

An empirical test of the drivers of overall customer satisfaction: evidence from multivariate Granger causality

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Abstract

Purpose – The purpose of this paper is to investigate whether customer-perceived service quality and expectation of service quality have causal impacts on overall customer satisfaction.

Design/methodology/approach – Data on all the variables were elicited from the American Customer Satisfaction Index (ACSI), and these were analyzed using the Granger causality method.

Findings – Satisfaction and perceived quality were positively related. Even though perceived quality did not Granger-cause satisfaction in the short term, it did so in the long term. Likewise, even though satisfaction did not Granger-cause perceived quality in the short term, it did so in the long term. But customer expectations Granger-caused both satisfaction and expectation in the short-term and the long term.

Research limitations/implications – The findings are based on only one company. Extrapolation to other companies demands caution and the data may not satisfy asymptotic assumptions.

Originality/value – The study contributes to the literature by advising managers to extend their customer satisfaction tracking to overall customer satisfaction with its strategic implications.

Keywords Management strategy, Customer satisfaction, Expectation, Quality

Paper type Research paper

An executive summary for managers and executive readers can be found at the end of this article.

Importance of the study

Customer satisfaction (CS) is increasingly becoming a corporate strategy (Reichheld and Sasser, 1990; Rust and Zahorik, 1993), the bedrock of business success (Drucker, 1973), the cornerstone of relationship marketing and management (Claycomb and Martin, 2002), and the influencer of organizational competitive advantage (Anderson *et al.*, 1994). Under the rubrics of defensive marketing strategy (Fornell and Wernerfelt, 1987, 1988), the importance of CS has been underscored by business practitioners. Empirically, recent research supports the notion that there is a positive relationship between CS and corporate financial performance (see; e.g. Reichheld and Sasser, 1990; Rust and Zahorik, 1993; Anderson *et al.*, 1997).

Related to this, an influential work by Anderson *et al.* (1994, p. 63) on the Swedish Customer Satisfaction Index, concluded that “firms that actually achieve high customer satisfaction also enjoy superior economic returns.”

Overall, previous research suggests that higher levels of customer retention rates can be achieved through higher levels of customer satisfaction rates, which in turn leads to increased corporate economic performance in a number of firms in different industries (e.g. Hogan *et al.*, 2003; Reichheld and Sasser, 1990). Despite this, the extant knowledge of the variables that mediate the link between CS and corporate profitability remains scanty (Szymanski and Henard, 2001). A similar conclusion is reached with regard to those linking CS to other marketing constructs (Jones and Sasser, 1995). Regrettably, the interrelationships among these intangible constructs have received inadequate empirical attention (Reichheld and Sasser, 1990; Jones and Sasser, 1995). From previous studies we know that some studies find that higher levels of CS lead to higher levels of customer loyalty (see; e.g. Anderson and Sullivan, 1993; Fornell, 1992; Bolton and Drew, 1991a, b; Oliver and Swan, 1989a, b),

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which in turn has a positive impact on corporate profitability (Reichheld and Teal, 1996).

What remains unclear is whether or not higher levels of customer perceived quality (PQ) and customer expectation (XP), lead to higher levels of customer overall satisfaction (CS), which in turn should have a positive impact on corporate profitability (Reichheld and Teal, 1996). Specifically, we do not know whether customer perceived quality (PQ) and expectation (XP) are causally linked to customer overall customer satisfaction when a different causality method involving time series data, is used. To this end, this paper employs a different causality method called Granger causality to investigate this theoretically grounded causality tests. The Granger causality method is discussed in subsequent sections of this paper. Nonetheless, we stress that the primary purpose of the paper is not on Granger methodology per se, but on substantive results based on that methodology. This is especially important because the extant literature in this area ignored the type of causality proposed by this methodology, thus exposing a gap in the empirical literature. Therefore, this study attempts to extend current knowledge in this area by examining whether PO and XP are causally linked to CS in the framework of multivariate Granger causality with co-integrated time series data on these variables.

Finally, even though empirical investigation of the causal impact of PQ and XP on CS is a worthy area of research according to marketing scholars (e.g. Yi, 1991; Fornell *et al.*, 1996; Johnson *et al.*, 1995), they conclude that many issues still remain unresolved. We believe that the use of diverse methods to probe the theorized causal link of PQ and XP on CS may provide a vital insight into some of the unresolved empirical issues in this area. Consequently, the present study was designed to investigate whether perceived service quality (PQ), customer expectation of service quality (XP) had causal impact on overall customer satisfaction (CS), using time series data in multivariate Granger (1988) causality method. Against the backdrop of the preceding discussion, the following research question was investigated.

Research question

Do customer perceived quality (PQ) and customer expectation (XP) have causal impacts on overall (cumulative) customer satisfaction (CS)?

In many ways, our study differs from previous research in this area.

Substantively, the bulk of the previous research on customer satisfaction and its drivers focused mainly on:

- individual level customer satisfaction with a specific product or service (Yi, 1991); and
- on transaction-specific one-time customer satisfaction experience.

