retail service level to demand information is relatively high. We find that this is due to a few outlier observations that unduly affect the estimate for sensitivity. Consequently, the estimate for the coefficient of $DL \cdot \xi$ in Equation (17) is also affected by these outliers. To tackle the outliers without dropping them from the data, we estimate Equation (17) using a robust regression without participant-specific random shocks. The robust regression estimation procedure assigns lower weight to observations that have undue influence on the estimates. Table 10 presents the robust regression results. We observe that the estimates are similar to those in Table 6 (which are obtained from estimating Equation (17) after excluding the five observations in DL that are assigned zero weight by the robust regression procedure).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate (Standard Error)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>$22.23^{**}$ (2.85)</td>
</tr>
<tr>
<td>$IS$</td>
<td>-3.21 (3.84)</td>
</tr>
<tr>
<td>$DL$</td>
<td>$13.22^{**}$ (3.86)</td>
</tr>
<tr>
<td>$IS \cdot \xi$</td>
<td>0.05 (0.09)</td>
</tr>
<tr>
<td>$DL \cdot \xi$</td>
<td>$-0.28^{**}$ (0.08)</td>
</tr>
<tr>
<td>$\xi$</td>
<td>$0.29^{**}$ (0.06)</td>
</tr>
<tr>
<td>$b$</td>
<td>0.77 (0.17)</td>
</tr>
<tr>
<td>$b'$</td>
<td>-0.01 (0.14)</td>
</tr>
<tr>
<td>$t$</td>
<td>0.35 (0.20)</td>
</tr>
</tbody>
</table>

** indicates $p \leq 0.01$

We also estimated the sensitivity of retail service level to demand information in DL after excluding the observations that are assigned zero weight by the robust regression procedure. We find that the sensitivity is 0.02 and not significantly different from zero. This confirms that the sensitivity estimate in Table 1 is unduly influenced by outliers.
Appendix D  Additional Analysis

D.1 Retailer Profits in DL

Let $\Delta \Pi_R = \Pi_R (s, \xi) - \Pi_R (s_{ni}, \xi)$ denote the retailer’s incremental expected profit relative to its expected profit under the uninformed service level. We estimate the following random-effects regression for incremental expected profits

$$\Delta \Pi_{R,it} = \alpha_0 + \alpha_1 b_i + \alpha_2 t + \varepsilon_i + \eta_{it}.$$  (38)

We find that the intercept is significantly negative. Specifically, the intercept (standard error) is -192.01 (54.66) and $p < 0.01$.

D.2 Trust and Trustworthiness Types

We use random-effects regressions to account for possible within-participant correlation to perform the statistical tests comparing the behaviors of the different trust types and trustworthiness types. We use a regression with indicator variables for the behavioral types, and saints and believers serving as the base types for the indicator variables. We test whether the coefficients of the indicator variables are significantly different than zero. We use Wald’s chi-squared test for a joint test of coefficients. In the interest of space, we only report the relevant test statistic in each case.

D.2.1 IS

Table 11 presents summary statistics for the trustworthiness types. We observe that saints inflate the least and scoundrels the most. Further, this pattern continues in the last 5 rounds, e.g., those participants who are on average saints continue to be saints over time. The trustworthiness types differ significantly in the extent of their inflation (Wald $\chi^2_2 = 95.38$, $p < 0.01$). In-betweens and scoundrels inflate significantly more than saints ($z = 3.47$ and $z = 9.64$ respectively, $p < 0.01$ in both cases). The significant difference in behaviors between types persists in the last five rounds (Wald $\chi^2_2 = 71.70$, $p < 0.01$). Thus, the trustworthiness classification captures stable patterns of behavior. This is also illustrated in Figure 2, which shows the average inflation for saints and scoundrels in each decision round. We observe that saints do not inflate much while scoundrels inflate close to the maximum extent possible (dashed line). We also note from Table 11 that the demand information that participants received does not differ significantly across the trustworthiness types (ANOVA $p = 0.57$). Thus, all participants faced similar demand conditions. Yet, they inflated their reports to different extents, which suggests that the
trustworthiness classification reflects participants’ inherent tendencies to be trustworthy.

Table 11: Summary Statistics for Trustworthiness Types in IS: Mean, [Median], (Standard Deviation)

<table>
<thead>
<tr>
<th></th>
<th>Saints</th>
<th>In-betweens</th>
<th>Scoundrels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation ($\hat{\xi} - \xi$)</td>
<td>0.47 [0] (5.10)</td>
<td>8.87 [5] (14.02)</td>
<td>24.14 [16.5] (19.24)</td>
</tr>
<tr>
<td>Inflation in last 5 rounds</td>
<td>0.60 [0] (5.90)</td>
<td>10.66 [8] (12.61)</td>
<td>30.45 [24] 19.71</td>
</tr>
<tr>
<td>Slope of $\hat{\xi}$ with $\xi$</td>
<td>0.98</td>
<td>0.64</td>
<td>0.31</td>
</tr>
<tr>
<td>Demand Information ($\xi$)</td>
<td>45.18 [51] (22.0)</td>
<td>42.72 [44] (20.9)</td>
<td>41.33 [35] (19.80)</td>
</tr>
</tbody>
</table>

Notes: 12 participants per type.

