

Bucknell University

Bucknell Digital Commons

Faculty Journal Articles

Faculty Scholarship

Fall 11-12-2018

A Review and Analysis of Service Level Agreements and Chargebacks in the Retail Industry

Chun-Miin (Jimmy) Chen
Bucknell University

Follow this and additional works at: https://digitalcommons.bucknell.edu/fac_journ



Part of the [Business Administration, Management, and Operations Commons](#)

Recommended Citation

Chen, C.M.J. (2018), "A review and analysis of service level agreements and chargebacks in the retail industry", *The International Journal of Logistics Management*, Vol. 29 No. 4, pp. 1325-1345.
<https://doi.org/10.1108/IJLM-09-2016-0205>

This Article is brought to you for free and open access by the Faculty Scholarship at Bucknell Digital Commons. It has been accepted for inclusion in Faculty Journal Articles by an authorized administrator of Bucknell Digital Commons. For more information, please contact dcadmin@bucknell.edu.

A Review and Analysis of Service Level Agreements and Chargebacks in the Retail Industry

Chun-Miin (Jimmy) Chen

Freeman College of Management, Bucknell University

Published in *The International Journal of Logistics Management*

DOI: <https://doi.org/10.1108/IJLM-09-2016-0205>

Please cite as:

Chen, C.M.J. (2018), "A review and analysis of service level agreements and chargebacks in the retail industry", *The International Journal of Logistics Management*, Vol. 29 No. 4, pp. 1325-1345. <https://doi.org/10.1108/IJLM-09-2016-0205>

Deposit license:

This author accepted manuscript is deposited under a Creative Commons Attribution Non-commercial 4.0 International (CC BY-NC) licence. This means that anyone may distribute, adapt, and build upon the work for non-commercial purposes, subject to full attribution. If you wish to use this manuscript for commercial purposes, please contact permissions@emerald.com.

A Review and Analysis of Service Level Agreements and Chargebacks in the Retail Industry

Chun-Miin (Jimmy) Chen

Freeman College of Management, Bucknell University, Lewisburg, Pennsylvania 17837

jimmy.chen@bucknell.edu

April 5, 2018

ABSTRACT

Purpose – This study examines service level agreements (SLAs) in the retail industry and uses empirical data to draw conclusions on relationships between SLA parameters and retailer financial performance.

Design/methodology/approach – Based on prior SLA theories, hypotheses about the impacts of SLA confidentiality, choice of chargeback mechanisms, and chargeback penalty on retailer inventory turnover are tested.

Findings – Retailer inventory turnover could vary by the level of SLA confidentiality, and the variation of retailer inventory turnovers could be explained by chargeback penalty.

Research limitations/implications – The research findings may not be readily applicable to SLAs outside of the retail industry. Also, most conclusions were drawn from publicly available SLAs.

Practical implications – The significant relationships between SLA parameters and retailer inventory turnover imply that a retailer could improve its financial performance by leveraging its SLA design.

Originality/value – Not only does this study contribute to the understanding of retail SLA design in practice, but it also extends prior theories by investigating the implications of SLA design on retailer inventory turnover.

Keywords Supplier relations; Supply chain management; Retailing; Order fulfillment

Paper type Research paper

1 INTRODUCTION

“Vendor compliance is imperative to our collective success” (Macy’s, 2017). Retail supply chains are increasingly reliant on vendors’ demand-fulfillment compliance (Craig *et al.*, 2015). Many retailers improve the effectiveness and efficiency of inbound logistics by maintaining a vendor compliance guide that clarifies the expectations of order fulfillment (Terry, 2013). For example, Tiffany & Co. implemented a vendor compliance program to provide a single-source reference for packaging, routing, and documentation procedures for a large number of small craft shops that have little logistics expertise (Bradley, 2001). In practice, the key aspect of a vendor compliance guide is often the service level agreement (SLA), a host of requirements with key performance indicators for demand-fulfillment expectations (Douglas, 2006; Friedman and Yazdi, 2010; Douglas, 2012; Inbound Logistics, 2014). The expectations often include, but are not limited to, on-time delivery and fill rate measured over some finite time horizon (Whipple and Russell, 2007). In recent decades, more and more retailers have designed requirements based on their needs and charge noncompliant vendors a penalty. The professional journals in the areas of supply chain management and logistics are never short on topics about retailers’ use of SLA parameters or chargebacks (Katz, 2003; Manrodt and Vitasek, 2008; Gilmore, 2010; Douglas, 2012; Terry, 2013; Inbound Logistics, 2014; Attain Consulting Group, 2015). Retailers have no restrictions when designing SLA parameters, and from the vendors’ perspective, chargebacks are out of control. The purpose of this study is to analyze, in the presence of chargebacks, how a retailer’s design of SLA parameters might in return affect its own financial performance.

In general, SLAs stipulate a retailer's minimum standards for acceptable shipment arrival dates and shipment completeness. Additionally, retailers often specify contingent penalties in SLAs as motivation for vendors to follow any mutually agreed-upon standards (Simatupang and Sridharan, 2002). As such, retailers believe that SLAs can improve the efficiency of the inbound logistics and material handling processes (CVS, 2016). For example, if shipments arrive after the required date or if the fill rate is less than the required target, then the retailer could deduct from the vendor payment according to the penalty specified in the SLA – a vendor chargeback, which is essentially revenue for retailers. Noncompliant vendors often fight chargebacks in order to recover revenues deducted by retailers (RetailingToday, 2014). Attain Consulting Group (2015) surveyed more than 500 companies and found that *on-time* or *on-target* requirements in an SLA are common triggers of vendor chargebacks. On-time requirements typically refer to a due date by which the shipment must arrive, whereas on-target requirements typically refer to a percentage of the purchased quantity filled over a finite review horizon. The retail industry relies on SLAs and vendor chargebacks to ensure uniformity in receiving inbound shipments from vendors. For example, Dollar Tree (2015) stated that failures to comply with the SLA, such as the inability to ship on time, could result in charges to the vendor. Boscov's Department Store (2015) kept an expense-offset list of routing guide violations; failure to comply with the shipping requirements would result in the violation fees indicated.

The objective of this empirical study is twofold. First, this study aims to offer an overview of SLA parameters in the retail industry. A vendor compliance document is often classified as confidential because the document may include the retailer's proprietary information. Thus, the actual design of SLA parameters and chargebacks in the retail industry has not been common knowledge among researchers. An initial review of some sampled SLAs indicates that SLAs tend to differ with respect to requirements and chargebacks. Considering that consultants and organizations offer tutorials to vendors on how to navigate increasingly complicated SLA requirements, uniformity of SLA parameters does

not seem to be the case in practice (Katz, 2016; Retail Value Chain Federation, 2017; Boyle, 2017). The second objective is to investigate the implications of SLA parameters on retailer financial performance. Prior studies theorized that well-designed SLA parameters can effectively coordinate a supply chain. In this study, we explore another facet of SLAs by investigating (1) the implication of SLA confidentiality and parameters on retailer financial performance and (2) how much SLA parameters and chargebacks can help explain the variation of retailer financial performance.

This article is organized as follows. In Section 2, we contextualize the empirical background of vendor compliance. In Section 3, specific SLA parameters considered in this study are explained. In Section 4, we introduce relevant theories and develop hypotheses to be tested. In Section 5, we describe the methodology for data collection and processing. In Section 6, we conduct the data analysis and report the results. In Section 7, analysis results are discussed to offer insights into improving SLA design. In Section 8, implications of the study results are presented to offer some guidance on improving SLA design, along with the conclusion of this study.

2 EMPIRICAL CONTEXT

Dating back to the 1970s, the first vendor chargeback appeared in the apparel business (Hays, 2001). Since then, the practice of vendor chargebacks has become increasingly common in many other industries, while vendors were usually at a weaker position to dispute any questionable chargebacks (Hays, 2001; Roubos *et al.*, 2012). This seemingly unfair chargeback practice between retailers and vendors was mostly the case until 2005, when famous apparel retailer Saks Fifth Avenue was involved in high-profile federal investigations initiated by its clothing vendors (Rozhon, 2005a; Byron, 2005). In 2005, many of Saks's vendors were outraged by the constant lack of transparency in Saks's chargeback practices (Rozhon, 2005b). Specifically, Saks was accused of improperly collecting approximately \$20 million in chargebacks from its vendors for reasons such as short shipments, late deliv-

eries, mismarked merchandise, and improper packaging (Rozhon, 2005c; O’Connell, 2007). Facing an onslaught of vendor complaints and federal investigations, the department store conducted an internal investigation and announced that it would return at least \$21.5 million to its vendors. Despite the reimbursements, Saks was still taken to court due to the lack of appropriate records justifying the chargebacks made. Two years later, Saks settled the lawsuits and returned an undisclosed amount of money to some of the vendors (Barbaro, 2007; O’Connell, 2007). Similar stories with Dillard’s and Federated Department Stores (now Macy’s) were also reported (Rozhon, 2005d). In the wake of the highly publicized investigations into Saks’s practices, the retailer-vendor atmosphere gradually changed in vendors’ favor. Notably, retailers have since begun to provide more governing transparency by supplying comprehensive vendor compliance instructions or SLAs that describe demand-fulfillment expectations and chargeback policies.