As a consequence, there is paucity of research focusing on “aggregate satisfaction of those who purchase and consume a particular [service] product offering (e.g. Ford Escort owners or Federal Express user)” (Johnson *et al.*, 1995, p. 695). Since the bulk of the empirical works on customer satisfaction is on the transaction-specific strand (Yi, 1991), there is ample opportunity for more comprehensive study on the subject. The cumulative satisfaction strand is relatively a neglected research area in spite of its current and long-term strategic

importance to managers (Johnson *et al.*, 1995). Hence, to contribute towards filling this gap, our study focused on aggregate market-level data as well as on overall (cumulative) data on PQ, XP and CS in the fast food industry.

Methodologically, to our knowledge previous research has not used multivariate Granger (1988) causality in co-integrated variables to examine if PQ and XP Granger-cause CS. Because Granger causality tests are temporal causality, it is the appropriate method to address this research question. It is important to note that structural causality involving path diagrams of causes and effects in non-experimental data (Bentler, 1980), will be less appropriate because it does not ascertain temporal occurrence of variables, but Granger causality does. Hence, in this paper, the use of Granger causality as opposed to structural equation methods is also in line with past studies calling for more research on causal ordering between service quality and customer satisfaction, and “This issue has been the subject of much debate in the marketing literature” (Dabholkar and Overby, 2005, p. 14). Equally important is the fact that multivariate Granger (1988) causality method is a superior test of causality than the traditional Granger (1969) method, the former examines more sources of causality than the latter. In this way, our study offers a more rigorous investigation of whether PQ and XP Granger-cause CS, and hence it makes a methodological contribution since it shows “how to better extract and manipulate information from numeric data” (Shugan, 2002, p. 370).

Academically, unlike other disciplines (e.g., economics and management) that have contributed to modern business strategy, marketing’s contribution to business strategy “has been marginalized (Homburg *et al.*, 1999)” (Hunt and Lambe, 2000, p. 18). By positioning our study in strategic marketing, it is hoped that the contribution of this study will help reduce the marginalization of marketing’s contribution to modern business strategy.

Managerially, this study makes the case for managers to go beyond transaction-specific customer experiences when tracking of customer satisfaction. Managers should monitor “both overall [cumulative] satisfaction with the service provider as well as satisfaction with a particular encounter” (Jones and Suh, 2000, p. 155). Similarly, when managerial interest centers on finding the temporal (which comes first in time) occurrence of the drivers of overall customer satisfaction, they should appeal to Granger causality method discussed below.

Development of hypotheses

Customer satisfaction

Admittedly, customer satisfaction (CS) is an important construct to managers, consumer groups, and the academia (Oliver, 1999). However, the extant literature on CS diverges into two opposite streams (Szymanski and Henard, 2001). These two streams are the transaction-specific strand and the cumulative (overall) strand (Yi, 1991). The transaction-specific approach conceptualizes CS as an emotional response of the consumer to the most recent transaction experience with an organization (Oliver, 1993). Under this approach, the associated response occurs at a specific point in time following the consumption experience. In this cross-sectional approach, the affective response from the consumer is a direct function of the situational variables operative at the time.

In contrast, the cumulative (overall) perspective sees CS not as a one-point-in-time phenomenon but a cumulative evaluation involving a linear combination (summation) of satisfaction experiences associated with specific products (services) and some facets of the firm. Among others, Parasuraman *et al.* (1988) and Cronin and Taylor (1992) conceptualize cumulative satisfaction as being primarily driven by perceived service quality. An excellent definition of overall (cumulative) satisfaction is “the consumer’s overall dis/satisfaction with the organization based on all encounters and experiences with that particular organization” (Bitner and Hubbert, 1994, pp. 76-7). Hence, there is a unique difference between transaction-specific satisfaction and overall satisfaction. In the latter case, for a example, a customer of Pizza Hut may not be satisfied with a one-time transaction-specific pizza delivery but will be satisfied overall with the sum total of pizza delivery by Pizza Hut over a long time experiences.

Another recent literature sees cumulative satisfaction as a moving average (MA) process whereby a consumer’s past and present satisfaction evaluations are conceptualized as a trajectory of consumption experiences incrementally being updated over time (Jones and Suh, 2000). In this conceptual framework, a longitudinal time series data set seems apt to capture the cumulative information present in the cumulative satisfaction approach. Thus, this paper attempts to capture this rich cumulative information which is strategically critical for competitive advantage among organizations (Hogan *et al.*, 2003). Unfortunately, however, only a trickle of the cumulative strategic information embedded in cumulative satisfaction is available to managers and academics because empirical works on cumulative satisfaction is still meager (Yi, 1991). Work by Smith and Bolton (2002) suggests the same conclusion. Again, this study attempts to fill this gap.

Linking perceived service quality to customer satisfaction

Since the conceptualization of service quality as distinct from customer satisfaction varies across disciplines (Anderson *et al.*, 1994, p. 54), we must first define service quality before we turn to its importance. The present paper follows Zeithaml (1988, p. 3) to conceptualize customer perceived quality as a global (summative) overall judgment of a product (service) during a moment of truth, where the moment of truth refers to the exact time when the customer decides whether he/she is satisfied or dissatisfied with the service or product. Put differently, service quality is determined by how well customers’ needs are met and/or customers’ quality expectations are exceeded (Lewis and Booms, 1983). The outcome of the moment of truth is critical to managers of restaurants in particular because if customers perceive quality in the services they receive, the company’s economic performance will be positively impacted (Grönroos, 1990). Therefore, perceived service quality deriving from the moment of truth is a critical determinant of a company’s economic success (Parasuraman *et al.*, 1988; Grönroos, 1990). In the same vein, a stream of empirical works suggest that superior service quality leads to competitive advantage (e.g. Morris and Westbrook, 1996; Easingwood and Mahajan, 1989), and hence a critical factor for business success as past research indicates (Zeithaml *et al.*, 1996; Boulding *et al.*, 1993).

