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Critical Incidents and the Impact of Satisfaction on Customer Share

In business markets, the long-term nature of relationships may prompt parties to conduct "business as usual," but negative critical incidents (CIs) can cause a destabilization of these long-term relationships. The authors develop a comprehensive dynamic model of customer loyalty to account for the impact of negative CIs on both the nature and the magnitude of the relationships between satisfaction and customer share. The results indicate that CIs trigger a stronger updating of the customer relationship, which moves customers from a business-as-usual mind-set to a reconsideration of the relationship. Furthermore, nonlinearities in the relationships are much more pronounced in the presence of CIs. Depending on the relationship quality, CIs have different consequences for customer relationships, and if relationship quality is high, a negative CI can even have a positive impact on customer share.

Keywords: service failure, business-to-business relationships, customer loyalty, services, customer relationship management, critical incidents

In business markets, the link between satisfaction and loyalty often appears weak or even absent (Narayandas 2005) because mature, ongoing customer–supplier relationships tend to be characterized by inertia that causes parties to conduct "business as usual" and, in essence, maintain the status quo. However, in some circumstances, long-term relationships can destabilize, especially when negative critical incidents (CIs) occur. Negative CIs can be defined as out-of-the-ordinary events during an interaction that customers perceive or recall as unusually negative (Roos 2002). Furthermore, a negative CI can trigger a decline in customer satisfaction and alter customer purchasing behavior (e.g., Bitner, Booms, and Tetreault 1990). In this research, we propose that negative CIs not only directly affect customer satisfaction and loyalty but also play a moderating role in the customer relationship, such that they intensify relationships between current satisfaction and loyalty and thus move the relationship away from business as usual to a more active state.[1]

Marketing literature has already subjected customer satisfaction and customer loyalty to extensive research. Whereas early studies devoted attention to the process of satisfaction formation (e.g., Oliver 1980), recent research has focused on the relationship between customer satisfaction and customer loyalty (e.g., Bolton and Lemon 1999; Cooil et al. 2007; Mittal, Kumar, and Tsiros 1999). In addition to cross-sectional studies, research has begun to employ a longitudinal design to consider carryover effects in the relationships between satisfaction and loyalty (e.g., Mittal and Kamakura 2001) (see Table 1). Several cross-sectional and longitudinal studies have also conveyed an integrated view of the process of satisfaction formation and its relationship to customer loyalty (e.g., Bowman and Narayandas 2004; Mittal, Kumar, and Tsiros 1999).

The impact of CIs in the context of satisfaction formation and customer loyalty has received some attention (for an overview, see Gremler 2004), but to date, many studies remain qualitative in nature and examine, for example, the categories of CIs that affect customers' (dis)satisfaction most (Bitner, Booms, and Tetreault 1990; Kelley, Hoffman, and Davis 1993). Another group of studies links CIs and behavioral consequences (Gardial, Flint, and Woodruff 1996; Keaveney 1995; Roos, Edvardsson, and Gustafsson 2004), and a related literature stream in services marketing examines how recovering from a service failure affects satisfaction and loyalty intentions (Maxham and Netemeyer 2002; Smith and Bolton 1998) or perceived justice (Smith, Bolton, and Wagner 1999). As we show in Table 1, most research on CIs centers on their impacts on either satisfaction formation or customer loyalty. Therefore, as our first objective, we attempt to develop a comprehensive view of the role of CIs in the formation of service satisfaction and customer loyalty. We further strive to investigate how CIs affect the links between attribute and overall satisfaction and between overall satisfaction and customer loyalty. By taking an integrative view, we provide a complete picture of how negative CIs affect customer relationships.

In addition, an ongoing debate centers on the role of CIs in customer relationships. Although ample theoretical evi-

[1]In the remainder of this article, we study the effect of negative CIs. Thus, when we use the term CI, we imply a negative CI.

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TABLE 1
Overview of Studies in Satisfaction and Loyalty Literature

Literature Stream	Study Design	Satisfaction Formation	Satisfaction–Loyalty
Satisfaction–loyalty Literature	Cross-sectional studies	Churchill and Surprenant (1982) Oliver (1980) Tse and Wilton (1988)	Agustin and Singh (2005)
			Anderson and Sullivan (1993) Bowman and Narayandas (2004) Mittal, Ross, and Baldasare (1998)
	Longitudinal studies	Bolton and Drew (1991) Johnson, Anderson, and Fornell (1995)	Cooil et al. (2007) Mittal and Kamakura (2001) Verhoef (2003)
			Bolton and Lemon (1999) Boulding et al. (1993) Mittal, Kumar, and Tsiros (1999)
Impact of CIs	Cross-sectional studies	Bitner (1990) Bitner, Booms, and Tetreault (1990) Kelley, Hoffman, and Davis (1993) Smith and Bolton (1998) Smith, Bolton, and Wagner (1999)	Keaveney (1995) Roos, Edvardsson, and Gustafsson (2004)
	Longitudinal studies		Bolton (1998) Gardial, Flint, and Woodruff (1996) Gustafsson, Johnson, and Roos (2005) Maxham and Netemeyer (2002)
			This research

dence suggests a moderating effect of CIs on customer relationships, empirical evidence has been tenuous. Gustafsson, Johnson, and Roos (2005) find neither a significant direct effect of CIs on retention nor a moderating effect on the relationship between customer satisfaction and retention. In an investigation of the impact of service failures on relationship duration, Bolton (1998) finds a positive moderating effect of unreported service failures on relationship duration, which implies that unreported service failures prolong relationships. She argues that this counterintuitive finding may occur because customers who do not report failures may be more tolerant. In contrast, reported service failures have a negative but insignificant moderating effect on relationship duration.

The results of these studies notably diverge, which is surprising because both use the consumer telecommunications market as their context. Thus, the potential moderating effect of CIs demands further investigation. In turn, our second objective is to examine the moderating effects of CIs in the context of customer relationships. In particular, we suspect that CIs may revive the customer relationship and enhance the link between current satisfaction evaluations and customer loyalty, thus reducing the inertia of a business-as-usual relationship state. For our research context, we choose business-to-business (B2B) services, which are more likely to be strongly affected by CIs than the consumer telecommunications market, in which CIs, though highly irritating, usually do not have major economic consequences.

Moreover, we posit that negative CIs might not only enhance the magnitude of the links between current satisfaction and loyalty but also affect their shape and induce nonlinearities in the relationships. Thus far, studies investigating nonlinearities in the context of customer satisfaction and loyalty have arrived at mixed results (Gupta and Zeithaml 2006) and have assumed that nonlinear relationships occur for all customers (e.g., Agustin and Singh 2005; Mittal and Kamakura 2001). In contrast, we examine whether the occurrence and type of nonlinearities depend on the presence of CIs. We assume that CIs induce nonlinearities in a relationship that are not detectable (or may even differ) for customers who have not experienced a CI. Therefore, as a third goal of our research, we investigate the extent to which negative CIs trigger nonlinearities and asymmetries in the relationships among attribute, overall service satisfaction, and customer loyalty.

Finally, unlike most previous research on CIs, we use a dynamic approach that takes into account past evaluations of satisfaction and past loyalty. Thus, we explicitly acknowledge that CIs occur within an existing relationship and that the history of a relationship may influence the effect of CIs. This approach enables us to explore (using simulations) how CIs can affect relationships differently depending on the initial state of those relationships before the CI occurred.

We organize the remainder of this article as follows: In the next section, we describe our conceptual model and deduce our hypotheses. Subsequently, we describe the

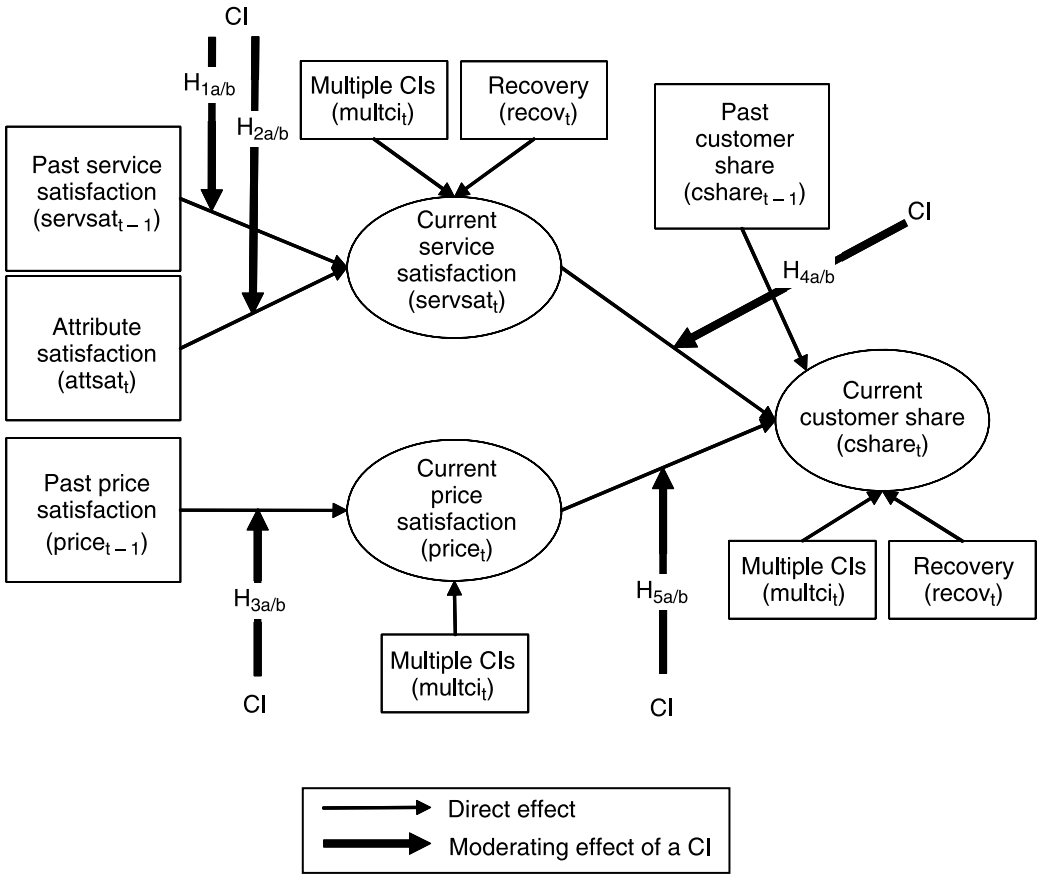
design of our empirical study and discuss several basic descriptive statistics. We specify our econometric model and discuss the estimation results in the next two sections. We conclude with a discussion of our results, the research limitations, and avenues for further research.