But the transparency afforded by SLA documentation does not stop retailers from designing SLAs in self-serving ways. In general, demand-fulfillment requirements are tailored to retailers’ needs (Friedman and Yazdi, 2010). In addition to common expectations such as on-time delivery and fill-rate target, retailers can use many other means of measuring how a purchase order is fulfilled (Novack and Thomas, 2004; Manrodt and Vitasek, 2008). Although SLA chargebacks have a laudable purpose of improving supply chain and operations efficiency, vendors tend not to talk openly with retailers about chargebacks if they are still doing business with the retailers (Hays, 2001). This reticence could have allowed retailers to increase requirements and chargebacks without restraints. Hence, it is not surprising that concern began to build among vendors that the practice of vendor chargebacks was being abused (Gilmore, 2010). Discussions about vendor compliance and chargeback policies have continued in recent years (Daugherty *et al.*, 2010; Friedman and Yazdi, 2010; Douglas, 2012; Terry, 2013; Inbound Logistics, 2014; Boyle, 2017). On the contrary, reports about actual applications of chargebacks are not as common. Understandably, SLA chargebacks take place only if something goes wrong, and neither the retailer nor the ven-

dor would be proud of such incidents. Nonetheless, Altaner (1998) revealed that clothing vendors constantly got hit with chargeback penalties paid to their retail store chains when instructions were not followed. For more anecdotes about SLA chargebacks, please see Table 4 in the Appendix.

SLAs may not be a binding contract between vendor and retailer without complementary enforcing mechanisms that serve to deter vendors' opportunistic behavior against the SLA requirements (Skjoett-Larsen, 1999; Schneeweiss and Zimmer, 2004; Ogden and Carter, 2008; Raue and Wieland, 2015). The literature indicates that enforcements fall into two categories: *implicit consequences* (e.g., business relationship) and *explicit chargebacks* (e.g., financial penalties) (Charron, 2006; Chain Store Age, 2016). An implicit consequence typically entails decreased promotional priority, less prominent or reduced shelf space, reduced business opportunities, revoked vendor status, or future financial penalties (Wilkinson, 1996; Chain Store Age, 2003; Ryan, 2010). For example, The Bon-Ton Stores (2015) stated that vendors would not be back-charged for failing to meet a fill-rate target, but unacceptable fill rates could jeopardize the business relationship and/or generate future chargebacks. Advance Auto Parts (2015) stated that repeated failures to meet order-fill and lead times could result in loss of supplier status. Publix Super Markets (2005) stated that noncompliance jeopardizes the business relationship and could result in a reduction and/or termination of business activity. Nonetheless, anecdotal evidence suggests that retailers favor explicit chargebacks over implicit consequences for better control of a vendor's logistics performance. For example, Walmart has enforced vendor compliance with respect to its supply chain reliability program by adopting explicit chargebacks (Cassidy, 2010; Boyle, 2017). Thus, this study focuses on SLAs with explicit chargebacks.

3 SERVICE LEVEL AGREEMENT PARAMETERS

A stream of empirical studies on the use of SLAs can be related to our study. Groves and Valsamakis (1998) compared performance measures under the influence of various types

of vendor-customer relationships. Forslund (2007) suggested that formulations, updates, and measures of logistics performance can be joint efforts between vendor and customer. Forslund (2009) showed that the design of SLA parameters or chargebacks can vary by the industry or by the firm. Forslund (2012) indicated that logistics performance measures could be similar among logistics service providers, but the service level target can be different. On the one hand, these studies demonstrated the academic interest in SLA parameters. On the other hand, a review of retail SLAs in practice and links between SLA parameters and retailer financial performance remain to be addressed in the literature.

3.1 Service Level Requirements

In this study, on-time requirements pertain to meeting a specified delivery due date. Teng and Jaramillo (2005) illustrated on-time delivery as a common expectation of vendors on which their performance is evaluated. Wang and Yan (2009) incorporated a penalty cost charged to the supplier for each customer order not fulfilled on time. van de Klundert and Wormer (2010) minimized the number of customers (i.e., implicitly assuming a lump-sum penalty for each noncompliance delivery) whose waiting time exceeded the threshold values specified in the SLAs. In practice, acceptable deliveries have to be made by some prespecified due date that appears on the purchase order or by a number of days after the due date, which is the so-called grace period (Lee *et al.*, 2001; Jaruphongsa *et al.*, 2004). An initial observation of sampled SLAs suggests that retailers tend to omit information about grace periods in their SLAs. Thus, this study will focus on on-time requirements and the consequences of late delivery.

We also considered on-target requirements, or fill-rate targets, which specify the completeness or accuracy of the expected shipment quantity across the delivery (or deliveries) as specified on the purchase order. On-target noncompliance events have been recognized as one of the common non-correctable fulfillment errors in the retail industry (Craig *et al.*, 2015). The fill rate of a finite review horizon has been extensively studied in the litera-

ture. Chen *et al.* (2003) and Banerjee and Paul (2005) investigated the distributions of the expected fill rate as a function of the review horizon. Thomas (2005) demonstrated the impacts of the relationship between the length of the review horizon and the fill rate on inventory decisions. Durango-Cohen and Yano (2006) studied how the supply chain could be coordinated under the vendor chargeback that is a function of the fill rate. Other applications of fill rate in the context of inventory management can be found in Guijarro *et al.* (2012).

3.2 Noncompliance Chargebacks

An explicit chargeback (hereafter “chargeback”) is some financial penalty either deducted from the payments or separately charged to the vendor to discourage the vendor’s demand-fulfillment errors (Craig *et al.*, 2016). Albeit undesirable, chargebacks are supposedly the most straightforward way to motivate vendors to adhere to SLA requirements (Frazelle, 1998; Putka, 2000). A survey of 100 top retail and consumer goods companies showed that 67% of participants used chargebacks if the vendors failed to meet SLA requirements (Business Wire, 2007). One common justification for imposing chargebacks is to offset the retailer’s administrative costs or operating losses associated with processing noncompliant deliveries (Buckle, 2015). Sieke *et al.* (2012) and Liang and Atkins (2013) both proved that contracts with chargebacks can coordinate a supply chain. Ryall *et al.* (2009) empirically found that high-technology firms’ contracts could be more detailed and more likely to include chargebacks when engaging in frequent deals with trading partners.

Chargebacks are typically either *variable-fee* or *flat-fee* penalties. Specifically, the variable-fee penalty varies with the quantity or percentage by which actual performance is below target performance, whereas the flat-fee penalty does not change according to the extent by which actual performance deviates from the target. SLA examples of variable-fee penalties are as follows: Big Lots (2015) stated that for a purchase order that was not shipped on time, the deduction amount would be \$250 plus up to 6% of the invoice

amount, depending on the number of delayed days. Pep Boys (2011) charges 5% of cost on items not shipped if the fill rate falls below the target. Examples of flat-fee penalties are as follows: A retail bookseller (for confidentiality reasons, the name is hidden but available upon request) specifies that the fill-rate target is 100% and the penalty cost per order if the delivery quantity is under the purchased quantity is \$200. A drugstore chain (name available upon request) stated that a purchase order would be considered noncompliant and would result in a \$150 penalty per purchase order if less than 96% of total quantities ordered were not delivered by the due date.

To summarize, Figure 1 visualizes the structure of the SLA parameters under consideration in this study.

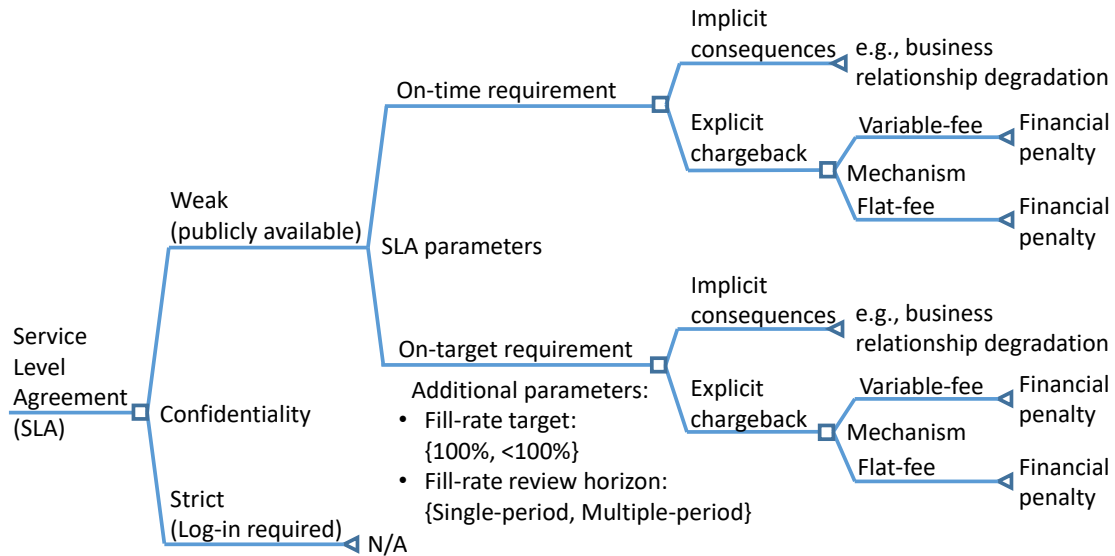


Figure 1: Simplified SLA characteristics and parameters

4 HYPOTHESIS DEVELOPMENT

Known purposes of a retailer's SLA is to standardize, streamline, and optimize the retailer's inbound logistics. Furthermore, it is generally believed that effective inbound logistics services enable retailers to improve their financial performance because they are able to offer better product availability to their end consumers (Groves and Valsamakis, 1998; Christensen *et al.*, 2007; Toyli *et al.*, 2008). Thus, we plan to investigate the potential links between SLA parameters and retailer financial performance. Throughout the analysis, retailer inventory turnover, a common financial indicator in the retail industry, is considered a performance variable, whereas the SLA parameters and chargebacks are considered explanatory variables.