In this way, firms that provide superior quality have satisfied customer bases who in turn provide them with greater economic returns (Anderson *et al.*, 1997; Bolton, 1998; Anderson *et al.*, 1994). It has long been stated that managers should strive to understand and influence customer satisfaction by understanding and influencing customer expectations (Anderson, 1973). In contrast, if customers do not perceive quality in their service experience evaluations, the likelihood of dissatisfaction and complaints will increase. Consistent with the preceding analyses, customer satisfaction and perceived service quality are expected to be directly and positively related. Hence, the following hypotheses:

- H1. Customer satisfaction and customer perceived service quality will be positively related in the long term.
- H2. The positive relationship between customer satisfaction and perceived quality suggests that perceived quality would Granger-cause customer satisfaction.
- H3. Customer satisfaction will Granger-cause customer perceived quality.

Customer expectations of service quality

Because customer expectations are critical for customer satisfaction judgment (Oliver, 1997), empirical interest centers on how customer expectations that are constantly changing especially in a service setting (Solomon *et al.*, 1985), impact overall (cumulative) customer satisfaction. Specifically, in a service setting characterized by heterogeneity of service encounters (Peters *et al.*, 1995), negatively disconfirmed expectations should negatively impact customer satisfaction judgment. This view is in line with the adaptation theory (Helson, 1964) which offers a conceptual anchor (Oliver, 1981) for this reasoning.

Understandably, the importance of customer expectations cannot be ignored by managers. This statement is consistent with Oliver (1997, p. 68) who argues that “the expectation, not the need, is what consumers bring to the purchase.” Claycomb and Martin (2002, p. 617) agree with Oliver (1997) that “customers do not generally purchase services, per se, but promise of services”. Thus, to the extent that promises lead to expectation, expectations should be related to customer satisfaction. This analysis is consistent with the observation that in three out of five places, expectation is linked to satisfaction (Oliver, 1997). In the particular case of restaurant customers, the ex ante belief by restaurant customers that the forthcoming services from the restaurant operator would be good or bad, is the expectation (working hypothesis) which they hold. Then, the moment of truth is the actual consumption experience, and that is the anchor customers use to revise their expectations about future services.

Similarly, work by Brickman (1972) showed that customers revise their expectations based on prior disconfirmed expectation information. That is, if expectations are positively disconfirmed, customers are satisfied and they revise their next purchase expectations upwards. On the other hand, if expectations are negatively disconfirmed it may result in customers’ dissatisfaction and downward adjustment of their expectations for the next purchase (Anderson and Sullivan, 1993). Following this reasoning, this study hypothesizes that the relationship between the customer satisfaction and customer expectation may be negative for

some reasons. First, even when expectations are met, customers may still experience negative effect as would be the case when customers believe that if they had chosen alternative service providers they would have gotten a better deal than they presently have (Taylor, 1997; Inman *et al.*, 1997), and thus their satisfaction and expectation will be negatively related in the long term. Second, the theory of “Forward-looking expectation” (Fornell *et al.*, 1996, p. 9) positing a long term perspective, argues that customers’ expectations are subjective forecasts whereby customers’ consumption experiences in time t are used by them to make subjective forecasts about the capability of the service provider to satisfy them in time $t + 1, t + 2, \dots, t + n$ to the long term. In the framework of this long term perspective, a firm with a market history of negatively disconfirmed expectations will have the trajectory of its expectations being negatively related to customer satisfaction over the long term.

Similar analysis by Clow and Vorhies (1993) argued that long term success of service firms is directly related to the extent that managers strategically manage customers’ expectation. On the other hand, from the standpoint of “the forecast component of expectation” theory (Anderson *et al.*, 1994, p. 56), one can conjecture that, if and only if, consumers’ subjective forecasts of future quality of services turn out to be actually poor quality, then expected quality (expectation) and customer satisfaction will be negatively (inversely) related so that it reflects the market’s accumulated information about the service provider’s poor quality (Anderson *et al.*, 1994). Does this analysis apply to this paper? If it does, it remains to be seen because the data will speak to itself.

Ideally, however, it is well known that satisfaction is dependent on positive disconfirmation of quality as opposed to negative disconfirmation. On the other hand, if the data generation process (DGP) in a particular study reveals that consumers did not experience improvements in quality but rather experienced deterioration in quality over time, the expectations of quality and customer satisfaction will be inversely (negatively) related. In the meantime, the preceding discussion suggests the following hypotheses.