Figure 2: Average Inflation across Rounds in IS: Saints vs. Scoundrels

Table 12 presents summary statistics for the trust types. We observe that believers deflate the least, and skeptics deflate the most, and this pattern continues in the last 5 rounds. The trust types differ significantly in their deflation (Wald $\chi^2_2 = 86.07$, $p < 0.01$). In-betweens and skeptics deflate their reports significantly more than believers ($z = 3.28$ and $z = 9.14$ respectively, $p < 0.01$ in both cases). The significant difference in behaviors between types persists in the last five rounds (Wald $\chi^2_2 = 44.72$, $p < 0.01$). Thus, the trust classification captures stable patterns of behavior. This is illustrated in Figure 3, which shows the average deflation for believers and skeptics in every decision round. We observe that skeptics consistently deflate more than believers do. We also note from Table 12 that the trust types do not differ significantly in the information report that they receive (ANOVA $p = 0.47$) or the inflation in the received reports (ANOVA $p = 0.91$). Hence, the three types faced similar conditions. But they differ significantly in their behaviors, which suggests that the trust classification reflects participants’ inherent tendencies to be trusting.
Table 12: Summary Statistics for Trust Types in IS: Mean [Median] (Standard Deviation)

<table>
<thead>
<tr>
<th></th>
<th>Believers</th>
<th>In-betweens</th>
<th>Skeptics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deflation ($\hat{s}_p - s$)</td>
<td>5.77 [4]</td>
<td>14.6 [14]</td>
<td>30.2 [34]</td>
</tr>
<tr>
<td>Slope of $s$ with $\hat{\xi}$</td>
<td>0.76</td>
<td>0.51</td>
<td>0.19</td>
</tr>
<tr>
<td>Manufacturer’s Report ($\hat{\xi}$)</td>
<td>51.7 [54]</td>
<td>54.5 [56]</td>
<td>56.0 [67]</td>
</tr>
</tbody>
</table>

Notes: 12 participants per type.

Figure 3: Average Deflation across Rounds in IS: Believers vs. Skeptics

D.2.2 AP

Table 13 presents summary statistics for the trustworthiness types. We observe that saints inflate the least and scoundrels the most, and this pattern continues in the last 5 rounds. The trustworthiness types differ significantly in their inflation (Wald $\chi^2 = 61.67, p < 0.01$). In-betweens and scoundrels inflate significantly more than saints ($z = 2.06, p = 0.04$; and $z = 7.60, p < 0.01$ respectively). The significant difference between types persists in the last five rounds (Wald $\chi^2 = 24.04, p < 0.01$). We also note from Table 13 that the demand information that participants received does not differ significantly across the trustworthiness types (ANOVA $p = 0.99$). The persistent difference in behaviors despite facing similar demand conditions suggests that the trustworthiness classification reflects participants’ inherent tendencies to be trustworthy.

As explained at start of §D.2, we use random-effects regressions for comparisons and only report the key test statistic.
Table 13: Summary Statistics for Trustworthiness Types in AP: Mean [Median] (Standard Deviation)

<table>
<thead>
<tr>
<th></th>
<th>Saints</th>
<th>In-betweens</th>
<th>Scoundrels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation ($\hat{s} - s_i(\xi)$)</td>
<td>5.15 [5] (6.92)</td>
<td>13.91 [12] (11.5)</td>
<td>37.42 [22.5] (40.2)</td>
</tr>
<tr>
<td>Inflation in last 5 rounds</td>
<td>5.83 [4] (7.54)</td>
<td>17.79 [14] (12.35)</td>
<td>44.19 [22] (51.41)</td>
</tr>
<tr>
<td>Slope of $\hat{s}$ with $\xi$</td>
<td>1.05</td>
<td>0.78</td>
<td>0.79</td>
</tr>
<tr>
<td>Demand Information ($\xi$)</td>
<td>43.3 [44] (21.5)</td>
<td>43.2 [44] (19.9)</td>
<td>42.8 [44] (21.5)</td>
</tr>
</tbody>
</table>

Notes: 12 participants per type.