4.1 SLA Confidentiality

In practice, a retailer is not obliged to publish its SLA. As a result, many retailers archive their SLAs on dedicated web space where only preapproved vendors can log in and access the SLA-related documents. In this case, the SLAs are not shared with entities outside the retailers' supply chains, including competing retailers. Some SLAs are available in the public domain, whether or not those SLAs proclaim to be confidential. These SLAs are shared not only within but also outside the retailers' supply chains, including with competing retailers. For the purpose of this study, we define SLAs that are unavailable in the public domain as *strictly confidential* SLAs. Conversely, we define SLAs that are available in the public domain as *weakly confidential* SLAs.

Regardless of the level of SLA confidentiality, a retailer's SLA is to be vertically shared with the trading partners within its supply chain. Vertically sharing SLA information across a firm's own supply chain can drive the firm toward collaborative business models and improve logistics or financial performances (Fawcett *et al.*, 2007; Blankley, 2008; Biotto *et al.*, 2012). Mason-Jones and Towill (1997) and Mason-Jones and Towill (1999) substantiated the tremendous benefits of information sharing and advocated the necessity

of information sharing throughout the supply chain. In addition to the expansive empirical studies, analytical studies such as Lee *et al.* (2000) and Cachon and Fisher (2000) theoretically quantified the benefits of information sharing in a supply chain as well. Blankley (2008) studied how financial gains are realized as the result of investments in supply chain management technology. Moreover, Blankley (2008) constructed a chronological model that neatly laid out the causalities related to our study: a firm's information sharing can lead to operational improvements, which can improve the firm's inventory investment and logistics measures (e.g., fill rates and lead times), which consequently improves the firm's financial performance. As such, the positive effect that the vertical sharing of SLA information has on a retailer's financial performance is not of concern in this study.

But little is known about the effects of sharing SLA information with competing retailers on a retailer's own financial performance. Li (2002) stated that sharing market demand or own cost information with competing retailers has uncertain impacts on the entities engaged in the information sharing. That is, in the presence of competition, obtaining additional information does not necessarily make the informed retailer better off, and giving away private information to other retailers does not necessarily make the original information holder worse off. Zhang (2002) considered the confidentiality of the shared information and analyzed retailer competitions under various game-theoretic settings. Moreover, one of the conclusions made by the author is that no information sharing is the unique equilibrium for both Cournot and Bertrand types of competition. Li and Zhang (2008) found that increasing the level of information confidentiality can alleviate double marginalization and hence benefit the supply chain as a whole. Many other articles on information sharing under horizontal competition also conclude that firms may not want to share demand information under competition (Anand and Goyal, 2009). Given the expansive studies of sharing demand information in the presence of competing retailers, we hypothesize that retailer financial performance could be affected by the level of SLA confidentiality in a certain way.

H1. Retailers with weakly confidential SLAs have lower inventory turnovers than retailers with strictly confidential SLAs.

4.2 Chargeback Mechanisms: Flat-fee versus Variable-fee

In the event of SLA noncompliance, the vendor facing a flat-fee penalty pays a fixed amount, whereas the vendor facing a variable-fee penalty pays a fee that is a function of the magnitude of the underperformance. While both chargeback mechanisms can be found in the literature, many supply chain management studies use variable-fee penalties as inventory underage or back-order costs when modeling supply chain coordination problems. Qi *et al.* (2009), Teunter *et al.* (2010), and Beutel and Minner (2012) minimized total supply chain costs consisting of inventory holding and penalty costs, and the latter can be modeled such that they are proportional to the shortage quantities. Relatively fewer studies have modeled a flat-fee penalty as part of the supply chain costs. Thomas (2005) used simulation to investigate the implications SLA review horizon has on the optimal base-stock level while assuming flat-fee penalties for the SLAs. Sieke *et al.* (2012) derived optimal SLA parameters and their interdependencies when the supply chain is coordinated by either a flat-fee or variable-fee penalty. Liang and Atkins (2013) compared the effectiveness of the chargeback mechanisms in coordinating a supply chain. Liang and Atkins (2013) concluded that a variable-fee penalty is more robust than a flat-fee penalty with respect to mitigating the strategic behavior of a vendor in fulfilling demands, which could increase the variance of the fill rates and hence negatively affect the retailer's product availability. Thus, we hypothesize that retailer inventory turnover would vary by SLA chargeback mechanism in a certain way.

H2a. For on-time requirements, the retailers setting a flat-fee penalty have lower inventory turnovers than the retailers setting a variable-fee penalty.

H2b. For on-target requirements, the retailers setting a flat-fee penalty have lower inventory turnovers than the retailers setting a variable-fee penalty.

4.3 Financial Penalty

Prior studies on SLA chargebacks tend to, for a given set of parameter values, focus on optimal penalties that can coordinate the supply chain. That is, the implication of the chargeback penalty variation is not always of concern. Nonetheless, some studies suggest that the magnitude of the penalty could positively affect the supplier's compliance, which then improves the retailer's inventory management. Zimmer (2002) illustrated that penalty costs not only compensate the shortage cost of the vendor but also influence the vendor's capacity decision. Ching *et al.* (2011) examined the service capacity problem in outsourcing supply chains. Moreover, the buyer can impose a fixed penalty on the vendor if the vendor fails to meet the promised delivery-time requirement. Ching *et al.* (2011) showed that the penalty cost has a positive impact on the equilibrium service capacity. Chen and Thomas (2016) illustrated that increasing the chargeback penalty tends to help the retailer gain a preferential inventory allocation from the vendor. Therefore, we hypothesize that a significant relationship exists between SLA chargeback penalties and retailer inventory turnover. Note that we focus on only a certain penalty component that is invariant with the shortage units (Chen, 2017):

$$\text{Penalty} = a + b(D - y)^c,$$

where D is the demand quantity; y is the supplier's base-stock level; and a , b , and c are constant terms that determine the mechanism of the chargeback. The penalty cost involving b and c depends on the shortage unit. In this study, we disregard the variable portion of the penalty (i.e., b and c) when analyzing the relationship between the chargeback penalty and the retailer's financial performance for simplicity.

H3. Chargeback financial penalty magnitude has significant effects on retailer inventory turnovers.

Figure 2 visualizes the aforementioned hypotheses.

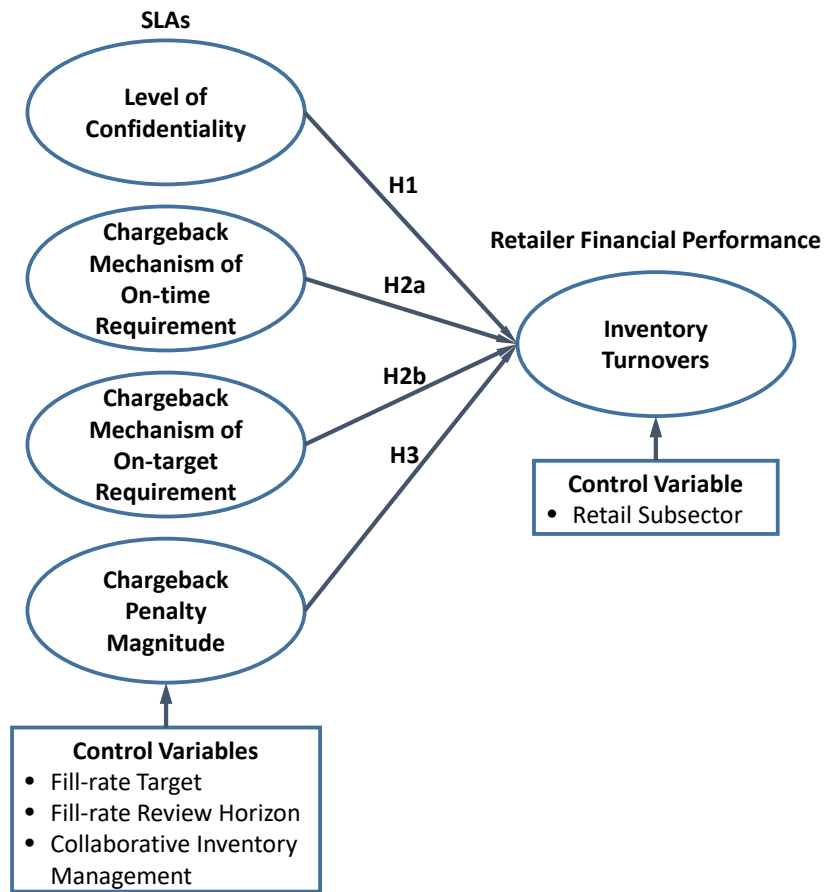


Figure 2: Hypothesized relationship between SLA confidentiality or SLA parameters and retailer inventory turnover

5 METHODOLOGY

We aim not only to help vendors better understand industry-wide expectations of logistics measures but also to help retailers make informed decisions when designing or updating their SLAs. To this end, we independently collected SLA documents of major U.S. retailers from the Internet. Subsequently, we consolidated SLA confidentiality, chargeback mechanisms, fill-rate targets (the percentage of ordered quantity expected to be filled), fill-rate review horizons (the time horizon during which the fill rate is being measured), and retailer inventory turnover (the cost of goods sold divided by the average inventory cost) for analysis purposes. To ensure the availability of a company's inventory turnover data, we looked at only the publicly listed retailers.