- H4. In the long term, there will be a negative relationship between customer satisfaction and customer expectations.
- H5. Customer expectations will Granger cause customer satisfaction.
- H6. Customer expectations will Granger cause customer perceived quality

Methodology

Data and the unit of analysis

A national fast food restaurant chain is the unit of analysis of this study largely because previous research ranks restaurants as number one in terms of frequency of complaints resulting from customer dissatisfaction (Tax *et al.*, 1998). The data were generously donated to us by University of Michigan School of Business under a binding anonymity contract. Fornell *et al.* (1996) provide a detailed discussion of the data. Finally, the data were quarterized from 1994Q1 to 2003Q4, and logged.

Measurement of cumulative customer satisfaction

In this study, the overall (cumulative) customer satisfaction is measured by the American Consumer Satisfaction Index (ACSI), a national consumer survey which has been used in previous studies and Fornell *et al.* (1996) provide details. The following salient points about ACSI should be noted. From the ACSI perspective, customers’ satisfaction is conceptualized as a latent construct measured as “a weighted average of three survey ratings: (1) an overall rating of satisfaction; (2) the degree to which performance falls short of or exceeds expectations; and (3) a rating of overall performance relative to the customer’s ideal good or service in the category. The three measures provide a highly reliable and stable index of satisfaction.” (Johnson *et al.*, 2002). As a latent score of satisfaction, the ACSI is an “indicator of the firm’s past, current and future performance” which can be compared across firms, industries, sectors and nations (Fornell *et al.*, 1996, p. 8).

Measurement of customer expectations

From the ACSI perspective, customer expectations are measured by asking respondents to recall “the level of quality they expected on the basis of their knowledge and experience with a good or service” Based on this basic question, responses are elicited from the respondents on the following questions:

- overall expectation;
- expectations regarding customization; and
- expectations regarding reliability.

From these responses, an index of customer expectations is constructed (Fornell *et al.*, 1996, p. 10).

Measurement of perceived service quality

In the framework of the ACSI theory and data employed in this paper, perceived quality is explicitly stated as the first determinant of cumulative customer satisfaction, “which is the served market’s evaluation of recent consumption experience, and is expected to have a direct and positive effect on overall customer satisfaction.” (Fornell *et al.*, 1996, p. 9). Thus, ACSI measures perceived quality based on “two primary components of consumption experience: (1) customization, that is, the degree to which the firm’s offering is customized to meet heterogeneous customer needs, and (2) reliability; that is, the degree to which the firm’s offering is reliable, standardized, and free from deficiencies.” (Fornell *et al.*, 1996, p. 9). Responses elicited from these two questions were used to compute the perceived customer quality index, according to the ACSI documentation (Fornell *et al.*, 1996).

Analyses

Order of integration

Because the data for this study are time series, our presumption was that customer satisfaction (CS), perceived quality (PQ), and expectation (XP), must be non-stationary (unit root) processes (see, e.g. Enders, 2004; Arize *et al.*, 2002; Engle and Granger, 1987). As such, their means, standard deviations and zero order correlation will not be so insightful because these statistics are time dependent. Second, the specific econometric method used in this paper is co-integration and error correction (ECM) methods. By co-integration, we mean long-term relationship among the variables (CS, PQ and

XP). By ECM we mean short-term relationship among the same variables (CS, PQ and XP). To save space, a detailed discussion of these methods is left out in this paper. The interested reader can consult the reference cited. Finally, a precondition for co-integration (long term) analysis is to test for the order of integration of the above variables. To this end, we employed the augmented Dickey and Fuller (1981) method. The results are presented in Table I.

The evidence in Table I suggests that the null hypothesis of no unit root could not be rejected ($p < 0.05$) for all the three variables on their levels. In contrast, when the same test was conducted on the first difference of all the variables, the null of unit root was rejected ($p < 0.05$), suggesting that the three variables are first-difference stationary denoted as I(1).

Conditional on the result that each of these variables is I(1), the standard practice is to proceed with co-integration (long term) analysis of the variables (e.g., Engle and Granger, 1987; Johansen and Juselius, 1990; Arize *et al.*, 2002). To this end, we employed Johansen and Juselius (1990) [hereafter, JJ] method, which is a system-based co-integration method. The JJ method uses two likelihood-ratio (LR) test statistics to report the number of co-integrating (long term) vectors among the three variables in this paper. These statistics are called the Trace and the Maximal eigenvalue (λ -max), both have approximate chi-square distributions. Because these statistics are asymptotically (large sample) valid, we followed the suggestion made by Reinsel and Ahn (1992) and Reimers (1992) to correct the JJ test statistics for finite-sample bias before comparing them with their asymptotic critical values. Specifically, the finite sample multiplied the JJ test statistics by the scale factor of $T - pk/T$, the result is labeled Modified Johansen in Tables II and III.

The result of the JJ method is enhanced when the lag order in the vector auto-regression (VAR) is empirically determined.