Conceptual Model

In Figure 1, we depict our conceptual model, in which customer share, which serves as a measure of customer loyalty, is influenced by its lag, current service satisfaction, and price satisfaction. Furthermore, we posit that current service satisfaction is affected by attribute evaluations and past service satisfaction and that current price satisfaction is influenced by past price satisfaction (Mittal, Kumar, and Tsiros 1999). Because the links among attribute evaluations, satisfaction, and customer share are well established (e.g., Bowman and Narayandas 2004; Mittal, Kumar, and Tsiros 1999), we do not put forth specific hypotheses. Likewise, previous literature has documented carryover effects within these constructs (e.g., Johnson, Herrmann, and Huber 2006). Following the literature, we assume positive links between attribute satisfaction and past and current overall service satisfaction (Mittal, Kumar, and Tsiros 1999), as well as between past and current price satisfaction. We also expect current service satisfaction, price satisfaction, and—because of inertia effects (Rust, Lemon, and Zeithaml 2004; Verhoef 2003)—past customer share to have positive impacts on current customer share. We allow the magnitude and the nature of the relationships to differ across customers who have experienced a CI and those who have not.

According to prior literature, both the occurrence of a service failure and the quality of subsequent service recovery have strong impacts on customer relationships (e.g., Smith and Bolton 1998). Therefore, we include service recovery as a determinant of service satisfaction and customer share in our model. In line with prior literature, we assume that satisfaction with the service recovery has a positive effect on both service satisfaction and customer share for customers who have experienced a CI (Maxham and Netemeyer 2002; Smith, Bolton, and Wagner 1999). Because this relationship is well established, we do not include explicit hypotheses regarding service recovery effects. Furthermore, in the course of ongoing service relationships, customers may experience not just one but multiple CIs. Prior research has suggested that multiple CIs can lead to less favorable evaluations of the customer relationship and different outcomes than when only one CI occurs (Maxham and Netemeyer 2002). Thus, we account for the

FIGURE 1
Conceptual Model



occurrence of multiple CIs in our conceptual model and expect that multiple CIs lower both the level of satisfaction and customer share.

Hypotheses

Satisfaction Formation

Impact of lagged on current service satisfaction. In the context of an ongoing buyer–supplier relationship, service satisfaction represents a cumulative construct that reflects the customer's overall evaluation of the service provider, as opposed to transactional satisfaction that reflects an evaluation of a single service encounter (Bolton 1998). Therefore, overall service satisfaction incorporates a customer's past and recent experiences with the service provider and can be described according to the general anchoring-and-adjustment model, as specified by Hogarth and Einhorn (1992). Current opinion, which serves as an anchor, adjusts on the basis of successive experiences. In the context of customer satisfaction, this model implies that past satisfaction evaluations get updated through current experiences (Bolton 1998), which can be captured in recent measures of attribute satisfaction. Therefore, we arrive at the following:

$$(1)\qquad servsat_t = \varphi \times servsat_{t-1} + \sum_{l=1}^{L} \omega_l \times attsat_{lt} + \varepsilon_t,$$

where $servsat_t$ is service satisfaction at t and $attsat_{lt}$ is satisfaction with the attribute l at t.

When CIs occur, they can have two effects according to this model. On the one hand, they could lead to lower satisfaction ratings on the attribute level. On the other hand, they could affect the adjustment weights φ and ω_l and determine how strongly customers weight current information compared with previous information.

We base our considerations regarding the adjustment weights on Fiske and Neuberg's (1990) continuum model of impression formation, in which they distinguish between conceptually driven top-down processes that are largely guided by attitudes and stereotypes and data-driven bottom-up processes, in which impression formation is based on attributes. They conceptualize these two processing mechanisms not as mutually exclusive but rather as endpoints of a continuum (Fiske and Neuberg 1990; Kunda and Thagard 1996). Transferred to our context, in both the presence and the absence of CIs, current service satisfaction should be guided by attribute satisfaction and previous evaluations, but the occurrence of CI might affect the weights of both pieces of information.

We propose that if no CIs occur, the updating process is less pronounced, more attitude-based, and more reliant on past service satisfaction as the strongest influence on current satisfaction. If CIs occur, more data-driven processing results because, in most cases, CIs will be connected to one or several attributes relevant for the evaluation and thus will increase attribute accessibility and facilitate attribute retrieval. In these circumstances, more attribute-based processing is likely (Mantel and Kardes 1999; Sanbonmatsu and Fazio 1990). Evaluations should be guided more by the new data and less by past experience; in turn, a stronger update of overall service satisfaction should occur. Thus, in reference to Equation 1, we posit that φ will be smaller for customers who experience a CI than for those who do not.

H_{1a}: Lagged service satisfaction has a weaker impact on current service satisfaction for customers who experience a negative CI than for customers who do not experience a CI.

Nonlinear impact of lagged on current service satisfaction. Prior customer satisfaction literature has acknowledged potential nonlinear relationships (e.g., Anderson and Mittal 2000). To the best of our knowledge, such nonlinear relationships in the link between past and current evaluations of service satisfaction have not yet been investigated. However, the many studies that find nonlinear effects in the context of customer satisfaction formation have indicated that this relationship may display nonlinearities as well. In particular, we posit that the presence and nature of these nonlinear effects may depend on the occurrence of a CI. A negative CI provides strong negative cues that should alter satisfaction evaluations considerably and lead to lower attribute and overall service satisfaction levels. However, previous research in the domain of impression formation has suggested that people are reluctant to alter their attitudes completely. Defensive processing resulting from the desire to confirm a preferred position can lead people to discount negative information and weight it less heavily than positive information (Ahluwalia 2002; Kunda 1990). Therefore, previous impressions or attitudes can be resistant to change, even in the presence of a negative cue.

In the context of customer satisfaction, defensive processing implies that customers with a high level of service satisfaction who experience a negative CI may discount the negative information and attach more weight to their previously held positive overall attitudes. When a CI occurs, higher satisfaction ratings should have a stronger tendency to carry over to the next period than lower ratings; in other words, we expect a positive asymmetry.

H_{1b}: For customers who experience a negative CI, higher past service satisfaction ratings have a stronger impact on current service satisfaction than lower ratings.

In the absence of a CI, the updating process should be much less pronounced, and the theoretical considerations of the nature of the lagged relationships likely will not apply. Therefore, we must seek other rationales for the nature of the relationships in the absence of a CI. On the one hand, the relationship between past and current service satisfaction might be straightforward and linear. On the other hand, negative or positive past evaluations may have a stronger impact on current satisfaction. Prospect theory, which posits that losses loom larger than gains, would suggest a negative asymmetry, that is, a greater impact of less favorable satisfaction evaluations (Kahnemann and Tversky 1979; Mittal, Ross, and Baldasare 1998). The so-called negativity effect also offers theoretical grounds for negative asymmetry because it argues that negative information stands out and is weighted more heavily than positive information (Fiske

1980; Kanouse and Hanson 1972; Mittal, Ross, and Baldasare 1998; Peeters and Czapinski 1990).

However, positive past satisfaction scores conceivably might exert a greater influence on customer satisfaction as well. Theoretically, this claim is grounded in the general positivity bias (Anderson 1998; Whitney 1971). Such an effect is especially likely in highly individualized service settings, in which customers anticipate and accept greater variability in service levels (Folkes and Patrick 2003).

Thus, from a theoretical point of view, the nature of the lagged relationships in the absence of a CI is difficult to predict. Therefore, we do not put forth specific hypotheses but rather test for nonlinearities in the relationships in our empirical model.

Impact of service attributes on service satisfaction. In the next step, we investigate the magnitude and nature of the impact of attribute satisfaction on service satisfaction. As we noted previously, we expect a CI to induce stronger updates of the otherwise cumulative construct of overall service satisfaction than a situation without a CI. In turn, current evaluations of the attributes should become more salient for overall service satisfaction ratings. Thus, we assume that ω_l (see Equation 1) is greater for the group of customers who experience CIs than for those who do not.

H_{2a}: Current attribute satisfaction has a stronger impact on current service satisfaction for customers who experience a negative CI than for customers who do not experience a CI.

Nonlinear impact of service attributes on service satisfaction. Next, we investigate the nonlinearities in the link between attribute satisfaction and overall service satisfaction. In Table 2, we provide an overview of studies pertaining to these nonlinear relationships and distinguish between (1) studies that investigate nonlinearities in the attribute satisfaction–overall customer satisfaction link and (2) studies that investigate nonlinearities in the overall satisfaction–customer loyalty link.

Regarding the relationship between attribute satisfaction and overall customer satisfaction, the majority of the empirical evidence points to a negative asymmetry, which implies that negative attribute scores exert a stronger influence on overall satisfaction than positive ones. Because we assume a strong impact of current attribute satisfaction in the presence of a CI, we transfer the findings of cross-sectional studies in previous literature to relationships in the presence of a CI. For customers who experience a CI, we assume a negative asymmetry in the link between attribute satisfaction and overall service satisfaction. Theoretically, we base this rationale on prospect theory (Kahnemann and Tversky 1979) and the negativity effect (Peeters and Czapinski 1990).

H_{2b}: For customers who experience a negative CI, lower ratings of current attribute satisfaction have a stronger impact on current service satisfaction than higher ratings.