Table 14 presents the summary statistics for the trust types. We observe that believers deflate the least, and skeptics deflate the most, and this pattern persists in the last 5 rounds. The trust types differ significantly in their deflation (Wald $\chi^2 = 30.87$, $p < 0.01$). In-betweens and skeptics deflate their reports significantly more than believers ($z = 1.79$, $p = 0.07$; and $z = 5.52$, $p < 0.01$ respectively). The significant difference in behaviors between types persists in the last five rounds (Wald $\chi^2 = 40.74$, $p < 0.01$). Thus, the trust classification captures stable patterns of behavior. As shown in Table 14, the advice that skeptics receive is significantly more inflated compared to that of believers ($p < 0.01$). Specifically, skeptics are more likely to have received advice that cannot be optimal irrespective of the demand information (i.e., $\hat{s} > s_i(\tilde{\xi})$). Skeptics receive such highly inflated advice in 31% of the instances compared to 3% for believers. Thus, to some degree, the higher deflation by skeptics could be because of the higher inflation in the advice they receive. Nevertheless, skeptics deflate even advice that is not as highly inflated by a larger amount compared to believers. In the remaining instances, in which $\hat{s} \leq s_i(\tilde{\xi})$, there is no significant difference in inflation in the advice received by either type ($p = 0.37$). But skeptics deflate their advice significantly more than believers even in these remaining instances (20.9 units vs. 6.17 units, $z = 4.30$ and $p < 0.01$).

Table 14: Summary Statistics for Trust Types in AP: Mean [Median] (Standard Deviation)

<table>
<thead>
<tr>
<th></th>
<th>Believers</th>
<th>In-betweens</th>
<th>Skeptics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deflation ($\hat{s} - s$)</td>
<td>6.78 [6]  (18.1)</td>
<td>20.2 [15]  (26.0)</td>
<td>42.8 [35] (42.9)</td>
</tr>
<tr>
<td>Deflation in last 5 rounds</td>
<td>5.13 [6]  (18.6)</td>
<td>6.52 [3]   (10.6)</td>
<td>47.6 [30] (53.9)</td>
</tr>
<tr>
<td>Slope of $s$ with $\hat{s}$</td>
<td>0.46</td>
<td>0.26</td>
<td>0.03</td>
</tr>
<tr>
<td>Manufacturer’s Advice ($\hat{s}$)</td>
<td>53.4 [59] (21.4)</td>
<td>58.3 [57] (30.2)</td>
<td>74.1 [68] (41.9)</td>
</tr>
<tr>
<td>Inflation in Advice ($\hat{s} - s_i(\xi)$)</td>
<td>11.0 [7] (12.8)</td>
<td>15.0 [10] (19.9)</td>
<td>30.5 [15] (40.1)</td>
</tr>
</tbody>
</table>

Notes: 12 participants per type.
D.2.3 DL

Table 15 provides the summary statistics for the trust types. Believers provide significantly more leeway than in-betweens ($z = -2.91, p < 0.01$) and skeptics ($z = -6.87, p < 0.01$).\textsuperscript{17} We also observe that believers provide less leeway in the last 5 rounds than in the earlier rounds. Essentially, some believers set relatively high service limits in the initial rounds and are “exploited” by manufacturers (who set high service levels). Subsequently, these believers set lower service limits. Nevertheless, believers still provide significantly higher leeway than skeptics ($z = -4.37, p < 0.01$) in the last 5 rounds. We also find that the trust types did not experience significantly different demand conditions; the expected demand level $\xi$ does not differ significantly across the types (ANOVA $p = 0.91$).

Table 15: Summary Statistics for Trust Types in DL: Mean [Median] (Standard Deviation)

<table>
<thead>
<tr>
<th></th>
<th>Believers</th>
<th>In-betweens</th>
<th>Skeptics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leeway ($s_{lim} - s_{ni}$)</td>
<td>15.32 [5] (45.40)</td>
<td>-4.2 [0] (7.31)</td>
<td>-18.09 [-15] (11.44)</td>
</tr>
<tr>
<td>Leeway in last 5 rounds</td>
<td>-2.79 [0] (13.67)</td>
<td>-3.58 [0] (7.30)</td>
<td>-17.23 [-15] (10.73)</td>
</tr>
<tr>
<td>Expected Demand ($\xi$)</td>
<td>42.28 [44] (20.26)</td>
<td>43.88 [44] (21.81)</td>
<td>43.17 [44] (20.91)</td>
</tr>
</tbody>
</table>

Notes: 12 participants per type.