Table I ADF unit root tests

Series: level/first diff	ADF		Conclusion
	Without trend	With trend	
log CS Level First Diff.	-0.96 (2)	-1.81 (2)	I (1)
	-4.51* (1)	-4.59*(1)	I (0)
logXP Level First Diff.	-2.58 (1)	-2.70 (1)	I (1)
	-4.36* (1)	-4.31*(3)	I (0)
logPQ Level First Diff.	-1.35 (1)	-1.77 (3)	I (1)
	-4.30* (1)	-4.41*(1)	I (0)

Notes: * $P < 0.05$; () denotes argumentation lags selected using Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC). The critical value for the ADF is approximately -2.94 and -3.46 for level and first differences, respectively. CS is customer satisfaction, XP is expectation, and PQ is perceived quality

Source: MacKinnon, 1991

Table II Modified Johansen's unrestricted co-integration rank test results

Null	Alternative	L-max statistic	5 percent critical value	10 percent critical value
$r = 0$	$r = 1$	34.80	21.12*	19.02
$r < = 1$	$r = 2$	5.98	14.88	12.98
$r < = 2$	$r = 3$	0.39	8.07	6.50

Notes: * $p < 0.05$; L-max test indicates 1 co-integrating equation at 5 percent level of significance

In this paper, the lag order which yielded white noise error was based on information from the Sims' likelihood ratio (LR) test, Akaike information criterion, and the Ljung-Box statistics. With the lag order of the VAR ascertained, the non-stationary part of the data generating process (DGP) in the JJ method is known to be affected by the presence of a trend and/or constant term (e.g. Enders, 2004; Arize *et al.*, 2002). We followed Johansen (1995) to use the Pantula Principle to test the joint hypothesis of both the rank order and the deterministic components. Thus, our JJ VAR model has an unrestricted intercept and no trend (a preliminary test failed to admit seasonality ($\chi^2_{(9)} = 7.7$, $P = 0.56$) in the model. Studentized residuals revealed outlier observations (Hendry and Doornik, 1994), spike dummies equal to 1 for the focal observation and zero elsewhere, attempted to adjust for the outliers. Tables II and III present the co-integration results.

The estimated λ -max and Trace statistics (corrected with scale factor stated above) and their associated critical values test for the presence or absence of long-term relationship among customer satisfaction, expectation and perceived service quality. Taken together, the λ -max and the Trace statistics test the null hypothesis that there are at most r cointegrating vectors (≥ 0) and the alternative hypotheses are $r + 1$ and at least $r + 1$ for the λ -max and the Trace statistics, respectively.

Beginning with the λ -max, the results of the test suggest that the null hypothesis of no cointegration ($r = 0$) is rejected ($p = 0.05$) in favor of one cointegration ($r = 1$) vector because the computed test statistics is 34.8 which is greater than the critical values of 21.12, as shown in Tables II and III. Focusing on the Trace statistic, we obtained the same result because the null of no co-integration ($r = 0$) against the alternative hypothesis of $r \geq 1$ yielded computed statistic of 40.82 which is greater than the critical value of 31.54 ($p < 0.05$). All in all, we have evidence suggesting that CS, XP and PQ are co-integrated, and the co-integration rank is equal to one.

Given co-integration and its rank, a standard practice is to normalize the system of equations on the dependent variable so that the association between the variables as dictated by the underlying market forces, becomes clearer. By setting the estimated coefficient of customer satisfaction (CS) equal to -1 and dividing the co-integrating vector by the negative of the estimated CS coefficient, we obtained the normalized relationship shown below:

$$CS_t = 6.41PQ_t - 7.41XP_t$$

We have the following encouraging results. First, there is a positive relationship between overall customer satisfaction and customer perceived quality. Therefore, $H1$ is supported. Also, as can be seen above, the long-term relationship between customer satisfaction and expectation is inverse

Table III Modified Johansen's unrestricted co-integration rank test results

Null	Alternative	Trace statistic	5 percent critical value	10 percent critical value
$r = 0$	$r \geq 1$	40.82	31.54*	28.78
$r < = 1$	$r \geq 2$	6.38	17.86	15.755
$r < = 2$	$r = 3$	0.39	8.07	6.50

Notes: * $p = 0.05$; Trace test indicates 1 co-integrating equation at 5 percent level of significance

(negative). Therefore, H_4 is supported. To test the remaining hypotheses, we turn to Granger causality when the variables are co-integrated.

Granger (1988) causality in co-integrated variables

Econometricians agree that "The traditional concept for analyzing causation in time series is Granger causality." (Sander and Kleimeier, 2003, p. 175). However, Granger (1988) causality conditional on cointegrated $[I(1)]$ variables, differs from Granger (1969) causality in stationary $[I(0)]$ variables. According to Granger (1969), if the history (lags) of a weakly stationary variable X can be used to better predict another weakly stationary variable Y , conditional on all other relevant information, then X is a *prima facie* Granger-cause of Y . Stated another way, for a variable X to Granger-cause another variable Y , the information contained in the history (lags) of X should reduce the forecast error variance of Y , conditional on all other relevant information being accounted for. As in this paper, the lag order must be chosen by some criteria. Hence, this framework clearly states that structural equation modeling (Bentler, 1980) involving path-diagrams of causality in non-experimental design cannot be used for testing Granger causality because both focus on two different types of causality. The former focuses on structural causality and the latter focuses on temporal causality appropriate for the present study.