5.1 Sampled Population

More than 1 million U.S. companies in the retail sector could have SLAs with their suppliers (Bureau of Labor Statistics, 2016). The sampled population was reduced to a manageable size of 184 companies by selecting retailers with public financial information as well as annual sales greater than \$100 million. We then exhaustively searched for weakly confidential SLAs that were publicly available: 56 companies had their SLA document available on the Internet, while 128 companies either granted access only to preapproved vendors (on dedicated websites) or appeared to have no information regarding the document. Table 1 describes the SLA confidentiality frequency and the inventory turnover statistics by retail subsectors. For the SLA confidentiality frequency in relation to other retailer attributes, please see Table 5 in the Appendix.

5.2 Parsing Data

In each of the sampled SLAs, we searched for chargeback information related to on-time or on-target requirements. Parsing every sentence was necessary to collect the needed SLA parameter information, if available at all, in the document. For example, SLA docu-

Table 1: Sampled SLA confidentiality and inventory turnover statistics by retail subsector

Retail subsector	SLA confidentiality		Inventory turnover	
	Weak	Strict	M	SD
Motor vehicle and parts dealers (441)	3	12	5.31	4.42
Furniture and home furnishings stores (442)	2	9	3.87	2.59
Electronics and appliance stores (443)	2	10	8.48	10.94
Building material, garden equipment, and supplies dealers (444)	3	7	3.83	2.19
Food and beverage stores (445)	5	12	14.69	7.60
Health and personal care stores (446)	2	7	10.59	13.94
Gasoline stations (447)	1	1	46.65	31.59
Clothing and clothing accessories stores (448)	19	24	4.53	2.43
Sporting goods, hobby, book, and music stores (451)	4	11	3.03	1.19
General merchandise stores (452)	11	12	4.36	2.31
Miscellaneous store retailers (453)	3	2	5.08	2.45
Nonstore retailers (454)	1	21	21.01	30.64

ments have different names such as “compliance manual,” “shipping requirement,” “routing guide,” “vendor reference,” or “logistical standards.” Similarly, chargebacks can be referred to as “deductions,” “fees,” “fines,” “failure costs,” “violation charges,” “expense offsets,” “penalties,” “recovery charges,” or “reimbursement charges.” We also discovered that the 100% fill-rate target can be denoted as “complete shipment,” “no partial shipment is allowed,” “no short shipping,” “ship exact quantity as ordered,” and the like. When none of the chargeback-related terms could be found in the documents, we viewed such SLAs as contracts with implicit consequences. Table 2 tabulates the frequency of the SLA confidentiality and parameters to be analyzed in Section 6.

Table 2: SLA confidentiality and parameters for statistical analysis

Confidentiality (frequency)	Logistics expectations	Enforcement (frequency)	Mechanisms (frequency)
Weak (56)	On-time requirement	Explicit chargeback (39)	Variable-fee penalty (17) Flat-fee penalty (22)
	On-target requirement	Explicit chargeback (31)	Variable-fee penalty (14) Flat-fee penalty (17)
	N/A	N/A	N/A
	Strict (128)	N/A	N/A

5.3 Data Transformation

Studies show that differences in retailer inventory turnover could be attributed to retail subsectors (Gaur *et al.*, 2005; Gaur and Kesavan, 2009). Because the sampled population consisted of publicly traded companies, we were able to collect the inventory turnover information of each sampled retailer as well as the subsector averages. To control the effects of retail subsectors on inventory turnover, we used centered inventory turnovers – an individual retailer’s turnover minus the respective subsector turnover average. Moreover,

to improve the normality conformance of the data, natural logarithms of centered inventory turnover and chargeback penalties were used.

6 DATA ANALYSES AND RESULTS

To offer conclusions for the hypotheses, we will use a 5% significance level for evaluating the statistical results. We use various statistical methods such as two-sample t -tests and generalized linear regression. All of the following statistical analyses were done in MATLAB (2017).

6.1 Hypothesis 1

We conducted a two-sample t -test using the assumption that the two samples are from normal distributions with unknown and unequal variances (Brown-Forsythe test $p < 0.05$). The results show that the retailers with weakly confidential SLAs had lower inventory turnovers ($M = 0.18$, $SD = 2.77$) than did those with strictly confidential SLAs ($M = 3.08$, $SD = 14.15$), $t(147.61) = -2.23$, $p = .014$ (one-tailed). Note that the non-integer degrees of freedom were from Satterthwaite's approximation.

6.2 Hypotheses 2a and 2b

Alternative Hypotheses 2a and 2b were evaluated through a two-sample t -test. For the on-time requirement hypothesis, we assumed that the two samples were from normal distributions with unknown and equal variances (Brown-Forsythe test $p > 0.05$). The results show that retailer inventory turnover was not significantly different between SLAs with flat-fee penalties ($M = 0.40$, $SD = 1.89$) and SLAs with variable-fee penalties ($M = -0.52$, $SD = 2.35$), $t(37) = -1.36$, $p = .09$ (one-tailed). The pooled estimate of the population mean is 0.0001 and the standard deviation is 2.10. Thus, Hypothesis 2a is not supported. For the on-target requirement hypothesis, we assumed that the two samples were from

normal distributions with unknown and unequal variances. The results show that retailer inventory turnover was not significantly different between SLAs with flat-fee penalties ($M = 0.22$, $SD = 1.21$) and SLAs with variable-fee penalties ($M = -0.11$, $SD = 2.72$), $t(17.23) = -0.43$, $p = .336$ (one-tailed). Thus, Hypothesis 2b is not supported.

6.3 Hypothesis 3

The alternative hypothesis that the chargeback penalty can significantly affect the retailer inventory turnovers was tested with a generalized linear regression model (Kutner *et al.*, 2005). Gaur *et al.* (2005) and Gaur and Kesavan (2009) established regression models to investigate the relationship between a firm's inventory turnover and financial performance, such as capital investment, gross margin, and annual sales. We extended the regression models by using the SLA parameters and chargebacks as the explanatory variables. In our parsimonious regression model, we controlled the collaborative inventory-management practices as well as the fill-rate target and review horizon in the SLAs when testing the hypothesis (Sieke *et al.*, 2012; Liang and Atkins, 2013; Abbasi *et al.*, 2017).

When a vendor and a retailer form a vertically collaborative supply chain to share their responsibilities and information to serve end customers, the supply chain is better positioned to carry out collaborative inventory management activities such as quick response; collaborative, planning, forecasting, and replenishment; vendor-managed inventory; and continuous replenishment planning (Simatupang and Sridharan, 2002; Williams and Tokar, 2008). Considering the potential impacts of these activities on retailer inventory turnover, we controlled the collaborative inventory-management activities for the regression model by devising a simple binary variable indicating whether the retailer engages in any collaborative inventory management activities as shown in the SLA.

As for controlling the fill-rate target and the review horizon for the model, we found that the sample fill-rate targets range from 80% to 100%, while more than half of the observations are 100% (skewness = -2.88). Similarly, the sample review horizons can

be per order, weekly, biweekly, monthly, quarterly, or some number of days, whereas more than half of the observations are per order or weekly. To focus on the effects of the extreme values of the variables rather than the mean changes in the turnover for one unit of change in the variable, we converted the heavily skewed quantitative data, or categorical data, into dichotomous variables (MacCallum *et al.*, 2002). That is, we respectively partitioned each of the observations of the fill-rate target and review horizon into two distinctive groups: (1) less-than-100% fill-rate target (reference category) or 100% fill-rate target and (2) single-period review horizon (reference category) or multiple-period review horizon.

Table 3 shows that the on-time chargeback penalty appears to be an insignificant predictor of the retailer inventory turnover, but the on-target chargeback penalty can be a significant predictor for retailer inventory turnover. Moreover, the impact of the on-target chargeback penalty on retailer inventory turnover is negative. For example, holding the other predictor variables constant, we expect that a 10% increase of the on-target chargeback penalty can result in an estimated 0.25% decrease in inventory turnover. Please see the Appendix for the calculation details. The Anderson-Darling test shows the regression residuals followed a normal distribution.