The nature of this effect for customers who do not experience CI is not clear. On the basis of prior literature that assumes no moderating effect of CI, we might expect a negative asymmetry. However, in the absence of a CI, we expect updating to be less prominent and current attribute evaluations to be less important for overall service satisfaction. As a consequence, nonlinear effects might be less likely. Therefore, we do not specify a hypothesis about the nature of this relationship but rather examine the presence and nature of nonlinearities in our empirical analysis.

Price satisfaction. Existing literature contains evidence that the evaluation of the economic costs and benefits of a service has a distinct impact on customer behavior (Bolton and Lemon 1999; Bolton, Lemon, and Verhoef 2008). Therefore, we include the construct of price satisfaction, which reflects a customer's evaluation of the economic exchange ratio, in our model. Drawing on the same rationale we applied in the context of service satisfaction, we expect similar effects. When CIs occur, customers should be guided to a lesser extent by past evaluations, whereas in the absence of CI, current price satisfaction should be determined largely by past price satisfaction.

H_{3a}: Past price satisfaction has a weaker impact on current price satisfaction for customers who experience a negative CI than for customers who do not experience a CI.

Using the same rationale that underlies H_{1b}, we expect a positive asymmetry with respect to the impact of past price satisfaction ratings on present ratings.

H_{3b}: For customers who experience a negative CI, higher ratings of past price satisfaction have a stronger impact on current price satisfaction than lower ratings.

Customer Share Formation

Impact of satisfaction on customer share. The second part of our model pertains to the formation of customer share over time. As we noted previously, inertia effects and, therefore, past customer share are important determinants of current customer share (Rust, Lemon, and Zeithaml 2004; Verhoef 2003). The extent to which current ratings of service satisfaction and price satisfaction influence current customer share likely is affected by CIs. Again, we expect that CIs trigger a stronger update of customer share and imply a stronger impact of both overall service satisfaction and price satisfaction (Gustafsson, Johnson, and Roos 2005).

H_{4a}: Current service satisfaction has a stronger impact on current customer share for customers who experience a negative CI than for customers who do not experience a CI.

H_{5a}: Current price satisfaction has a stronger impact on current customer share for customers who experience a negative CI than for customers who do not experience a CI.

Nonlinear impact of satisfaction on customer share. Empirical evidence regarding nonlinearities in the relationship between satisfaction and loyalty is somewhat ambiguous (see Table 2); both increasing returns (suggesting a positive asymmetry) and decreasing returns (indicating negative asymmetries) have been observed. Theoretically, we might expect negative asymmetries according to

TABLE 2
Nonlinearities in the Context of Customer Satisfaction and Loyalty

Authors	Industry	Researched Relationships 1	2	Results
Anderson and Sullivan (1993)	ACSI data	x	x	1. Negative asymmetry (disconfirmation–satisfaction) 2. Linear relationship between satisfaction and repurchase intentions
DeSarbo et al. (1994)	Bank, dental services	x		Negative asymmetry (SERVQUAL dimension–quality)
Mittal and Baldasare (1996)	Health care	x		Negative asymmetry (attribute evaluations–overall satisfaction)
Bolton (1998)	Telecommunications		x	Negative asymmetry (perceived losses/gains on relationship duration)
Mittal, Ross, and Baldasare (1998)	Health care, automotive industry	x	x	Negative asymmetry (attribute satisfaction–overall satisfaction, attribute satisfaction–repurchase intentions)
Anderson and Mittal (2000)	ACSI data		x	Negative asymmetry, greater effect at the extremes (satisfaction–repurchase intentions)
Bowman and Narayandas (2001)	Consumer products	x	x	1. Negative asymmetry (disconfirmation–satisfaction with a customer-initiated contact) 2. Decreasing returns (satisfaction with a customer-initiated contact–purchasing behavior)
Mittal and Kamakura (2001)	Automotive industry		x	Satisfaction–loyalty intentions: decreasing returns; satisfaction–behavioral loyalty: increasing returns
Bowman and Narayandas (2004)	B2B: processed metal		x	Increasing returns (satisfaction–customer share)
Gómez, McLaughlin, and Wittink (2004)	Supermarket	x	x	1. Negative asymmetry (quality–overall satisfaction); positive asymmetry (customer service and value–overall satisfaction) 2. Negative asymmetry (satisfaction–sales performance)
Streukens and De Ruyter (2004)	Retail service industries	x	x	Linear relationships (service quality–satisfaction, service quality–behavioral intentions, satisfaction–behavioral intentions)
Agustin and Singh (2005)	Retailing and airline		x	Decreasing returns only in the retail data (satisfaction–loyalty intentions)
Cooil et al. (2007)	Bank		x	Segment-specific nonlinearities

Notes: 1 = antecedents of satisfaction/attribute satisfaction–overall satisfaction, and 2 = satisfaction–loyalty. ACSI = American Customer Satisfaction Index.

prospect theory (Kahnemann and Tversky 1979) and the general negativity effect (Peeters and Czapinski 1990). A stronger impact of positive satisfaction evaluations on loyalty is linked to the notion of customer delight, which posits that only truly delighted customers are loyal to a company (Bowman and Narayandas 2004). However, most empirical evidence points to a negative asymmetry (see Table 2). Because CIs may direct special customer attention to less favorable aspects of the service, we suggest a negative asymmetry in the relationship between satisfaction and loyalty in the presence of CIs.

H_{4b}: For customers who experience a negative CI, lower ratings of current service satisfaction have a stronger impact on current customer share than higher ones.

H_{5b}: For customers who experience a negative CI, lower ratings of current price satisfaction have a stronger impact on current customer share than higher ones.

For customers who do not experience a CI, the presence and nature of nonlinear effects remain uncertain. On the one hand, the ongoing business relationship of these customers might imply the lack of a relationship between satisfaction and loyalty (Narayandas 2005). On the other hand, cus-

tomers may modify the share they offer to the supplier only when they are very satisfied, in line with the principle of customer delight. In the absence of a CI, therefore, customer share changes might occur only as a result of very positive evaluations of both service satisfaction and price satisfaction. In consideration of these divergent views, we do not put forth specific hypotheses about the presence and nature of a nonlinear effect for customers who do not experience a CI but rather examine the presence of nonlinear relationships in our empirical analysis.

Research Design

Data Collection

Our sampling frame consists of approximately 850 customers in Germany and the Netherlands of a European professional logistics service provider. The service portfolio of the logistics company mainly consists of physical transportation services within Europe; only a small portion of the company's customer base uses additional logistic services such as packaging or warehousing. We conducted a telephone survey in yearly iterations during 1999–2001, with one-year time spans between surveys. The collaborative project ensures that the logistic service provider is heavily involved in the data collection. We interviewed key decision makers regarding suppliers' choice of transport services and obtained an average response rate of 60%. Because we need at least two observations per firm over time (t – 1 and t), we included only those companies that participated in at least two subsequent iterations of the survey and in which the same key decision maker responded to the survey. As a consequence, our final sample consists of 399 (response rate of 47%) different companies—230 companies that participated in two subsequent iterations of the survey and 169 that participated in three iterations. Thus, our data set comprises companies participating in 1999 and 2000 (36% of our sample of 399 companies); those participating in 2000 and 2001 (22%); and those participating in 1999, 2000, and 2001 (42%). Of the 399 different companies, 109 belong to the ore, coal, and steel industry; 82 belong to the construction industry; 83 belong to the chemical industry; 59 belong to the industrial and agricultural industry; and 66 belong to the manufacturing industry. We pooled the data over all respondents and periods to obtain 568 cases that contain a present and a lagged period. In addition, we verified whether the 399 companies differ significantly from the responding companies for which we had only one observation. These results reveal no significant differences for industry sector, satisfaction, or customer share, suggesting that sample bias due to attrition is not a problem.

As noted previously, we require a minimum of two observations over time, which is rather common in longitudinal research within customer satisfaction literature (e.g., Bolton and Lemon 1999; Mittal, Kumar, and Tsiros 1999; Verhoef, Franses, and Donkers 2002). We acknowledge the question whether one year between two surveys is too long to measure feedback effects, but prior research indicates that it is not. Mittal, Kumar, and Tsiros (1999) employ a 21-month span between surveys and reveal feedback effects; the same holds true for Verhoef, Franses, and Donkers (2002), who use a period of exactly one year between surveys. Johnson, Hermann, and Huber (2006) even allow two years between surveys and still show substantial carryover effects in customer perceptions and loyalty intentions. Thus, a time span of one year should not be too long to assess feedback effects.

Measures

We developed the questionnaire on the basis of input from expert interviews. Specifically, we asked customers to indicate (on a seven-point bipolar rating scale; see the Appendix) their overall satisfaction with service; price; and transport-related attributes, interactions with sales agents, and handling and billing. Because we aim to develop a longitudinal database and given the few customers in our data, as is typical in this type of B2B market, sufficient customer participation is an important issue. Furthermore, because the length of the survey represents an important determinant of response levels (e.g., Yammarino, Skinner, and Childers 1991), we strive for a short survey and therefore use single- instead of multiple-item measures (see also Bergkvist and Rossiter 2007; Rossiter 2002).

Customers indicated the customer share they have with the company on a six-point scale (1: <10%; 2: 10%–20%; 3: 20%–30%; 4: 30%–40%; 5: 40%–60%; and 6: >60%). The customer share measure recognizes that business customers usually purchase from multiple vendors (e.g., Bowman, Farley, and Schmittlein 2000), which implies that loyal behavior must be defined as awarding greater customer share to a particular supplier (Bowman and Narayandas 2004). By measuring loyalty through customer share instead of absolute purchase volumes, we can avoid the problem of purchase volumes distorted by the success of the firm, which can occur in multiperiod investigations (for a more detailed discussion, see Cooil et al. 2007; Verhoef 2003). We chose a categorical scale rather than the actual measure because assessments of actual customer share tend to become unreliable and more difficult to answer. In addition, the company itself wanted consistency in its measurement and had used this measure in previous surveys.