However, when the variables X and Y are co-integrated (unit root processes), as in this paper, the Granger (1969) method is inappropriate and should be replaced by Granger (1988) method. This latter method is used in this paper because CS , PQ and XP are co-integrated variables, as discussed above. Granger (1988) demonstrated that the causal impact of one variable on another variable takes place in two different channels within a vector error correction (VEC) model. One channel is through the impact of the lagged changes in the first difference of the regressors. The second channel is through the error correct term (ECT) which is the disturbance term generated from the long term co-integration estimation (see Arize, 1993). The ECT is a factor for correcting short-term divergences from long run permanent relationships between these variables. In this study, the VEC models estimated are embedded in Tables IV and V which contain the results of the VECs estimated.

Beginning with Table IV where the dependent variable is change in customer satisfaction (CS), the hypothesis that perceived quality (PQ) Granger-causes CS in the presence of the long term error correction term (ECT) lagged one period, is rejected. But, the ECT lagged one period is by itself significant. This allows the inference that, even though there is no causality from PQ to CS in the short term, in the long term there is causality running from PQ to CS since the ECT is significant. Therefore, H_2 is supported partially. On the other hand, evidence in Table IV suggests that the hypothesis

that customer expectation (XP) Granger-causes customer satisfaction (CS), is supported in the short term and long term. Therefore, H_5 is supported.

Turning to Table V where the dependent variable is change in customer perceived quality, the hypothesis that customer satisfaction (CS) Granger-causes customer perceived quality (PQ) in the presence of the long term (ECT) lagged one period, cannot be accepted. But, the ECT lagged one period is by itself significant implying the existence of long term causality. Therefore, H_3 is supported partially. This allows the inference that, even though there is no causality from CS to PQ in the short term, in the long term there is causality running from CS to PQ given the significant ECT. Finally, evidence in Table V also suggests that the hypothesis that customer expectation Granger causes perceived quality is supported in the short term and long term. Therefore, H_6 is supported.

Empirical results summarized

H_1 states that customer satisfaction (CS) and customer perceived quality (PQ) will be positively related. Evidence in the Johansen and Juselius (1990) long run normalization $[CS_t = 6.41PQ_t - 7.41XP_t]$ discussed above suggests that this hypothesis is supported. Turning to H_2 , it proposes that the positive relationship between customer satisfaction and perceived quality (PQ), would suggest that perceived quality (PQ) would Granger cause customer satisfaction (CS). Evidence in Table IV suggests that H_2 is supported partially because, even though perceived quality does not appear to Granger cause customer satisfaction in the short term, it does so in the long term given the significance of the error correction term (ECT). Next, H_3 proposes that customer satisfaction (CS) would Granger cause customer perceived quality (PQ). Evidence in Table V indicates that this hypothesis is partially supported because, even though CS does not appear to Granger cause PQ in the short term, it does so in long term given the significant ECT.

Next, H_4 proposes that in the long run there will be a negative relationship between customer satisfaction (CS) and customer expectation (XP). Evidence provided by the Johansen and Juselius (1990) long run normalization $[CS_t = 6.41PQ_t - 7.41XP_t]$ discussed above suggests that this hypothesis is supported. Next, H_5 predicts that customer expectation (XP) Granger causes customer satisfaction (CS). Evidence in Table IV indicates a support for this hypothesis in the short term, and in the long term given the significant ECT. Hence, H_5 is supported. Finally, H_6 proposes that customer expectation (XP) Granger causes PQ . Evidence in Table V indicates that XP Granger causes PQ in the short term and in the long term given the significant ECT. Hence, H_6 is supported. This result is line with previous research that found positive association between satisfaction and quality (Anderson and Sullivan, 1993).

Table IV Vector error correction (VEC) model: Granger-causality tests

Short run (standard) causality Granger-causality With long run (ect_{t-1}) term: ΔCS is Dependent Variable.				Panel B: Long run (ect_{t-1})	
<u>Hypothesis*</u>	<u>F-stat.</u>	<u>P-value</u>	<u>Result</u>		
PQ Granger-causes CS	$\chi^2_{(3)} = 1.07$	0.78	No	$ect_{t-1} = -4.15 (0.000)$	
XP Granger-causes CS	$\chi^2_{(3)} = 9.0$	0.03	Yes		
VEC Model Fitted $\Delta CS = \alpha_1 + \sum_{i=1}^3 \beta_{1i} \Delta CS_{t-i} + \sum_{i=1}^3 \beta_{2i} \Delta PQ_{t-i} + \sum_{i=1}^3 \beta_{3i} \Delta XP_{t-i} + \lambda_{ect-1} + \varepsilon_t \quad (1)$					
Notes: Reported F-statistics are Wald's for the joint hypotheses implied by eq. (1) above, testing whether lagged difference terms of either PQ or XP or CS, and the λ term have zero impact on CS, jointly. And, CS, PQ and XP are customer satisfaction, perceived quality and expectation, respectively. The ect_{t-1} is the error correction term generated from the JJ long term estimation, Δ is the first-difference of the focal variable. *Hypotheses are not stated in the null but in the alternative. β_{1i} is not reported for lack of theoretical reason why the dependent variable should Granger-cause itself, it only helped to control for serial correlation. $\bar{R}^2 = 0.41$, $SEE = 0.015$, $DW = 1.56$. Ramsey's RESET test for model mis-specification, $\chi^2_{(1)} = 1.85 (0.174)$. Heteroscedasticity $F(1,34) = 1.13 (0.3)$					