D.3 How Retailer Trust Type Affects Whether Manufacturer Benefits from Assistance

Let $\Delta \Pi_M = \Pi_M (s, \xi) - \Pi_M (s_{ni}, \xi)$ denote the manufacturer’s incremental expected profit relative to its expected profit under the uninformed service level. In each treatment, we estimate the following regression for manufacturer participant $i$ paired with a believer in decision round $t$

$$\Delta \Pi_{M, it} = \alpha_0 + \alpha_1 b_i + \alpha_2 t + \varepsilon_i + \eta_{it}, \quad (39)$$

We find that the intercept is significantly positive in IS and AP. Specifically, the intercepts (standard errors) are: 131.54 (44.58) in IS, $p < 0.01$; 100.91 (43.89) in AP, $p = 0.02$; -8.48 (40.52) in DL, $p = 0.834$. Estimating the same regression for manufacturers paired with skeptics, the intercept is significantly negative in all treatment conditions. Specifically, the intercepts (standard errors) are: -392.94 (36.90) in IS, $p < 0.01$; -279.6 (40.23) in AP, $p < 0.01$; -413.88 (44.16) in DL, $p < 0.01$.

\textsuperscript{17}As explained at start of D.2, we use random-effects regressions for comparisons and only report the key test statistic.
D.4 How Retailer Trust Type Affects Whether Retailer Benefits from Assistance

In each treatment, we estimate the regression in Equation (38) for believers, and then for skeptics. For believers, we find that the intercept is significantly positive in IS and AP. Specifically, the intercepts (standard errors) are: $83.31 (33.14), p = 0.01$ in IS; $58.09 (29.29), p = 0.05$ in AP; $15.13 (28.89), p = 0.60$ in DL. For skeptics, the intercept is significantly negative in all treatment conditions. Specifically, the intercepts (standard errors) are: $-158.54 (44.27), p < 0.01$ in IS; $-125.91 (43.28), p < 0.01$ in AP; $-232.44 (59.94), p < 0.01$ in DL.

D.5 Estimation Results for Retailer Profits for Each Trust Type in IS and AP

Table 16: Impact of Trustworthiness Types on Retailer Profits: Estimate (Standard Error)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Believers</th>
<th>Skeptics</th>
<th>Believers</th>
<th>Skeptics</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS</td>
<td>-846.37** (57.10)</td>
<td>-414.97** (115.63)</td>
<td>-1029.56** (141.78)</td>
<td>-557.93** (134.39)</td>
</tr>
<tr>
<td>AP</td>
<td>-202.22** (86.34)</td>
<td>35.43 (89.70)</td>
<td>-155.11+ (92.37)</td>
<td>45.07 (103.70)</td>
</tr>
<tr>
<td>IS</td>
<td>-301.75** (93.37)</td>
<td>-21.14 (83.64)</td>
<td>-174.17 (142.63)</td>
<td>-54.21 (95.10)</td>
</tr>
<tr>
<td>AP</td>
<td>46.04** (1.71)</td>
<td>26.55** (1.54)</td>
<td>48.16** (2.15)</td>
<td>32.63** (1.72)</td>
</tr>
<tr>
<td>t</td>
<td>4.67 (10.93)</td>
<td>4.98 (10.49)</td>
<td>-6.97 (14.03)</td>
<td>-4.56 (12.03)</td>
</tr>
</tbody>
</table>

**indicates $p \leq 0.01$, * indicates $p \leq 0.05$, + denotes $p \leq 0.1$.

D.6 Retailer Exit Survey Results

Table 17: Exit Survey Measures by Trust Types: Mean [Median] (Standard Deviation)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Types</th>
<th>Economic Motive</th>
<th>Other’s Interest</th>
<th>Sacrifice Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In-betweens</td>
<td>6.42 [6] (0.51)</td>
<td>2.67 [2] (1.50)</td>
<td>2.08 [2] (1.24)</td>
</tr>
<tr>
<td></td>
<td>Skeptics</td>
<td>5.83 [6] (1.70)</td>
<td>2.50 [2.5] (1.38)</td>
<td>1.83 [2.5] (1.03)</td>
</tr>
<tr>
<td></td>
<td>In-betweens</td>
<td>6.08 [7] (1.16)</td>
<td>2.17 [2] (1.27)</td>
<td>1.92 [1.5] (1.31)</td>
</tr>
<tr>
<td></td>
<td>Skeptics</td>
<td>5.75 [7] (1.81)</td>
<td>3.75 [4] (1.48)</td>
<td>2.08 [2] (1.24)</td>
</tr>
<tr>
<td>DL</td>
<td>Believers</td>
<td>5.75 [6] (1.54)</td>
<td>3.17 [2.5] (2.17)</td>
<td>2.58 [2.5] (1.88)</td>
</tr>
<tr>
<td></td>
<td>In-betweens</td>
<td>5.83 [7] (2.04)</td>
<td>2.67 [1.5] (2.06)</td>
<td>2.25 [2] (1.36)</td>
</tr>
<tr>
<td></td>
<td>Skeptics</td>
<td>6.42 [7] (0.79)</td>
<td>2.92 [3] (1.73)</td>
<td>2.58 [2.5] (1.68)</td>
</tr>
</tbody>
</table>

Notes: 12 participants per type.