CIs

Using the CI technique, we asked customers about the special occurrences among their interactions with the service provider they recalled as being unusually negative (Roos 2002), which matches our definition of a negative CI. On the basis of discussions with management, we initially formed CI categories related to the attribute categories in the questionnaire. Two judges subsequently assigned the CI to these categories. The proportion of pairwise interjudge agreements is 94.2%; thus, the classification has a sufficient level of reliability (Rust and Cooil 1994). The cases on which the judges did not agree were resolved through discussion.

In total, our data contain 530 CI reports. In 159 of the 568 cases, respondents experienced one CI, and in 153, they encountered more than one CI, with an average of 2.4 CIs

for the cases in which multiple CIs occurred. In addition, 325 CIs are categorized as transport-related and constitute core service failures (Keaveney 1995; Maxham and Netemeyer 2002), such as delayed or cancelled transport services ("A transport arrived in the middle of the night instead of in the morning") or damaged cargo ("Our multifunctional machine was damaged during transport; the consequence was production downtimes"). All these CIs refer to the core service of physical transportation, not to additional logistic services. We assigned 40 CIs to interactions with sales agents, including issues such as long response times to transport inquiries ("Since July 14th, we are waiting for an offer for transports to Austria") or unavailability of the sales agent. Thus, these CIs constitute service encounter failures (Keaveney 1995). The CIs assigned to the handling-and-billing category consist of problems during interactions with customer service ("The customer service could not tell me where my cargo was at that moment") or billing errors ("Our bill was 250,000 € too high"). Thus, these CIs also mainly stem from interactions. Finally, 24 CIs are related to pricing ("We just received the second price increase for this year"), and 42 CIs cannot be assigned to any of the categories. To assess service recovery, we used a single item that measures how satisfied customers are with the firm's resolution of their problems, again with a seven-point bipolar rating scale.

Descriptive Statistics

In Table 3, we summarize the descriptive statistics of our sample. The CIs are associated with decreases in attributes, overall service satisfaction, and price satisfaction; the transport-related attributes, which contain the most CIs, yield the greatest satisfaction decrease. Evaluations by customers who did not experience a CI remain stable or show slight increases. The customer share among both customer groups decreases over time, in line with prior research indicating that the customer share of existing customers decreases over time (e.g., Verhoef 2003). Lagged customer shares do not differ between customers who experienced a CI and those who did not ($p > .1$), which suggests that CIs are unrelated to previous customer share.

Econometric Model

We use a system of equations to test our conceptual model. We first discuss the general structure of our model, and then we extend the model to allow for nonlinear effects. As we noted, we explain current service satisfaction using lagged service satisfaction and current attribute ratings as explanatory variables. In the second equation of our model, we specify dynamic relationships for price satisfaction, and in the third, we let customer share depend on its lag, current service satisfaction, and price satisfaction. We pool the data across industries and periods and control for industry sector and time effects by including the corresponding dummy variables. We allow the relationships to differ for customers who experienced and did not experience CIs and estimate distinct regression parameters for these two groups. Because we have no reason to assume that CIs affect our control variables, we maintain uniform parameters for these.[2] For customers who experienced CIs, we add a dummy variable to denote whether the respondent experienced one CI or multiple CIs and a variable to measure satisfaction with service recovery.[3]

[2]According to a Chow test, there is no significant difference in the parameter vectors for our control variables at $p < .05$.

[3]We assume a direct impact of the occurrence of multiple CIs on satisfaction and customer share, though the occurrence of multiple CIs also might function as a moderator. However, the relatively small number of observations with one CI and multiple CIs means that the estimates would become unreliable if we were to model additional moderating effects. The type of CI might also matter and could serve as a moderator, but again, the relatively small number of observations for several CI types would lead to unreliable estimates.

TABLE 3
Descriptive Statistics

	All M (SD)		With CIs M (SD)		Without CIs M (SD)	
	t – 1	t	t – 1	t	t – 1	t
Transport-related attributes	4.33 (1.18)	4.19 (1.22)	4.20 (1.20)	3.81 (1.18)	4.46 (1.15)	4.62 (1.11)
Interaction with the sales agent	5.11 (1.25)	4.97 (1.31)	5.03 (1.30)	4.78 (1.36)	5.19 (1.20)	5.19 (1.22)
Handling and billing	4.39 (1.33)	4.34 (1.29)	4.27 (1.33)	4.07 (1.26)	4.53 (1.32)	4.64 (1.25)
Service satisfaction	4.25 (1.12)	4.12 (1.16)	4.18 (1.11)	3.81 (1.15)	4.34 (1.13)	4.46 (1.07)
Price satisfaction	3.83 (1.20)	3.78 (1.22)	3.76 (1.19)	3.62 (1.24)	3.92 (1.20)	3.96 (1.19)
Customer share	3.90 (1.66)	3.73 (1.72)	3.98 (1.63)	3.83 (1.69)	3.80 (1.70)	3.63 (1.75)
Service recovery	N.A.	N.A.	N.A.	3.62 (1.47)	N.A.	N.A.

Notes: N.A. = not applicable.

$$
\begin{aligned}
(2)\quad \text{servsat}_{ti} &= \alpha_{01} + I_i(k) \times \varphi_{CI} \times \text{servsat}_{t-1,i} \\
&\quad + N_i(k) \times \varphi_{noCI} \times \text{servsat}_{t-1,i} \\
&\quad + \sum_{l=1}^{L} [I_i(k) \times \omega_{l,CI} \times \text{attsat}_{lti} \\
&\quad + N_i(k) \times \omega_{l,noCI} \times \text{attsat}_{lti}] \\
&\quad + I_i(k) \times \phi \times \text{recov}_{ti} + I_i(k) \times \psi \times \text{multci}_{ti} \\
&\quad + \sum_{m=1}^{4} \chi_{1m} \times d_{\text{industry},m} + \tau_1 \times d_{\text{time}} + \varepsilon_{1t} \\
\text{price}_{ti} &= \alpha_{02} + I_i(k) \times \theta_{CI} \times \text{price}_{t-1,i} \\
&\quad + N_i(k) \times \theta_{noCI} \times \text{price}_{t-1,i} + I_i(k) \times \vartheta \times \text{multci}_{ti} \\
&\quad + \sum_{m=1}^{4} \chi_{2m} \times d_{\text{industry},m} + \tau_2 \times d_{\text{time}} + \varepsilon_{2t} \\
\text{cshare}_{ti} &= \alpha_{03} + I_i(k) \times \beta_{CI} \times \text{cshare}_{t-1,i} \\
&\quad + N_i(k) \times \beta_{noCI} \times \text{cshare}_{t-1,i} \\
&\quad + I_i(k) \times \gamma_{CI} \times \text{servsat}_{ti} \\
&\quad + N_i(k) \times \gamma_{noCI} \times \text{servsat}_{ti} \\
&\quad + I_i(k) \times \delta_{CI} \times \text{price}_{ti} + N_i(k) \times \delta_{noCI} \times \text{price}_{ti} \\
&\quad + I_i(k) \times \kappa \times \text{recov}_{ti} + I_i(k) \times \rho \times \text{multci}_{ti} \\
&\quad + \sum_{m=1}^{4} \chi_{3m} \times d_{\text{industry},m} + \tau_3 \times d_{\text{time}} + \varepsilon_{3t},
\end{aligned}
$$

where

servsat_{ti} = service satisfaction at t for subject i,
attsat_{lti} = satisfaction with the attribute l at t for subject i,
recov_{ti} = service recovery at t for subject i,
price_{ti} = price satisfaction at t for subject i,
cshare_{ti} = customer share at t for subject i,
multci_{ti} = dummy variable (1 if respondent experienced multiple CI and 0 if otherwise),
$d_{\text{industry},m}$ = industry-dependent dummy variable, and
d_{time} = time-dependent dummy variable.

In addition, $I_i(k)$ and $N_i(k)$ are indicator variables, where

$$
I_i(k) = \begin{cases} 1, & \text{if subject i had negative CI} \\ 0, & \text{if otherwise} \end{cases}
$$

and

$$
N_i(k) = \begin{cases} 0, & \text{if subject i had negative CI} \\ 1, & \text{if otherwise.} \end{cases}
$$

We investigate nonlinear relationships in our model by estimating several nonlinear model specifications (quadratic, exponential, logarithmic, and spline models). In our case, the spline model specifications offer the best fit. We define spline adjustment variables Z_j at the thresholds j = 1, …, 6, with corresponding threshold values of X_j (Marsh and Cormier 2001):

$$
(3)\qquad Z_j = D_j(X - X_j), \text{ where } D_j = 0 \text{ for } X \le X_j \text{ and } D_j = 1 \text{ for } X > X_j.
$$