7 DISCUSSION

7.1 Significant Role of SLA Confidentiality (H1 Supported)

Consistent with the findings in Li and Zhang (2008), we found that SLA confidentiality holds value to the information owners/retailers and tends to associate with high retailer inventory turnover. The following studies help explain our findings. Raith (1996) stated that if a firm is perfectly informed about its own cost, it is generally not true that it benefits from obtaining information about its rivals as well. Vives (1984) stated that, if the goods are substitutes, not to share information is a dominant strategy for each firm in Cournot competition. In an oligopoly where firms observe uncertain market signals,

Table 3: Generalize linear regression model results

	Coefficient	SE	<i>t</i> -statistics	<i>p</i> -value
Intercept	4.0662	0.0439	92.6040	<0.001
<i>Explanatory variables</i>				
log on-time chargeback penalty	0.0091	0.0076	1.1940	0.2510
log on-target chargeback penalty	-0.0266	0.0090	-2.9606	0.0097
<i>Controlled for explanatory variables</i>				
Review horizon	-0.0167	0.0152	-1.0999	0.2887
Fill-rate target	-0.0082	0.0126	-0.6541	0.5229
Collaborative inventory management	0.0104	0.0180	0.5799	0.5706
Number of observations: 21; error degrees of freedom: 15				
Root mean squared error: 0.0233				
R^2 : 0.398; adjusted R^2 : 0.198				
F -statistic vs. constant model: 1.99; p -value = 0.139				

Gal (1985) found that not revealing private information is the unique Nash equilibrium. Although SLA parameters are not exactly uncertain marketplace signals such as demand, it is still up to the firms to determine the level of output to be publicized on the basis of the information available to the firm.

A rather intuitive explanation of the results is as follows. If a retailer's SLA is strictly confidential, then no competing retailers would know about the retailer's chargeback penalty costs. More important, a retailer with a strictly confidential SLA may take advantage of weakly confidential SLAs by strategically adjusting its chargeback penalty according to the weakly confidential SLAs for improving its own vendor's fulfillment service. For example, having suffered from ongoing compliance issues, the supermarket chain Safeway (2013) stated that "an unintended consequence of not having a penalty for not showing up for an appointment is that our loads are compromised so carriers can make appointments with competitors that currently have a missed appointment fee." As a result, Safeway responded to publicly available SLA penalty information and instituted a fee-based compliance program. The supermarket chain would not have made such a decision had it not known about its competitors' SLA information.

Another plausible explanation of the results is as follows. The assumption for H1 is that every retailer has either a weakly or a strictly confidential SLA. If relaxing this assumption, then a possible scenario is that retailers not publicly sharing their SLAs actually have not furnished any SLAs. After all, an SLA is not (yet) a required legal document to enable transactions between a retailer and a vendor. As such, retailers with little inbound logistics troubles may not feel the urgency to have an SLA, whereas retailers facing major inbound logistics issues may feel a pressing need to correct or alleviate the issues by furnishing an SLA. For example, the aftermarket auto chain Pep Boys had many vendors who frequently missed delivery deadlines or delivered incomplete shipments. As a result, Pep Boys was unable to move merchandise in and out of its distribution centers efficiently. To systematically monitor vendor activities over time, Pep Boys started to use a compli-

ance management system to manage fulfillment-related rules that govern inbound logistics (Douglas, 2006).

7.2 Insignificant Role of Chargeback Mechanism (H2a and H2b Not Supported)

The results analysis suggests that retailer inventory turnover does not significantly vary by the retailer's choice of chargeback mechanism, namely variable-fee and flat-fee penalties. Some prior studies help explain the results. Sieke *et al.* (2012) showed that both chargeback mechanisms can effectively coordinate a supply chain as long as the chargeback penalties are set in conjunction with other SLA parameters. Chen (2017) numerically compared the flat-fee and variable-fee chargeback mechanisms and found that neither mechanisms can minimize the expected noncompliance penalty costs for the supply chain under all experimented values of SLA parameters.

On a side note, as shown in Table 2, the SLAs with a flat-fee penalty seem to be more popular than the SLAs with a variable-fee penalty. Our conjecture is that the use of the flat-fee penalty is conceptually more straightforward than the variable-fee penalty, thereby reducing administrative burdens in justifying penalty increments with respect to the magnitude of underperformance. Another plausible explanation is that blatantly setting an intimidating flat-fee penalty may help deter bad performance from vendors. Moreover, Chen and Thomas (2016) found that a retailer could lose its strategic leverage in influencing a supplier's choice of inventory allocation rule if the retailer uses a variable-fee penalty, thereby making the variable-fee penalty less popular than the flat-fee penalty.

7.3 Significant Role of Chargeback Penalty (H3 Partially Supported)

The results show that the on-time chargeback penalty has little to do with retailer inventory turnover, which makes us wonder how careful the retailers were when determining their on-time chargeback penalties. Could the magnitude of the on-time chargeback penalty be entirely arbitrary? Interestingly, one supermarket chain (name available upon request)

has stated the following in its vendor compliance document: “The [delivery compliance] fee structure was developed by taking our competitor’s policies, plotting them and taking the mid-point. We feel the fee is fair and the intent isn’t to generate fees; it is to change the behavior so we can receive the inventory on the same day the carrier committed to delivering it.” It turns out that benchmarking other retailers’ chargebacks and adopting the industry norm seems to be one way that a retailer may set its on-time chargeback penalty. As a result, there could be little connection between retailers’ on-time chargeback penalties and their financial performance (Craig *et al.*, 2016).

On the other hand, we found that the on-target chargeback penalty can help explain the variation of retailer inventory turnover, revealing the strategic role that the SLA chargeback penalty plays in contributing to retailer financial performance. A domestic merchandise retail chain (name available upon request) states the following in its vendor compliance document: “[The company] has gone to great lengths to ensure that chargebacks are not arbitrary and accurately reflect agreed upon deductions, and that all compliance-related chargebacks meet our needs for cost recovery.” Moreover, the negative sign of the coefficient could be explained as follows. In general, a chargeback should be significant enough to deter bad fulfillment performance of vendors. However, Liang and Atkins (2013) pointed out that a strategic vendor who faces an SLA chargeback might drop efforts in fulfilling the retailer’s order if the vendor has no chance of attaining the target in the review horizon. Intuitively, the larger the chargeback is, the more likely a vendor may quit servicing its retailer early, thereby hurting the retailer’s financial performance eventually.

7.4 Research Limitations

Considering that the size of a sample contributes to the statistical power of the test, we tried to collect as many SLAs as possible. In addition, the sampled SLAs were all from the retail industry, which somewhat limits the generalizability of the findings outside of the retail industry. Last, this empirical study aims to shed light on *what* SLA parameters

and chargebacks are in practice and *how* they may affect retailer financial performance. Despite the limitations, we hope this study provides guidance to future SLA researchers.

8 MANAGERIAL IMPLICATIONS AND CONCLUSION

8.1 Theoretical Implications

Future research studies may consider investigating the effectiveness of using implicit chargebacks in SLAs. Despite the focus on explicit chargebacks, implicit consequences are considered as capable as explicit chargebacks when it comes to contributing to the success of a vendor's performance (Wiengarten *et al.*, 2013). Slobodow *et al.* (2008) showed that the application of implicit consequences in the context of trust and a long-term relationship can lead to improved fill rates and on-time deliveries. Liang and Atkins (2013) discussed how relational factors, such as reputation, may play a role in SLA enforcement. In fact, contracts with an appropriate combination of explicit chargebacks and implicit consequences appeared to be a subject of interest in many studies (Baker *et al.*, 1994; Poppo and Zenger, 2002; Levin, 2003; Mayer and Argyres, 2004). Holmstrom (1981) provides a qualitative comparison between contracts with explicit chargebacks and those with implicit consequences. Economic literature also has extensive discussions on the essences of implicit consequences. The enforcing mechanisms of a contract with implicit consequences, such as business relationship degradation, have been recognized as effective incentives in contract theory (MacLeod and Malcomson, 1989, 1998; Levin, 2003). That is, the contract between two parties leverages "job security" as the most important non-financial motivation and can be enforced on mutually-agreed upon terms (Azariadis, 1975). With subjective performance measures, Levin (2003) stated that contracts with business relationship termination mechanisms could be optimal. To enable such contracts, repeated transactions between two parties are necessary to credibly carry out the termination upon each other (Levin, 2003). By having a contract with implicit consequences, the value of the business

relationship, not the value of any contract component, becomes subjective. Bull (1987) showed how contracts with implicit consequences, or “gentleman’s agreements,” can effectively bind contracting parties in place of a legal contract in the labor market. The implicit consequences can be particularly effective if a vendor is in a weak negotiation position or views its reputation as more important than any other logistical measurements (Zinszer, 1997; Forslund, 2007; Nyaga *et al.*, 2013). However, the conditions under which a retailer would choose implicit chargebacks over explicit chargebacks have not been analyzed in the context of SLAs.