Table V Vector error correction (VEC) model: Granger-causality tests

Short run (standard) causality Granger-causality With long run (ect_{t-1}) term: ΔPQ is Dependent Variable.				Panel B: Long run (ect_{t-1})	
<u>Hypothesis*</u>	<u>F-stat.</u>	<u>P-value</u>	<u>Result</u>		
CS Granger-causes PQ	$\chi^2_{(3)} = 2.1$	0.54	No	$ect_{t-1} = -4.04 (0.000)$	
XP Granger-causes PQ	$\chi^2_{(3)} = 8.6$	0.03	Yes		
VEC Model Fitted $\Delta PQ = \alpha_1 + \sum_{i=1}^3 \beta_{1i} \Delta PQ_{t-i} + \sum_{i=1}^3 \beta_{2i} \Delta CS_{t-i} + \sum_{i=1}^3 \beta_{3i} \Delta XP_{t-i} + \lambda_{ect-1} + \varepsilon_t \dots (2)$					
Notes: Reported F-statistics are Wald's for the joint hypotheses implied by eq. (2) above, testing whether lagged difference terms of either CS or XP or PQ, and the λ term have zero impact on PQ, jointly. And, CS, PQ and XP are customer satisfaction, perceived quality and expectation, respectively. The ect_{t-1} is the error correction term generated from the JJ long term estimation, Δ is the first-difference of the focal variable. *Hypotheses are not stated in the null but in the alternative. β_{1i} is not reported for lack of theoretical reason why the dependent variable should Granger-cause itself, it only helped to control for serial correlation. $\bar{R}^2 = 0.40$, $SEE = 0.016$, $DW = 1.6$. Ramsey's RESET test for model mis-specification, $\chi^2_{(1)} = 1.2 (0.26)$. Heteroscedasticity $F(1,34) = 0.12 (0.725)$					

In sum, only in two cases do we have evidence of both short term and long term Granger causality, and strikingly both cases indicate causality running from customer expectations. First, we found that customer expectation (XP) Granger-causes customer satisfaction (CS) in the short term and in the long term. Second, we found that customer expectations (XP) Granger-causes customer perceived quality in the short

term and in the long term. Briefly stated, both cases underscore the importance of customer expectations in customer's purchase behaviors as Oliver (1997) and Claycomb and Martin (2002) echoed strongly. However, note that unlike Oliver (1997) and Claycomb and Martin (2002), our study uniquely used market-level aggregate data on overall customer satisfaction to corroborate the results of

these previous studies. We believe this is another unique contribution of our paper.

All in all, it appears that the results are robust because the residual diagnostics for each model as reported in each Table suggest that there are no serial correlation in the residual of the models, and no model mis-specification. Stability tests of the models fitted was performed but not reported here due to space limitations. The cumulative sum of recursive residuals (CUSUM) and the CUSUM of squares (Brown *et al.*, 1975), reveals no structural breaks during the sample period. We now turn to contributions of the paper.

Managerial implications and conclusions

Substantively, the study found evidence to conclude that CS and PQ are significantly positively related. This finding corroborates the conclusion made by Anderson *et al.* (1994, p. 56) that “several studies have shown that perceived quality affects customer satisfaction.” Second, the results suggesting that quality causes satisfaction over a longer period and not over a shorter period as revealed by time series data, represents one of the unique contributions of the paper. This result may open another channel through which quality and satisfaction may be separated as distinct constructs – a challenge for future research. To our knowledge, this study is the first to test whether perceived quality affects customer overall satisfaction using time series information and multivariate Granger causality in which customer expectation of service quality is a covariate.

Academically, unlike other disciplines (e.g. economics and management) which have contributed to modern business strategy, marketing’s contribution to business strategy “has been marginalized (Homburg *et al.*, 1999)” (Hunt and Lambe, 2000, p. 18). By positioning our study in strategic marketing, it is hoped that the contribution of this study will help to reduce the marginalization of marketing’s contribution to modern business strategy.

Methodologically, this study employed the rigorous Granger (1988) technique of causality to examine whether customer perceived quality (PQ) and customer expectations (XP) have causal impact on customer overall satisfaction (CS), using market-level data rather than individual-level data omnipresent in the extant literature.

Managerially, the finding that customer expectation (XP) of quality Granger-causes customer satisfaction (CS), is important. This suggests that market expectations of quality are a potent market force driving customer satisfaction. Put bluntly, the finding suggests that customers’ expectations are a potent force where managers should strategically invest their resources to affect customer satisfaction. This view is consistent with the recommendation made by Anderson (1973) that managers can best influence customer satisfaction by influencing customer expectations. And, Oliver (1997, p. 68) cemented this conclusion when he observed that “the expectation, not the need, is what consumers bring to the purchase.” Recently, Claycomb and Martin (2002, p. 617) took the same position from a relationship marketing perspective that what customers purchase is “promises of services.” However, note that if in the long term, customers expectations are not met, there will be a negative relationship between customer expectations and customer satisfactions under the conditions discussed earlier in this paper.

Managerially again, the study informs managers that they should not limit their tracking of customer satisfaction on transaction-specific customer experiences only. Instead, managers should monitor “both overall [cumulative] satisfaction with the service provider as well as satisfaction with a particular encounter” (Jones and Suh, 2000, p. 155). Similarly, when managerial interest centers on finding the temporal (which comes first in time) occurrence of the drivers of overall customer satisfaction, they should appeal to Granger causality method discussed above.