Thus, we arrive at the following:

$$
\begin{aligned}
\text{servsat}_{ti} &= \alpha_{01} + I_i(k) \times (\varphi_{CI} \times \text{servsat}_{t-1,i} \\
&\quad + \tilde{\varphi}_{CI} \times Z_j^{\text{servsat}_{t-1,i}}) \\
&\quad + N_i(k) \times (\varphi_{noCI} \times \text{servsat}_{t-1,i} \\
&\quad + \tilde{\varphi}_{noCI} \times Z_j^{\text{servsat}_{t-1,i}}) \\
&\quad + \sum_{l=1}^{L} [I_i(k) \times (\omega_{l,CI} \times \text{attsat}_{lti} + \tilde{\omega}_{l,CI} \times Z_{jl}^{\text{attsat}_{ti}}) \\
&\quad + N_i(k) \times (\omega_{l,noCI} \times \text{attsat}_{lti} + \tilde{\omega}_{l,noCI} \times Z_{jl}^{\text{attsat}_{ti}})] \\
&\quad + I_i(k) \times \phi \times \text{recov}_{ti} + I_i(k) \times \psi \times \text{multci}_{ti} \\
&\quad + \sum_{m=1}^{4} \chi_{1m} \times d_{\text{industry},m} + \tau_1 \times d_{\text{time}} + \varepsilon_{1t} \\
\text{price}_{ti} &= \alpha_{02} + I_i(k) \times (\theta_{CI} \times \text{price}_{t-1,i} + \tilde{\theta}_{CI} \times Z_j^{\text{price}_{t-1,i}}) \\
&\quad + N_i(k) \times (\theta_{noCI} \times \text{price}_{t-1,i} + \tilde{\theta}_{noCI} \times Z_j^{\text{price}_{t-1,i}}) \\
&\quad + I_i(k) \times \vartheta \times \text{multci}_{ti} + \sum_{m=1}^{4} \chi_{2m} \times d_{\text{industry},m} \\
&\quad + \tau_2 \times d_{\text{time}} + \varepsilon_{2t} \\
\text{cshare}_{ti} &= \alpha_{03} + I_i(k) \times (\beta_{CI} \times \text{cshare}_{t-1,i} \\
&\quad + \tilde{\beta}_{CI} \times Z_j^{\text{cshare}_{t-1,i}}) \\
&\quad + N_i(k) \times (\beta_{noCI} \times \text{cshare}_{t-1,i} \\
&\quad + \tilde{\beta}_{noCI} \times Z_j^{\text{cshare}_{t-1,i}}) \\
&\quad + I_i(k) \times (\gamma_{CI} \times \text{servsat}_{ti} + \tilde{\gamma}_{CI} \times Z_j^{\text{servsat}_{ti}}) \\
&\quad + N_i(k) \times (\gamma_{noCI} \times \text{servsat}_{ti} + \tilde{\gamma}_{noCI} \times Z_j^{\text{servsat}_{ti}}) \\
&\quad + I_i(k) \times (\delta_{CI} \times \text{price}_{ti} + \tilde{\delta}_{CI} \times Z_j^{\text{price}_{ti}}) \\
&\quad + N_i(k) \times (\delta_{noCI} \times \text{price}_{ti} + \tilde{\delta}_{noCI} \times Z_j^{\text{price}_{ti}}) \\
&\quad + I_i(k) \times \kappa \times \text{recov}_{ti} + I_i(k) \times \rho \times \text{multci}_{ti} \\
&\quad + \sum_{m=1}^{4} \chi_{3m} \times d_{\text{industry},m} + \tau_3 \times d_{\text{time}} + \varepsilon_{3t}.
\end{aligned}
$$

In terms of interpretation, the spline model specification implies that if, for example, servsat_{t-1} lies below the threshold j, the impact of servsat_{t-1} on servsat_t can be denoted by the regression coefficient φ_{CI} for a customer who experienced a CI, whereas the impact for $\text{servsat}_{t-1} >$

j is $\varphi_{CI} + \tilde{\varphi}_{CI}$. The line segments are connected at j, which is also referred to as a "spline knot" (for a discussion of spline models in marketing, see Rust and Bornman 1982). For the model estimation, we use a three-stage least squares (3SLS) estimator to account for the correlation of the disturbances ε_i and endogeneity.

Estimation Results

Model Fit and Stability

To assess the performance of our nonlinear moderated CI model, we estimate three rivals for comparisons. The first is a baseline model that does not allow for any effects of CI (log-likelihood [LL] = –2368.72; Akaike information criterion [AIC] = 4789.44). The second model examines the effects of CI in the formation of satisfaction and customer share. The direct CI model corresponds to the models mostly investigated in literature and examines direct effects of CI on satisfaction and customer share (LL = –2358.13; AIC = 4784.25). The third model investigates moderating effects of CI on customer satisfaction and customer share but constrains itself to linear effects (LL = –2323.80; AIC = 4725.61).

The nonlinear moderated CI model (LL = –2308.82; AIC = 4709.64) outperforms the others in terms of the AIC statistic; the likelihood ratio test (Greene 2003) also favors the nonlinear moderated CI model over the alternatives ($p < .01$). To verify that the regression coefficients differ between customers who experienced a CI and those who did not, we performed Chow tests (Greene 2003) for the three equations; these confirm the difference in the parameter vectors (for service satisfaction and customer share formation, $p < .01$; for price satisfaction formation, $p < .05$).

Thus, CIs have a moderating effect on the formation of satisfaction and customer share over time because including the moderating effects significantly improves the model. We assess the stability of our model by drawing ten random samples that each contain 75% of our sample and running the model with these samples (for a similar procedure, see Bolton, Lemon, and Verhoef 2008). In these tests, 87% of the estimated parameters reach the same level of significance as our reported model.[4] Of the significant parameters in our reported model, all have the same sign in our subsample models. Thus, our model results appear stable.[5]

Because the contemporaneous measures are collected within the same survey, common method variance could be a problem. We followed the procedure that Lindell and Whitney (2001) outline, using a marker variable to detect a potential bias.[6] The significance of the correlation coefficients does not change; thus, common method variance does not appear to be a problem. We depict the estimation results in Table 4.

Satisfaction Formation

Regarding the formation of overall service satisfaction, we find striking differences between customers who experienced and those who did not experience a negative CI. Among those who experienced a negative CI, lagged service satisfaction ratings at or below 4 do not influence their current service satisfaction at all; only the spline adjustment variable for ratings greater than 4 reaches a satisfactory level of significance. That is, very low service satisfaction ratings do not carry over to the next period, and only high overall service satisfaction ratings persist over time. For customers who did not experience a CI, the results are different. According to the regression coefficients, lagged overall service satisfaction is the most salient determinant of current service satisfaction (.446), and when satisfaction ratings exceed 4, the impact of lagged service satisfaction on current satisfaction decreases (.446 – .183 = .263). The difference between the coefficients associated with customers who experienced CI and those who did not is significant ($p < .01$).

In Figure 2, Panel A, we display the relationship between lagged and current service satisfaction depending on satisfaction level and whether a customer experienced CI. To develop this figure, we vary the lagged service satisfaction ratings from 1 to 7 and insert average values for all other explanatory variables. Although the slopes of the curves are comparable for lagged service satisfaction ratings that exceed 4, the impact of lagged service satisfaction on current service satisfaction is much greater for customers who experienced a CI, in support of H_{1a}. Furthermore, we find a positive asymmetry for customers who experienced a

[4]To account for our measures of satisfaction with a seven-point scale and customer share with a six-point scale, we also estimate models with a log-log specification. The parameter estimates remained comparable. To account for the categorical nature of our customer share measure, we estimate an ordered logistic regression and obtain virtually the same results as in our 3SLS model. Because the model contains multiple equations and we must account for endogeneity, we show only the results of the 3SLS model.

[5]Unfortunately, the 3SLS estimator does not account for the panel data structure of a part of our data set. Applying a panel data estimator is complicated because only part of our data set has a panel structure and the time dimension is small. The most straightforward solution would be to include company-specific fixed effects for the companies with two observations in each of the three equations simultaneously, but this is not possible because of the limitations of our data set. Instead, we estimate three different 3SLS models, in which we include company-specific effects for each of the three equations separately. For all three models, model fit deteriorates heavily as a result of the many additional parameters, but parameter estimates remain comparable. In addition, we estimate our model using a reduced data set—including only one case per company—which also yields comparable results. Thus, our results seem not to be affected by the panel data structure of part of our data set.

[6]As a marker variable, we used the respondents' assessment of how their overall satisfaction with the best competitor has developed over the past six months because this measure was included in all three surveys. The significance level of the correlation coefficients remained the same after correction. Because this marker variable might theoretically be somewhat related to the overall satisfaction measure we use in our study, we repeated the procedure for the data collected in the years 2000 and 2001 with the marker variable "How will the proportion of international transports in your company develop in the near future?" (2000) and a question about how familiar customers were with the goal and content of a specific new company policy (2001); again, significance did not change.

TABLE 4
Estimation Results of the Nonlinear Moderated CI Model

	Coefficients			
	CI		No CI	
Dependent: Service Satisfaction				
Service satisfaction$_{t-1}$		–.016		.446***
	Z_4	.216**	Z_4	–.183*
Transport-related attributes$_t$		.698***		.277***
	Z_3	–.321***		
Interaction with the sales agent$_t$		.117***		.127***
Handling and billing$_t$		.132***		.084**
Service recovery		.019		
Multiple CIs		–.156*		
Ore, coal, and steel industry		–.116		
Construction industry		–.124		
Chemical industry		–.158*		
Industrial and agricultural sector		.079		
Year: 2001		.011		
Constant		.407*		
R^2		.639		
Dependent: Price Satisfaction				
Price satisfaction$_{t-1}$		.193***		.341***
	Z_3	.290**		
Multiple CIs		.025		
Ore, coal, and steel industry		.352**		
Construction industry		.010		
Chemical industry		.068		
Industrial and agricultural sector		.283		
Year: 2001		–.020		
Constant		2.469***		
R^2		.194		
Dependent: Customer Share				
Customer share$_{t-1}$		.002		.608***
	Z_2	.799***	Z_4	.327*
Service satisfaction$_t$		.377***		.006
	Z_3	–.320*		
Price satisfaction$_t$		.118*		.095
Service recovery		–.049		
Multiple CIs		.167		
Ore, coal, and steel industry		.157		
Construction industry		–.313*		
Chemical industry		.057		
Industrial and agricultural sector		–.104		
Year: 2001		.064		
Constant		.698**		
R^2		.559		
AIC		4709.64		
LL		–2308.82		

*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

CI; only past service satisfaction ratings greater than 4 significantly influence current overall service satisfaction. Thus, H_{1b} is confirmed as well. For customers who did not experience a CI, less favorable service satisfaction ratings have a greater tendency to carry over, an effect opposite to the positive asymmetry we observe for customers who experienced a CI.