Future work may also investigate the implications of the chargeback mechanisms on a supply chain’s expected penalty cost. In the sample, we have observed many different mechanisms of explicit chargebacks:

- Convex mechanism: Penalty increases nonlinearly as fulfillment performance drops further below a required level of service (it may or may not contain a flat-fee penalty as the minimum penalty).
- Linear mechanism: Penalty increases linearly as fulfillment performance drops further below a required level of service.
- Affine mechanism: Penalty comprises a flat-fee penalty and a linear penalty.
- Stepwise mechanism: Penalty increases intermittently as fulfillment performance drops further below a required level of service (it may or may not contain a flat-fee penalty as the minimum penalty).

Retailers can choose any of these chargeback mechanisms. Chen (2017) compared the flat-fee and linear penalties and found that they resulted in markedly different expected penalty costs, all else being equal.

8.2 Practical Implications

First, simply because retailers with weakly confidential SLAs tend to have lower inventory turnover does not imply that they must immediately increase the level of confidentiality of their SLAs. The causality behind this finding requires further research. Second, retailers should not set SLA chargebacks wildly different from the industry norm. Third, the choice of chargeback mechanism may not matter as much as the magnitude of the chargeback penalty. Last, symbolically charging a small penalty to foster a long-term relationship with vendors could attribute more to good financial performance for a retailer than punitively charging a large, off-putting penalty. Overall, the empirical evidence gained from this study suggests that retailers who want to improve their inventory turnover should not overlook the opportunity held by SLA design.

8.3 Conclusions

Retailers rely on their vendors to deliver products on time and fill orders up to the fill-rate target to ensure operations efficiency and product availability. In the presence of SLAs, vendors are expected to follow retailers' inbound logistics requirements and face chargeback penalties for any noncompliance such as late or partial deliveries. This empirical study offers insights that could be valuable for improving the understanding of SLA design in the retail industry. Specifically, we confirmed that retailers that keep their SLAs strictly confidential (not shared outside the retailers' own supply chains) tend to have higher inventory turnovers than those that keep their SLAs weakly confidential (shared with any entities outside the retailers' own supply chains). Furthermore, we found that the choice of chargeback mechanism (i.e., flat-fee versus variable-fee penalty) has little effect on retailer inventory turnover. Last, we show that the larger the on-target chargeback penalty, the smaller the retailer inventory turnover could be. Overall, this exploratory study adds to the existing literature on SLAs in three ways: providing an overview of SLAs, summarizing common SLA parameters and chargebacks, and making statistical conclusions with

respect to theoretical beliefs or conventional wisdom about SLA design. Most important, this study reveals opportunities for retailers to improve inventory turnovers via SLA design. We encourage future research to advance the understanding of SLA practices.

ACKNOWLEDGEMENTS

The author is grateful to the editor-in-chief, associate editor, and three anonymous referees for their insightful and constructive suggestions which have helped significantly in improving the quality of the paper. The author also thanks Dr. Doug Thomas, Dr. Mihai Banciu, and Dr. Craig Nathan for their valuable feedback on the paper. All errors are the responsibility of the author.

APPENDIX

Additional Empirical Evidence

Table 4 shows the anecdotal references that illustrate the effectiveness of explicit chargebacks on improving a vendor's demand-fulfillment performance.

Table 4: Empirical evidence from professional commentators

	References
Explicit chargeback	Frazelle (1998); Avery (2000); Chain Store Age (2003); Atkinson (2007); Business Wire (2007); Harrington (2008); Slaughter (2009); Cassidy (2010); Terry (2012); Douglas (2016)

Additional Statistics of the SLAs

Table 5 shows the frequency of weakly or strictly confidential SLAs by the retailers' number of employees or sales amount.

Table 5: Confidentiality of sampled SLAs by retail characteristics

Retailer characteristics	SLA confidentiality	
	Weak	Strict
Number of employees		
1,001 – 5,000	5	58
5,001 – 10,000	10	26
10,001 – 50,000	24	27
50,001 – 100,000	8	6
100,001 and more	9	11
Sales amount (million)		
\$100 – 1,000	12	52
\$1,000 – 2,500	8	26
\$2,500 – 5,000	9	21
\$5,000 – 10,000	10	6
\$10,000 and more	17	23

Regression Coefficient Numerical Example

Let CIT denote the centered inventory turnover, and $P1$ and $P2$ denote any two values of the on-target chargeback penalty. Hold the other predictor variables at any fixed value,

and the regression model yields

$$\begin{aligned} \log(CIT(P2)) - \log(CIT(P1)) &= -0.0266 \cdot (\log(P2) - \log(P1)) \\ \Rightarrow \log(CIT(P2)/CIT(P1)) &= -0.0266 \cdot \log(P2/P1) \\ \Rightarrow CIT(P2)/CIT(P1) &= (P2/P1)^{-0.0266}. \end{aligned}$$

Therefore, if $P2/P1 = 1.1$, then $CIT(P2)/CIT(P1) = 0.9975$.

References

- Abbasi, B., Hosseini-fard, Z., Alamri, O., Thomas, D., and Minas, J.P. (2017), “Finite time horizon fill rate analysis for multiple customer cases”, *Omega*, available at: <http://www.sciencedirect.com/science/article/pii/S0305048317302608> (accessed 7 September 2017).
- Advance Auto Parts* (2015), “Shipping requirements guide”, available at: <https://corp.advanceautoparts.com/> (accessed 6 October 2016).
- Altaner, D. (1998,), “For clothing suppliers, the devil is in the details”, *Sun Sentinel*, 2 April, pp. 3D.
- Anand, K. S. and Goyal, M. (2009), “Strategic information management under leakage in a supply chain”, *Management Science*, Vol. 55 No. 3, pp. 438-452.
- Atkinson, W. (2007), “Get in charge of your chargebacks”, available at: <http://multichannelmerchant.com/opsandfulfillment/get-in-charge-of-your-chargebacks-01012007/> (accessed 6 October 2016).
- Attain Consulting Group* (2015), “Customer deductions: 2015 benchmark survey”, available at: <http://attainconsultinggroup.com> (accessed 14 March 2016).
- Avery, S. (2000), “Measuring performance takes on new importance”, *Purchasing*, Vol. 129 No. 3, pp. 123-126.
- Azariadis, C. (1975), “Implicit Contracts and Underemployment Equilibria”, *Journal of Political Economy*, Vol. 83 No. 6, pp. 1183-1202.

- Baker, G., Gibbons, R., and Murphy, K.J. (1994), "Subjective performance measures in optimal incentive contracts", *The Quarterly Journal of Economics*, Vol. 109 No. 4, pp. 1125-1156.
- Banerjee, A. and Paul, A. (2005), "Average fill rate and horizon length", *Operations Research Letters*, Vol. 33 No. 5, pp. 525-530.
- Barbaro, M. (2007), "Saks settles with S.E.C. on overpayments", *New York Times*, 6 September, pp. C12.
- Beutel, A.L., and Minner, S. (2012), "Safety stock planning under causal demand forecasting", *International Journal of Production Economics*, Vol. 140 No. 2, pp. 637-645.
- Big Lots* (2015), "Vendor routing and compliance guide", available at: <https://corp.advanceautoparts.com/> (accessed 6 October 2016).
- Biotto, M., De Toni, A.,F., and Nonino, F. (2012), "Knowledge and cultural diffusion along the supply chain as drivers of product quality improvement", *International Journal of Logistics Management*, Vol. 23 No. 2, pp. 212-237.
- Blankley, A. (2008). "A conceptual model for evaluating the financial impact of supply chain management technology investments", *The International Journal of Logistics Management*, Vol. 19 No. 2, pp. 155-182.
- Boscov's Department Store* (2015), "Department store domestic routing guide", available at: <http://vspec.boscovs.com/> (accessed 8 April 2016).
- Boyle, M. (2017), "Wal-Mart Cracks the Whip on Suppliers", *Bloomberg Businessweek*, Vol. 4531, 14-15.
- Bradley, P. (2001), "Tiffany & Co.: The logistics of luxury", *Logistics Management and Distribution*, Vol. 40 No. 10, pp. 36-43.
- Buckle* (2015), "Routing guide/vendor compliance manual", available at: <http://buckle.shipcomm.com/> (accessed 8 April 2016).
- Bull, C. (1987), "The existence of self-enforcing implicit contracts", *The Quarterly Journal of Economics*, Vol. 102 No. 1, pp. 147-159.
- Bureau of Labor Statistics* (2016), "North American Industry Classification System (NAICS) at BLS", available at: <https://www.bls.gov/bls/naics.htm> (accessed 8 April 2016).
- Business Wire* (2007), "Compliance is not the same as collaboration", 22 February,

available at: <http://www.businesswire.com/news/home/20070222005934/en/Compliance-Collaboration> (accessed 12 August 2015).

Byron, E. (2005), “Saks to pay vendors \$48 million over improper markdown sums”, *Wall Street Journal*, 25 August, pp. B8.

Cachon, G.P., Fisher, M. (2000), “Supply Chain Inventory Management and the Value of Shared Information”, *Management Science* Vol. 46 No. 8, pp. 1032-1048.

Cassidy, W.B. (2010), “Wal-mart tightens delivery deadlines”, *Journal of Commerce*, 8 February, available at: <http://www.joc.com/economy-watch/wal-mart-tightens-delivery-deadlines.20100208.html> (accessed 12 August 2015).