Overall, our prescription would be that the interests of managers in this firm (industry) will be better served if they deploy their assets strategically in order to restore or even exceed customer expectations, and never “overpromise” (Anderson *et al.*, 1994, p. 61). To this end, managers could use commercial communications (mass media), and strategic investments to build superior corporate reputation for meeting expectations. For example, previous research suggests that customers form their expectations of quality based on corporate reputation for quality (Landon and Smith, 1998), and strategic assets theory (Amit and Shoemaker, 1993) suggests that once such a reputation is formed it can be sustained (Dierickx and Cool, 1989). Future research should extend this investigation to other service industries. Such future efforts may find a way to mitigate the multicollinearity problem that forced us to drop disconfirmation from the list of covariates.

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Executive summary and implications for managers and executives

This summary has been provided to allow managers and executives a rapid appreciation of the content of this article. Those with a particular interest in the topic covered may then read the article in toto to take advantage of the more comprehensive description of the research undertaken and its results to get the full benefits of the material present.

The auto shop staff did not have the car ready when they said it would be, causing the customer to be late for an appointment. The pizza he had ordered later in the day was lukewarm. Not a good day for measuring his satisfaction ratings. However, he had been a customer of the same auto shop for quite a while and they had never let him down before, and the unappetizing pizza came as a surprise, as they had previously always been piping hot and delicious.

For marketers such an anecdote is not so much about the importance of keeping the customer satisfied (or failing to do

so), but also the effect of the customers' perceptions of what he or she expects.

And, to use the jargon, there is a unique difference between transaction-specific satisfaction and overall satisfaction. The transaction-specific approach conceptualizes customer satisfaction (CS) as the consumer's emotional response to the most recent transaction experience with an organization. It happens at a specific point in time following the consumption experience and the affective response from the consumer is a direct function of the situational variables operative at the time.

In contrast, the cumulative (overall) perspective sees CS not as a one-point-in-time phenomenon but a cumulative evaluation involving a linear combination (summation) of satisfaction experiences associated with specific products/services and some facets of the firm.

Vincent Omachonu's, William Johnson's and Godwin Onyeaso's paper attempts to capture this rich cumulative information which is strategically critical for competitive advantage among organizations. Unfortunately, however, only a trickle of the cumulative strategic information embedded in cumulative satisfaction is available to managers and academics because empirical works on cumulative satisfaction is still meager.

Omachonu, Johnson and Onyeaso ask: "Do customer perceived quality (PQ) and customer expectation (XP) have causal impacts on overall (cumulative) customer satisfaction (CS)?" and they make the case for managers to go beyond transaction-specific customer experiences when tracking customer satisfaction. Instead, managers should monitor both overall (cumulative) satisfaction with the provider as well as with a particular encounter.

Substantively, they found that CS and PQ are significantly positively related, corroborating previous study findings. Their second finding, that quality causes satisfaction over a longer period and not over a shorter period as revealed by time series data, represents one of the unique contributions of the paper. This result may open another channel through which quality and satisfaction may be separated as distinct constructs. To the authors' knowledge, this study is the first to test whether perceived quality affects customer overall satisfaction using time series information and multivariate Granger causality in which customer expectation of service quality is a covariate.

Managerially, the finding that customer expectation (XP) of quality Granger-causes customer satisfaction (CS), is important. It suggests that market expectations of quality

are a potent market force driving customer satisfaction. Put bluntly, the finding suggests that customers' expectations are the place where managers should strategically invest their resources to affect customer satisfaction.

This is consistent with the view that managers can best influence customer satisfaction by influencing customer expectations and other researchers' suggestion that "the expectation, not the need, is what consumers bring to the purchase." However, if in the long term, customers' expectations are not met, there will be a negative relationship between customer expectations and customer satisfactions.

When managerial interest centers on finding the temporal (which comes first in time) occurrence of the drivers of overall customer satisfaction, they should appeal to Granger causality method used in the study.

The interests of managers will be better served if they deploy their assets strategically in order to meet, restore or even exceed customer expectations, and never "over promise". To this end, managers could use commercial communications (such as the mass media), and strategic investments to build superior corporate reputation for meeting expectations.

After all, customer satisfaction is a corporate strategy whose importance has been variously described as being "the bedrock of business success", "the cornerstone of relationship marketing and management", and "the influencer of organizational competitive advantage". Firms that achieve higher customer satisfaction are predicted to have superior economic returns, and higher levels of customer retention can be achieved through higher levels of customer satisfaction rates. Hence the need to keep the spotlight on the variables that mediate the link between customer satisfaction and corporate profitability.

It has long been stated that managers should strive to understand and influence customer satisfaction by understanding and influencing customer expectations. But if customers do not perceive quality in their service experience evaluations, the likelihood of dissatisfaction and complaints will increase. Consequently, the expected direct and positive relationship between customer satisfaction and perceived service quality should be of concern to managers.

(A précis of the article "An empirical test of the drivers of overall customer satisfaction: evidence from multivariate Granger causality". Supplied by Marketing Consultants for Emerald.)

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