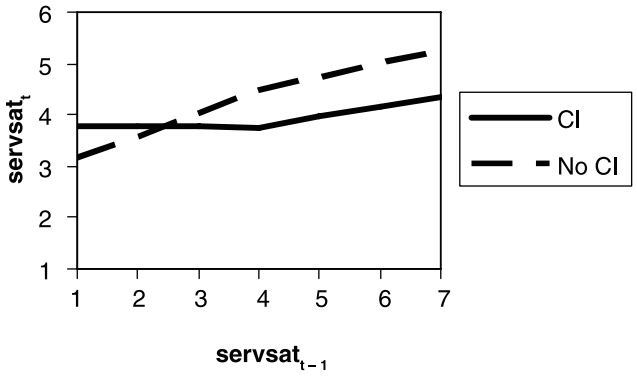
Current attribute satisfaction ratings are more important for customers who experienced a CI than for customers who did not. The former group considers the transport-related criteria, the attribute category of the majority of CIs, most important. For customers who experienced a CI, we find a negative asymmetry; the influence of the lowest ratings of the transport-related attributes (1, 2, and 3) on overall service satisfaction is almost twice as high (coefficient .698) as the influence of the higher ratings (net effect .698 – .321 = .377). Thus, the impact of the attribute ratings is stronger than it is for customers who did not experience a

CI (.277) ($p < .01$). For customers who did not experience a CI, we cannot identify nonlinearities for this attribute category. We depict the differences in the relationships caused by CIs in Figure 2, Panel B.

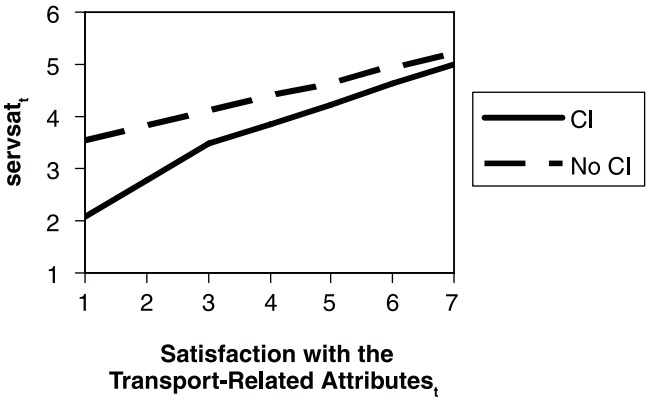
In the handling-and-billing category, we find a similar pattern; the coefficient associated with satisfaction evaluations of handling and billing for the customers who experienced a CI (.132) is much higher than the paired coefficient

FIGURE 2
Relationships Between the Variables for Customers With and Without CI

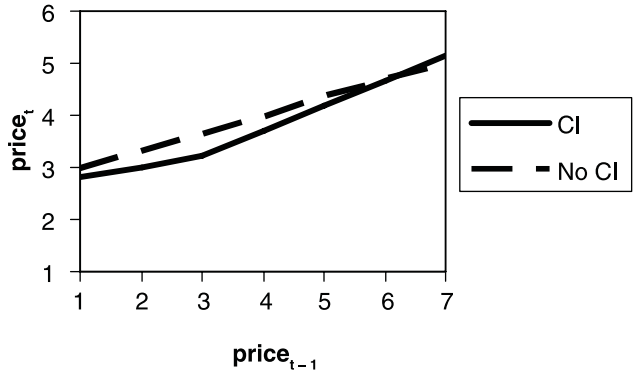
A: Impact of Lagged on Current Service Satisfaction



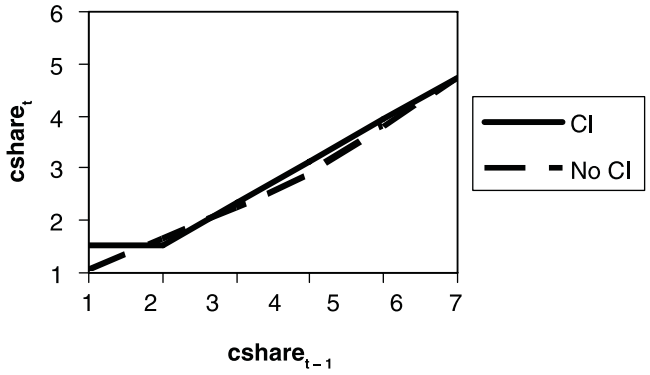
B: Impact of Satisfaction with the Transport-Related Attributes on Service Satisfaction



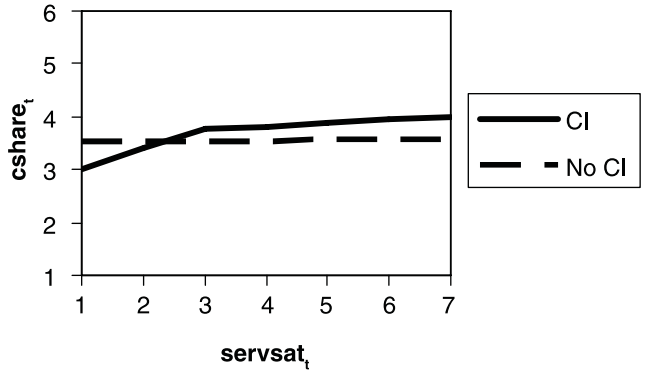
C: Impact of Lagged on Current Price Satisfaction



D: Impact of Lagged on Current Customer Share



E: Impact of Current Service Satisfaction on Customer Share



among customers who did not (.084) ($p < .01$). In contrast, the interaction with the sales-agent-attribute category does not follow this pattern. The coefficient for customers who experienced a CI is actually smaller than that for customers who did not, possibly because relatively few negative CIs occurred in this category. For neither the handling-and-billing nor the interaction-with-sales-agent categories could we detect nonlinear effects.

Customers who experienced multiple negative CIs are less satisfied than customers who experienced only one CI, an intuitive result. However, service recovery fails to exert a significant impact on service satisfaction, which is surprising in light of previous empirical evidence that supports such an effect (Maxham and Netemeyer 2002; Smith and Bolton 1998). We can only speculate about the reasons for this divergence, but a possible explanation might be related to the inclusion of measures of attribute satisfaction in our model, which is not present in the majority of literature. These measures might contain an implicit evaluation of the quality of the service recovery and, as such, conceal a distinct service recovery effect. Tentative evidence for this notion includes the significant ($p < .01$) and substantial correlations between service recovery and the transport-related attributes (.61) and handling and billing (.41).

In summary, we find support for H_{2a} for two of the three attribute categories. We identify a negative asymmetry in the relationship between attribute evaluations and overall service satisfaction only for the transport-related attributes, possibly because the other two attribute categories are less important in terms of overall service satisfaction. Thus, we find support for H_{2b} in one of the three attribute categories.

Price satisfaction is influenced by its lag and the industry sector. Again, we find differences in the price satisfaction formation of customers who experienced a CI and those who did not. For customers who experienced a CI, we find the expected positive asymmetry, in that more favorable evaluations are subject to greater carryover effects (.193 + .290 = .483) than are less favorable ones (.193), in support of H_{3b}. Because of this positive asymmetry, the question whether the lagged effects are stronger for customers who experienced a CI or customers who did not is somewhat more difficult to answer. For price satisfaction ratings equal to or less than 3, the carryover effects are greater for customers who did not experience a CI (.341 versus .193), in line with H_{3a}. However, because of positive asymmetry, for evaluations greater than 3, the coefficient increases for customers who experienced a CI (.483). In Figure 2, Panel C, we depict the impact of past price satisfaction on current price satisfaction, depending on the evaluation level and whether customers experienced a CI. For very high ratings of price satisfaction (between 6 and 7), the lagged effects are similar for customers who experienced a CI and those who did not. For lower ratings, the impact of past price satisfaction on current price satisfaction is greater among customers who did not experience a CI; in addition, the coefficients differ significantly ($p < .01$), so we find partial support for H_{3a}.

Customer Share Formation

In the customer share portion of our model, the comparably large coefficients associated with lagged customer share suggest a high level of inertia.[7] The impact of lagged customer share on current customer share is greater for customers with a higher customer share with the supplier (CI: .002 for customers whose lagged customer share is equal to or less than 2, and .801 for customers whose lagged customer share is greater than 2; no CI: .608 for lagged customer shares less than or equal to 4, and .935 for lagged customer shares greater than 4). That is, customers with a higher customer share are subject to a higher level of inertia, an intuitive result. For customers who experienced a CI, lower lagged customer share values (1 or 2 on the six-point scale) do not significantly affect their current customer share. Thus, these customers are more inclined to adjust their supplier portfolio, perhaps even implying a total switch to an alternative supplier, and are clearly endangered. Yet, as we show in Figure 2, Panel D, the relationship between lagged and current customer share is comparable for customers who experienced a CI and for those who did not.

However, a remarkable difference between customers who experienced a CI and those who did not is that service satisfaction and price satisfaction influence customer share among the former group, whereas both coefficients are insignificant for the latter group. Therefore, we find support for H_{4a} and H_{5a}. Furthermore, for the latter group, the only significant determinant of current customer share is past customer share, which suggests that these customers are subject to high inertia levels.

With respect to customers who experienced a CI, we also find that only very low current service satisfaction ratings (less than or equal to 3) affect their customer share. For ratings greater than 3, the effect becomes very small (.377 – .320 = .057). Thus, ratings greater than 3 hardly affect current customer share, in support of the negative asymmetry predicted in H_{4b}. We display the relationship between overall service satisfaction and customer share in Figure 2, Panel E. Counterintuitively, the significant impact of service satisfaction combined with negative asymmetry causes the customer share of customers who experienced a CI to exceed that of customers who did not at a certain point. In the next section, we discuss this phenomenon further.

We cannot identify any nonlinear effects for price satisfaction, which means that H_{5b} is not supported. For customers who experienced a CI, neither the occurrence of multiple CIs nor satisfaction with the service recovery significantly affects customer share. However, the occurrence of multiple CIs has an indirect negative effect on customer share through a lower level of service satisfaction; in the service satisfaction model, the respective coefficient is negative and significant. Again, we can only speculate about why the service recovery effect is insignificant, but the most straightforward explanation involves the evalua-

[7]The difference between the coefficients of customers who experienced a CI and those who did not is significant at $p < .05$.

tion of the service recovery being included implicitly in service satisfaction ratings.