Chain Store Age (2003), “Managing the trading-partner link is the key to success”, Vol. 79 No. 6, pp. 2A-11A.

Chain Store Age (2016), “How to increase compliance with shipment consolidation”, 11 May, available at: <http://www.chainstoreage.com/article/how-increase-compliance-shipment-consolidation> (accessed 8 April 2016).

Charron, K.G. (2006), “Why KPIs belong in supply chain contracts”, *Supply Chain Management Review*, Vol. 10 No. 2, pp. 22-28.

Chen, C.M.J. (2017), “Efficiency of Non-Compliance Chargeback Mechanisms in Retail Supply Chains”, available at: <https://ssrn.com/abstract=2926090>.

Chen, J., Lin, D.K. and Thomas, D.J. (2003), “On the single item fill rate for a finite horizon”, *Operations Research Letters*, Vol. 31 No. 2, pp. 119-123.

Chen, C.M.J. and Thomas, D.J. (2017), “Inventory allocation in the presence of service level agreements”, *Production and Operations Management*, <https://doi.org/10.1111/poms.12814>.

Ching, W., Choi, S., and Huang, X. (2011), “Inducing high service capacities in outsourcing via penalty and competition”, *International Journal of Production Research*, Vol. 49 No. 17, pp. 5169-5182.

Christensen, W.J., Germain, R.N. and Birou, L. (2007), “Variance vs average: supply chain lead-time as a predictor of financial performance”, *Supply Chain Management: An International Journal*, Vol. 12 No. 5, pp. 349-357.

Craig, N., DeHoratius, N., Jiang, Y. and Klabjan, D. (2015), “Execution quality: An analysis of

- fulfillment errors at a retail distribution center”, *Journal of Operations Management*, Vol. 38, pp. 25-40.
- Craig, N., DeHoratius, N., Jiang, Y. and Klabjan, D. (2016), “Fulfillment errors and chargeback penalties in retail supply chains”, working paper, No. 15-28, Chicago Booth Research Paper, May 31, available at: <https://ssrn.com/abstract=2637594>.
- CVS/pharmacy (2016), “Routing Guide & Supplier Compliance Instructions”, available at: <http://www.cvssuppliers.com/> (accessed 6 October 2016).
- Daugherty, P.J., Grawe, S.J. and Caltagirone, J.A. (2010), “A real-world look at SCM”, *Supply Chain Management Review*, Vol. 14 No. 4, pp. 12-19.
- Dollar Tree (2015), “Inbound shipping requirements and regulations”, available at: <http://www.dollartreeinfo.com/vendor-partners/> (accessed 14 March 2016).
- Douglas, M. (2006), “Slamming the brakes on supplier misbehavior”, *Inbound Logistics*, Vol. 26 No. 6, pp. 101-103.
- Douglas, M. (2012), “Jumping through hoops: The importance of vendor compliance”, *Inbound Logistics*, Vol. 32 No. 3, pp. 100-109.
- Douglas, M. (2016), “Richard Foley: Charging hard against chargebacks”, *Inbound Logistics*, Vol. 36 No. 3, pp. 14-15.
- Durango-Cohen, E.J. and Yano, C.A. (2006), “Supplier commitment and production decisions under a forecast-commitment contract”, *Management Science*, Vol. 52 No. 1, pp. 54-67.
- Fawcett, S. E., Osterhaus, P., Magnan, G. M., Brau, J. C., and McCarter, M. W. (2007). “Information sharing and supply chain performance: the role of connectivity and willingness”, *Supply Chain Management: An International Journal*, Vol. 12 No. 5, pp. 358-368.
- Forslund, H. (2007), “The impact of performance management on customers’ expected logistics performance”, *International Journal of Operations & Production Management*, Vol. 27 No. 8, pp. 901-918.
- Forslund, H. (2009), “Logistics service performance contracts: design, contents and effects”, *International Journal of Physical Distribution & Logistics Management*, Vol. 39 No. 2, pp. 131-144.
- Forslund, H. (2012), “Performance management in supply chains: Logistics service providers’ per-

- spective”, *International Journal of Physical Distribution & Logistics Management*, Vol. 42 No. 3, pp. 296-311.
- Frazelle, E.H. (1998), “Develop world-class supply practices”, *Transportation & Distribution*, Vol. 39 No. 11, pp. 45-47.
- Friedman, H.B. and Yazdi, T. (2010), “Your guide to routing guides”, *Inbound Logistics*, Vol. 30 No. 8, pp. 43-45.
- Gal-Or, E. (1985), “Information sharing in oligopoly”, *Econometrica*, Vol. 53 No. 2, pp. 329-344.
- Gaur, V., Fisher, M.L., and Raman, A. (2005), “An econometric analysis of inventory turnover performance in retail services”, *Management Science*, Vol. 51 No. 2, pp. 181-194.
- Gaur, V. and Kesavan, S. (2009), “The effects of firm size and sales growth rate on inventory turnover performance in the U.S. retail sector”, in Agrawal, N. and Smith, S.A. (eds) *Retail Supply Chain Management: Quantitative Models and Empirical Studies*, Springer Science & Business Media, New York, NY, pp 25-52.
- Gilmore, D. (2010), “Thinking about supply chain chargebacks”, available at: <http://www.scdigest.com/assets/firstthoughts/10-05-14.php?cid=3464> (accessed 6 October 2016).
- Groves, G. and Valsamakis, V. (1998), “Supplier-customer relationships and company performance”, *International Journal of Logistics Management*, Vol. 9 No. 2, pp. 51-64.
- Guijarro, E., Cardós, M. and Babiloni, E. (2012), “On the exact calculation of the fill rate in a periodic review inventory policy under discrete demand patterns”, *European Journal of Operational Research*, Vol. 218 No. 2, pp. 442-447.
- Ha, A.Y. and Tong, S. (2008), “Contracting and information sharing under supply chain competition”, *Management science*, Vol. 54 No. 4, pp. 701-715.
- Harrington, L. (2008), “TMS under the microscope”, *Inbound Logistics*, Vol. 28 No. 4, pp. 48-55.
- Hays, C.L. (2001), “Big stakes in small errors: Manufacturers fight retailer ‘discounts’ in shipping disputes”, *New York Times*, 17 August, pp. C1.
- Holmstrom, B. (1981), “Contractual Models of the Labor Market”, *The American Economic Review*, Vol. 71 No. 2, pp. 308-313.
- Inbound Logistics* (2014), “Supplier compliance: Ask the experts”, Vol. No. 7, pp. 147-160.

- Jaruphongsa, W., Cetinkaya, S. and Lee, C.Y. (2004), “Warehouse space capacity and delivery time window considerations in dynamic lot-sizing for a simple supply chain”, *International Journal of Production Economics*, Vol. 92 No. 2, pp. 169-180.
- Katz, N.A. (2003), “Vendor compliance: What doesn’t kill you makes you stronger”, *Inbound Logistics*, available at: <http://www.inboundlogistics.com/cms/article/vendor-compliance-what-doesnt-kill-you-makes-you-stronger/> (accessed 6 October 2016).
- Katz, N.A. (2016), *Successful supply chain vendor compliance*, Gower, Burlington, VA.
- Kutner, M.H., Nachtsheim, C.J., Neter, J. and Li, W. (2005), *Applied linear statistical models*, McGraw-Hill Irwin, New York, NY.
- Lee, H.L., So, K.C., Tang, C.S. (2000). “The value of information sharing in a two-level supply chain”, *Management Science* Vol. 46 No. 5, pp. 626–643.
- Lee, C.Y., Çetinkaya, S. and Wagelmans, A.P. (2001), “A dynamic lot-sizing model with demand time windows”, *Management Science*, Vol. 47 No. 10, pp. 1384-1395.
- Levin, J. (2003), “Relational incentive contracts”, *American Economic Review*, Vol. 93 No. 3, pp. 835-857.
- Li, L. (2002), “Information sharing in a supply chain with horizontal competition”, *Management Science*, Vol. 48 No. 9, pp. 1196-1212.
- Li, L. and Zhang, H. (2008), “Confidentiality and information sharing in supply chain coordination”, *Management Science*, Vol. 54 No. 8, pp. 1467-1481.
- Liang, L. and Atkins, D. (2013), “Designing service level agreements for inventory management”, *Production and Operations Management*, Vol. 22 No. 5, pp. 1103-1117.
- MacCallum, R.C., Zhang, S., Preacher, K.J. and Rucker, D.D. (2002), “On the practice of dichotomization of quantitative variables”, *Psychological Methods*, Vol. 7 No. 1, pp. 19-40.
- MacLeod, W.B. and Malcomson, J.M. (1989), “Implicit contracts, incentive compatibility, and involuntary unemployment”, *Econometrica*, Vol. 57 No. 2, pp. 447-480.
- MacLeod, W.B. and Malcomson, J.M. (1998), “Motivation and markets”, *The American Economic Review*, Vol. 88 No. 3, pp. 388-411.
- Macy’s (2017), “Vendor Standards: Expense Offset Policy”, available at: <https://www.macysnet.com/> (accessed 26 July 2017).