Finally, we find a few significant industry dummies that suggest, for example, that firms in the construction industry tend to decrease their customer share to a greater extent than those in the default industry category (manufacturing). These industry effects might occur because of the greater number of viable transport alternatives in the construction industry or because of the reduction in transport volume due to the decline in the construction industry in Germany at that time, which might have unequally affected the share of different logistic service providers.

Understanding the Impact of CIs

To gain a full understanding of the impact of CIs, we show the effects on service satisfaction, price satisfaction, and customer share and differentiate between customers with high and low values on the respective constructs. To demonstrate the consequences of CIs for customer evaluations of service satisfaction, we distinguish between those with high and low service satisfaction. Among customers in the low-satisfaction condition, we assume a lagged score of 2 for service satisfaction on our seven-point scale; for those in the high-satisfaction condition, we assume a score of 6. Likewise, we assume that the attribute ratings of these customers lie around 2 for customers in the low-satisfaction condition and 6 for customers in the high-satisfaction condition. When a CI occurs, we assume that current attribute satisfaction decreases, in accordance with the descriptive statistics we report in Table 3; specifically, we assume that average satisfaction with the transport-related attributes is .81 lower in the presence of a CI (satisfaction with the sales force is .41; satisfaction with handling and billing is .57).

In the price satisfaction model, we distinguish between customers with low (2) and high (6) past price satisfaction ratings. For our calculations in the customer share model, we distinguish between situations with a low lagged customer share (2) and a high lagged customer share (5). Furthermore, regarding our calculations of customer share, we differentiate between customers with high and low levels of service satisfaction and price satisfaction, using the previously computed scores. We provide the results of our calculations in Table 5.

In both high- and low-satisfaction conditions, service satisfaction is about a half point lower when a CI occurs. We find a strong decrease in price satisfaction due to CIs only when past price satisfaction is low; when past price satisfaction is high, the positive asymmetry in the carryover

TABLE 5
Impact of CIs on Satisfaction and Customer Share

Service Satisfaction

	Low Satisfaction		High Satisfaction	
	$servsat_{t-1} = 2$		$servsat_{t-1} = 6$	
CI	$attsat_{1t} = 1.60$ $attsat_{2t} = 1.80$ $attsat_{3t} = 1.72$	1.92	$attsat_{1t} = 5.60$ $attsat_{2t} = 5.80$ $attsat_{3t} = 5.72$	5.24
No CI	$attsat_{1t} = 2.40$ $attsat_{2t} = 2.20$ $attsat_{3t} = 2.29$	2.36	$attsat_{1t} = 6.40$ $attsat_{2t} = 6.20$ $attsat_{3t} = 6.29$	5.73
ΔCI – no CI		–.44		–.49

Price Satisfaction

	Low Past Price Satisfaction $price_{t-1} = 2$	High Past Price Satisfaction $Price_{t-1} = 6$
CI	3.00	4.64
No CI	3.30	4.66
ΔCI – no CI	–.30	–.02

Customer Share

			Low $Cshare_{t-1}$ $Cshare_{t-1} = 2$	High $Cshare_{t-1}$ $Cshare_{t-1} = 5$
Low service/price satisfaction	CI	$servsat_t = 1.92$ $price_t = 3.00$	1.62	4.02
	No CI	$servsat_t = 2.36$ $price_t = 3.30$	2.26	4.41
	ΔCI – no CI		–.64	–.39
High service/price satisfaction	CI	$servsat_t = 5.24$ $price_t = 4.64$	2.35	4.75
	no CI	$servsat_t = 5.73$ $price_t = 4.66$	2.41	4.56
	ΔCI – no CI		–.06	.19

effects attenuates the negative impact of CI on current price satisfaction.

The most intriguing results are related to customer share in the presence and absence of CIs. The strongest decline in customer share due to a CI occurs when both service satisfaction and past customer share already are low. This finding may be attributed to two effects: First, in a situation in which a CI has occurred, inertia is low for customers who have a low customer share. Therefore, these customers will lower their customer share or even consider a complete switch. Second, low service satisfaction ratings affect current customer share for this group of customers. These two effects mean that these customers are influenced most strongly by the occurrence of CI. When previous customer share is high, the decline in customer share due to CI is less pronounced for customers with low satisfaction levels because a high level of inertia exists among customers with a high customer share, regardless of whether they experienced a CI.

If past customer share is low and service satisfaction and price satisfaction are high, the negative effects of CI are mitigated by the favorable satisfaction ratings, so customer share remains virtually the same in both the presence and the absence of CI. Thus, the supplier does not gain customer share, despite customers' favorable evaluations of their satisfaction.

The most notable result appears among customers with high past customer share and favorable evaluations of the overall service and the price. For this group of customers, customer share is higher when a CI occurs than in the absence of a CI, possibly because of the updating process that CIs trigger. During the updating process, the customer takes satisfaction into account, and if these evaluations are favorable, they positively affect customer share. Thus, negative CIs can have positive consequences for the supplier. However, the pitfall of this argument lies in the necessary condition that both service and price satisfaction be high, even though a CI has occurred.

To investigate further the counterintuitive result pertaining to the higher current customer share of satisfied customers with a high past customer share who experienced a CI compared with those who did not, we take a closer look at our sample and, in particular, firms in the high-satisfaction, high-past-customer-share condition.[8] In 111 cases, a high service satisfaction (≥5 on the seven-point scale) coincides with a high (≥5) past customer share, and in 44 of these cases, a CI occurred. Average current customer share of customers who experienced a CI is .12 points higher than that of customers who did not. As we pointed out previously, customer share decreases in the whole sample over time, but the average decrease in current customer share of customers who experienced a CI is .14 points lower than that of customers who did not. What could be the reason for this effect? Unfortunately, we can only speculate. When we examine the firms in question, we find a somewhat higher satisfaction with service recovery among satisfied customers with a high past customer share (for all respondents who experienced a CI, 4.55 versus 3.62, respectively). Thus, it might be a service recovery effect, but because service recovery fails to reach a satisfactory level of significance in our model, this reasoning remains highly speculative. Another possibility could lie in the nature of the CI. If we examine the companies with a high service satisfaction (≥5 on the seven-point scale) and a high past customer share, we find that firms that report problems that are rather long-term are more likely to reduce their customer share than firms that report CIs that are rather short-term. However, both groups still decrease their customer share to a lesser extent than customers who did not experience a CI. An alternative explanation could be company size and, related to this, transaction volume. If a company has many transactions with the service provider, a negative CI can be just one bad experience among many good experiences. If we compare the companies in the high-satisfaction/high-share-condition that experienced a CI with those that did not, we indeed find a higher proportion of "A" customers according to the logistics company's own classification in the former sample than in the latter (39% versus 29%). However, we do not find much difference in company size between the two groups.[9] Still, this could partly explain our counterintuitive results.

Discussion

Overall, we find support for six of our ten hypotheses and partial support for three of them. The most important findings are as follows:

- Overall, service satisfaction undergoes a stronger update if a CI occurs.
- If and only if a CI occurs, customer share is significantly affected by service and price satisfaction.
- The occurrence of a CI influences the presence and nature of nonlinear relationships.
- Critical incidents can have a positive effect on customer share among satisfied customers who have maintained a high share with the supplier in the past.

Satisfaction Formation

For customers who experienced a CI, a stronger updating process takes place, with current attribute evaluations being weighted more heavily. This tendency holds in particular for low satisfaction scores of the attribute categories in which many CIs occurred—in our case, transport-related attributes. The negative effects of CIs are mitigated when past service satisfaction is high because carryover effects of past service satisfaction occur for high satisfaction ratings only. This finding implies that very satisfied customers are more forgiving than less satisfied customers, which con-

[8]We also assess whether the results differ when multiple CIs occurred. If multiple CIs occurred, service satisfaction is lower in all four conditions, which translates into a somewhat lower customer share in the presence of multiple CIs (low satisfaction/low past customer share = 1.56; low satisfaction/high past customer share = 3.96; high satisfaction/low past customer share = 2.34; high satisfaction/high past customer share = 4.74). However, the main conclusions derived from Table 5 remain the same for customers who experienced multiple CIs.

[9]The company size classifications are taken from the database AMADEUS.

firms our theory that defensive processing mechanisms subject positive experiences to greater carryover effects.

Service satisfaction of customers who did not experience a CI forms in a more cumulative way, with past service satisfaction being the most important determinant. For this group of customers, lower overall service satisfaction ratings are subject to stronger carryover effects than higher ratings, in line with prospect theory and the general negativity effect (Mittal, Ross, and Baldasare 1998). Thus, a remarkable impact of CI is that it reverses the nonlinearities in the relationship between past and current service satisfaction.

Price satisfaction formation bears similarities to the formation of service satisfaction, including the differences between customers who experienced a CI and those who did not. The carryover effects are smaller when customers experienced a CI, except for very high price satisfaction ratings.

Customer Share Formation

The link between satisfaction and loyalty differs significantly between the two groups of customers. The current customer share of customers who did not experience a CI is determined almost exclusively by the past customer share they provided the supplier, which mirrors previous research that indicates that in B2B markets, customer satisfaction may be related only weakly to customer loyalty (Narayandas 2005). However, this finding does not hold if a CI occurs, because for customers who experienced a CI, current service satisfaction and price satisfaction are relevant determinants of their current customer share.