- Manrodt, K. and Vitasek, K. (2008), “Benchmarking the perfect order – a comparative analysis of the perfect order in the retail industry”, *Vendor Compliance Federation*, available at: <https://www.rvcf.com> (accessed 14 March 2016).
- Mason-Jones, R., and Towill, D. R. (1997). “Information enrichment: designing the supply chain for competitive advantage”, *Supply Chain Management: An International Journal*, Vol. 2 No. 4, pp. 137-148.
- Mason-Jones, R., and Towill, D. R. (1999). “Using the information decoupling point to improve supply chain performance”, *The International Journal of Logistics Management*, Vol. 10 No. 2, pp. 13-26.
- MATLAB (2017), “MATLAB Statistics and Machine Learning ToolboxTM User’s Guide”, R2017a, The MathWorks, Inc., Natick, MA.
- Mayer, K.J., and Argyres, N.S. (2004), “Learning to contract: Evidence from the personal computer industry”, *Organization Science*, Vol. 15 No. 4, pp. 394-410.
- Novack, R.A. and Thomas, D.J. (2004), “The challenges of implementing the perfect order concept”, *Transportation Journal*, Vol. 43 No. 1, pp. 5-16.
- Nyaga, G.N., Lynch, D.F., Marshall, D. and Ambrose, E. (2013), “Power asymmetry, adaptation and collaboration in dyadic relationships involving a powerful partner”, *Journal of Supply Chain Management*, Vol. 49 No. 3, pp. 42-65.
- O’Connell, V. (2007), “Saks settles vendor lawsuits; retailer was accused of forcing suppliers to share in markdowns”, *Wall Street Journal*, 23 November, pp. B4.
- Ogden, J.A. and Carter, P.L. (2008), “The supply base reduction process: an empirical investigation”, *International Journal of Logistics Management*. Vol. 19 No. 1, pp. 5-28.
- Pep Boys* (2011), “Vendor compliance guidelines”, available at: <http://info.pepboys.com/> (accessed 14 March 2016).
- Poppo, L., and Zenger, T. (2002), “Do formal contracts and relational governance function as substitutes or complements?”, *Strategic Management Journal*, Vol. 23 No. 8, pp. 707-725.
- Publix Super Markets* (2005), “Supplier policies and guidelines”, available at: <http://corporate.publix.com/> (accessed 14 March 2016).
- Putka, G. (2000), “E-Commerce (A special report): Roundtable – a step back: Four online players

- and watchers talk about why e-tailers may seem down – but are far from out”. *Wall Street Journal*, 17 July, pp. R52.
- Qi, L., Shen, Z.J.M., and Snyder, L.V. (2009), “A continuous-review inventory model with disruptions at both supplier and retailer”, *Production and Operations Management*, Vol. 18 No. 5, pp. 516-532.
- Raith, M. (1996), “A General Model of Information Sharing in Oligopoly”, *Journal of Economic Theory*, Vol. 71 No. 1, pp. 260-288.
- Raue, J.S. and Wieland, A. (2015), “The interplay of different types of governance in horizontal cooperations”, *International Journal of Logistics Management*, Vol. 26 No. 2, pp. 401-423.
- Retail Value Chain Federation (2017), “Compliance Networks”, available at: <http://www.rvcf.com/> (accessed 7 September 2017).
- RetailingToday (2014), “Best retailers to work with – 2014”, available at: <http://www.chainstoreage.com/> (accessed 15 April 2017).
- Roubos, A., Koole, G. and Stolletz, R. (2012), “Service-level variability of inbound call centers”, *Manufacturing & Service Operations Management*, Vol. 14 No. 3, pp. 402-413.
- Rozhon, T. (2005a), “Saks fires 3 executives over problems found in audit”, *New York Times*, 10 May, pp. C1.
- Rozhon, T. (2005b), “Saks reopens an inquiry of deductions”, *New York Times*, 4 June, pp. C3.
- Rozhon, T. (2005d), “Suppliers to Saks now want to see the receipts”, *New York Times*, 15 July, pp. C1.
- Rozhon, T. (2005c), “Stores and vendors take their haggling over payment to court”, *New York Times*, 17 May, pp. C1.
- Ryall, M.D., and Sampson, R.C. (2009), “Formal contracts in the presence of relational enforcement mechanisms: Evidence from technology development projects”, *Management Science*, Vol. 55 No. 6, pp. 906-925.
- Ryan, C. (2010), “Leaked memo reveals how Asda sought to beat down suppliers”, 9 October, available at: <http://www.independent.co.uk/news/business/news/leaked-memo-reveals-how-asda-sought-to-beat-down-suppliers-2102448.html> (accessed 1 November 2016).

- Safeway* (2013), "Delivery compliance – frequently asked questions", available at: <https://suppliers.safeway.com/> (accessed 14 March 2016).
- Schneeweiss, C. and Zimmer, K. (2004), "Hierarchical coordination mechanisms within the supply chain", *European Journal of Operational Research*, Vol. 153 No. 3, pp. 687-703.
- Sieke, M.A., Seifert, R.W. and Thonemann, U.W. (2012), "Designing service level contracts for supply chain coordination", *Production and Operations Management*, Vol. 21 No. 4, pp. 698-714.
- Simatupang, T.M. and Sridharan, R. (2002), "The collaborative supply chain", *International Journal of Logistics Management*, Vol. 13 No. 1, pp. 15-30.
- Skjoett-Larsen, T. (1999), "Supply chain management: A new challenge for researchers and managers in logistics", *International Journal of Logistics Management*, Vol. 10 No. 2, pp. 41-53.
- Slaughter, P. (2009), "Volley and serve", *Home Furnishings Business*, Vol. 4 No. 8, pp. 18-19, 21-23.
- Slobodow, B., Abdullah, O. and Babuschak, W.C. (2008), "When supplier partnerships aren't", *MIT Sloan Management Review*, Vol. 49 No. 2, pp. 77-83.
- Teng, S.G. and Jaramillo, H. (2005), "A model for evaluation and selection of suppliers in global textile and apparel supply chains", *International Journal of Physical Distribution & Logistics Management*, Vol. 35 No. 7, pp. 503-523.
- Terry, L. (2012), "Expedited transport: It's all in the timing", *Inbound Logistics*, Vol. 32 No. 11, pp. 36-43.
- Terry, L. (2013), "Vendor compliance: setting them straight", *Inbound Logistics*, Vol. 33 No. 11, pp. 50-55.
- Teunter, R.H., Babai, M.Z., and Syntetos, A.A. (2010), "ABC classification: service levels and inventory costs", *Production and Operations Management*, Vol. 19 No. 3, pp. 343-352.
- The Bon-Ton Stores* (2015), "Transportation and merchandise logistics standards", available at: <https://corp.advanceautoparts.com/> (accessed 6 October 2016).
- Thomas, D.J. (2005), "Measuring item fill-rate performance in a finite horizon", *Manufacturing & Service Operations Management*, Vol. 7 No. 1, pp. 74-80.
- Toyli, J., Hakkinen, L., Ojala, L. and Naula, T. (2008), "Logistics and financial performance",

- International Journal of Physical Distribution & Logistics Management*, Vol. 38 No. 1, pp. 57-80.
- van de Klundert, J. and Wormer, L. (2010), "ASAP: The after-salesman problem", *Manufacturing & Service Operations Management*, Vol. 12 No. 4, pp. 627-641.
- Vives, X. (1984), "Duopoly Information Equilibrium: Cournot and Bertrand", *Journal of Economic Theory*, Vol. 34 No. 1, pp. 71-94.
- Wang, H. and Yan, H. (2009), "Inventory management for customers with alternative lead times", *Production and Operations Management*, Vol. 18 No. 6, pp. 705-720.
- Whipple, J.M. and Russell, D. (2007), "Building supply chain collaboration: a typology of collaborative approaches", *International Journal of Logistics Management*, Vol. 18 No. 2, pp. 174-196.
- Wiengarten, F., Pagell, M. and Fynes, B. (2013), "The importance of contextual factors in the success of outsourcing contracts in the supply chain environment: The role of risk and complementary practices", *Supply Chain Management*, Vol. 18 No. 6, pp. 630-643.
- Wilkinson, I.F. (1996), "Distribution channel management: Power considerations", *International Journal of Physical Distribution & Logistics Management*, Vol. 26 No. 5, pp. 31-41.
- Williams, B.D. and Tokar, T. (2008), "A review of inventory management research in major logistics journals", *International Journal of Logistics Management*, Vol. 19 No. 2, pp. 212-232.
- Zhang, H. (2002), "Vertical information exchange in a supply chain with duopoly retailers", *Production and Operations Management*, Vol. 11 No. 4, pp. 531-546.
- Zimmer, K. (2002), "Supply chain coordination with uncertain just-in-time delivery", *International Journal of Production Economics*, Vol. 77 No. 1, pp. 1-15.
- Zinszer, P.H. (1997), "Segmenting logistical service offerings using the extended buy grid model", *International Journal of Physical Distribution & Logistics Management*, Vol. 27 No. 9, pp. 588-599.