Our results deviate from those of Gustafsson, Johnson, and Roos (2005), who could not detect any effects triggered by a CI, a result they ascribe to the relatively short observation period (nine months) of their study. Furthermore, only 10% of their respondents actually experienced a reactional trigger, perhaps because the service area they selected for their empirical study, consumer telecommunications services, usually does not involve much interaction with the service provider. However, in the area of professional logistics services, interactions with service providers take place regularly and frequently, providing ample occasions for CIs. In addition, a service failure can disrupt a firm's operations and thus entails potentially greater financial consequences than consumer telecommunications services. Moreover, we study customer share instead of customer retention and acknowledge that leaving a firm in response to a CI may represent a drastic step, though decreasing business with a supplier happens far more easily. Customer retention is also affected by many other factors that go beyond customer satisfaction (e.g., commitment to the supplier).

Unlike previous studies, we find nonlinearities in the relationship between past and current customer share. For both groups of customers, the effect of past customer share on current customer share is significantly greater for higher customer shares, which appears to be an intuitive result. However, for customers with low customer shares who experienced a CI, there are no carryover effects, which suggests that inertia serves as a barrier against a potential drop in customer share due to a CI only if customer share is sufficiently large.

For customers who experienced a CI, we also find that only low service satisfaction ratings influence customer share. This finding mirrors those of other studies (e.g., Agustin and Singh 2005; Mittal and Kamakura 2001; Mittal, Ross, and Baldasare 1998) but contrasts with that of Bowman and Narayandas (2004), who also employ a B2B setting and study customer share as the dependent variable. We can only speculate about the reasons for this divergence, but the most obvious is that we account for the occurrence of CI, which Bowman and Narayandas do not. For example, if a CI occurs, customers may become especially sensitive to negative aspects of the service.

Unfortunately, the role of service recovery remains unclear. We fail to find a significant impact of satisfaction with service recovery in our model, possibly because evaluations of service recovery are implicitly included in attribute and overall satisfaction ratings. Still, from a theoretical point of view and in light of previous evidence, service recovery should be an important determinant of service satisfaction and customer share when a CI occurs.

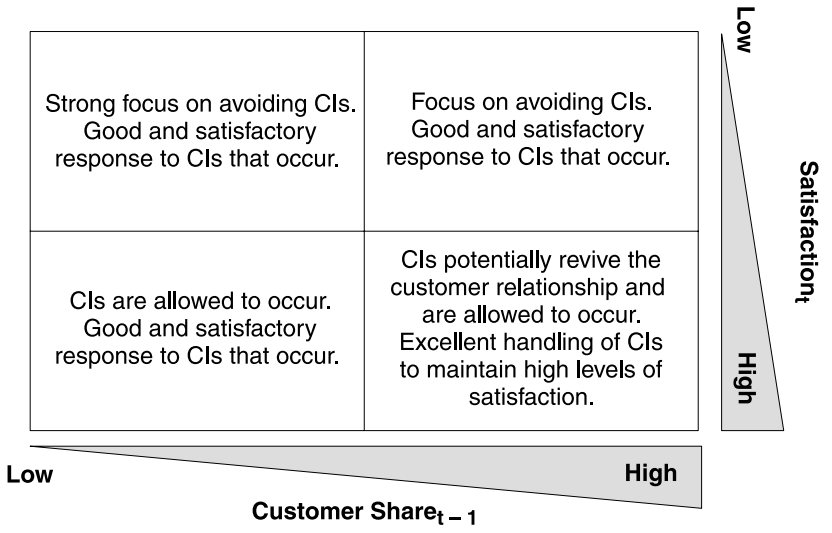
Management Implications

We offer some important implications related to managing customer relationships in business markets. First, managers should be aware that CIs affect customer relationships by triggering stronger updates, which move customers from a business-as-usual mind-set to a deeper reconsideration of the relationship. Therefore, managers should pay special attention to customers who recently experienced a CI and carefully resolve those CIs to enhance satisfaction evaluations, which may transform into customer loyalty.

Second, many previous recommendations tell managers to minimize the number of CIs, but our results suggest a more differentiated approach, in which managers address CIs differently depending on the customer relationship quality in terms of satisfaction and customer share. In Figure 3, we derive recommendations for relationship management strategies with respect to CIs on the basis of our calculations in Table 5. The relationship strategy should differ between cells; in some cases, CIs should be minimized, but in others, they may have a positive impact on a relationship. For satisfied customers with a high customer share, CIs might intensify the relationship. However, deliberately triggering negative CIs to increase customer share is not without risks. Crucially, both service satisfaction and price satisfaction must be high, despite the CI, which demands an excellent service recovery by the supplier. Still, a negative occurrence, such as a CI, can have a positive impact on the relationship with a customer. Thus, a service provider should be aware of the potentially relationship-reviving effect of CIs to make the most of these potentially positive effects.

Our recommendations are based on a single study in a specific industry. However, our study demonstrates that firms should try to understand the impact of CIs on their relationship with customers to infer whether they might use

FIGURE 3
Recommended Relationship Management Strategies for CIs



these incidents as instruments to intensify their customer relationships.

Limitations and Directions for Further Research

Our study suffers from several limitations, which simultaneously point to fruitful avenues for further research. First, our research is based on three years of data, which limits our analysis with respect to longer-term effects of CIs. Second, we base our study on satisfaction evaluations of only one company. Although the B2B relationships analyzed herein appear typical for long-term relationships, it would be worthwhile to know whether our results generalize to other contexts as well. In particular, additional research might determine whether the stronger updating processes for customers who experienced a CI also emerge in a consumer context.

Third, we assume that the respondent's customer satisfaction reflects the organization level, which is reasonable because we interview key decision makers appointed by the company's sales staff. However, especially in larger companies, a decision-making unit with multiple employees might make supplier choices, in which case it would be preferable to survey multiple decision makers. However, this approach represents an extensive exercise in a longitudinal research study and would probably reduce the number of usable observations over time. As another potential complication, our model might differ between firms that employ only one decision maker and those that use multiple decision makers. Therefore, additional research should consider this issue.

Fourth, we conceptualize negative CIs as one general category, though CIs may differ in terms of content, severity, and sequence (e.g., Maxham and Netemeyer 2002). Further research might investigate in more depth how specific groups of CIs moderate the studied relationships.

Fifth, because we use a longitudinal design and strive for a sufficiently large sample, we use single-item measures. Although recent results regarding the predictive validity of single-item measures are good (Bergkvist and Rossiter 2007), justifications for their use in scientific marketing research remains a continuous debate (e.g., Rossiter 2002).

Sixth, we measured customer share with self-reports, though data from a customer database or survey data on buying behavior in the market would provide more objective measures (e.g., Verhoef 2003). Because the study firm did not have a sophisticated database with up-to-date revenues for each year and was not informed about the total transport volume of its customers, our approach offers the best measure available. According to the company's sales staff, the decision makers we surveyed are highly informed, and their assessments should be close to the actual customer share, but further research should study more objective loyalty measures. Related to this issue, our customer share measure contains categories, which means that we cannot assess finer changes in customer share (e.g., from 50% to 54%). Such a measure would be possible with more objective data. Furthermore, it would have been informative to know whether other supplier relationships had changed within the period under study.

Seventh, although the 3SLS estimator can deal with the correlation of the disturbances and endogeneity, it does not account for the panel data structure of some of our data. We leave the issue of how panel data estimators for simultaneous equation models (e.g., Baltagi 1981) can be adapted to very short and unbalanced panels, as in our case, for further research. Finally, additional research could investigate how the occurrence of CIs affects other measures used in the context of customer relationship management, such as customer profitability or customer lifetime value (e.g., Rust, Lemon, and Zeithaml 2004).

APPENDIX

A: Scale Descriptions

Scale	Item	Source	Categories
Service satisfaction	How satisfied are you with the overall performance of company xy?	Adapted from Dubé and Morgan (1996)	Scale from 1 ("not at all satisfied") to 7 ("completely satisfied")
Transport-related attributes	How satisfied are you with the transport-related attributes?		
Interaction with the sales agent	How satisfied are you with the interaction with your sales agent?		
Handling and billing	How satisfied are you with the handling and billing?		
Price satisfaction	How satisfied are you with the price charged for the overall performance?	Bolton and Lemon (1999)	
Service recovery	How satisfied are you with the way in which your problem was handled?	Adapted from Smith, Bolton, and Wagner (1999)	
Customer share	How large is the share of company xy with respect to the total volume of traffic of your company?		<10%, 10%–20%, 20%–30%, 30%–40%, 40%–60%, and >60%

B: Correlations

	$Servsat_t$	$Servsat_{t-1}$	Transport-related $attributes_t$	Transport-related $attributes_{t-1}$	Interaction with the $sales\ agent_t$	Interaction with the $sales\ agent_{t-1}$	Handling and $billing_t$	Handling and $billing_{t-1}$	$Price_t$	$Price_{t-1}$	$Cshare_t$	$Cshare_{t-1}$
$Servsat_t$	1.00											
$Servsat_{t-1}$	.43***	1.00										
Transport-related $attributes_t$	.71***	.39***	1.00									
Transport-related $attributes_{t-1}$	.40***	.72***	.48***	1.00								
Interaction with the $sales\ agent_t$	.53***	.30***	.46***	.28***	1.00							
Interaction with the $sales\ agent_{t-1}$	.25***	.48***	.21***	.42***	.45***	1.00						
Handling and $billing_t$	.54***	.33***	.50***	.30***	.42***	.18***	1.00					
Handling and $billing_{t-1}$	.31***	.54***	.29***	.49***	.21***	.41***	.47***	1.00				
$Price_t$	.55***	.31***	.43***	.24***	.40***	.16***	.39***	.25***	1.00			
$Price_{t-1}$	.30***	.52***	.23***	.44***	.25***	.36***	.19***	.35***	.41***	1.00		
$Cshare_t$	.10**	.06	.05	.05	.09**	.11**	.00	.01	.11***	.07*	1.00	
$Cshare_{t-1}$	.06	.10**	.03	.08*	.08*	.07*	.00	.05	.12***	.03	.72***	1.00
For Respondents Who Experienced a CI												
$Recov_t$	.48**	.18**	.61**	.27**	.33**	.11	.41**	.26**	.26**	.17**	.05	.03

*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

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